Application Number: EPR/HB3597TC/V002

The information enclosed is in response to a request for additional information, dated 13th November 2014, relating to the application by Green Waste Company (Abergavenny) Limited.

Responses related to comments, dated 13th November 2014, on the data submitted in support of the SSBRA and conclusion of the SSBRA:

Schedule. Item 1.

The SSBRA has been prepared based on four windrows running the full length of the new proposed hard standing area, as per original discussions with the site owner, thereby occupying the whole of the new area, minus space for roadways, etc. The submission accompanying the application proposed a different layout of windrows, using up to 15 smaller windrows within the same area. As our initial analysis has been based on the same volume of material present, it is envisaged that the bioaerosol release will be of the same order of magnitude as the assumptions detailed in our SSBRA and consequently we are of the opinion that the assessment remains valid. There is a theoretical risk that in using a larger number of smaller windrows, the greater surface area could potentially result in an increase in bioaerosol liberation. However, the potential impact that windrow size has on bioaerosol release is not well characterised at this time. Variability in waste composition, moisture content and meteorological conditions also compound our ability to fully ascertain the potential impact that windrow size may have on bioaerosol release. Essentially, the same tonnages of waste would be moved and this is considered as the most significant source of release. Bioaerosol emissions from static windrows (i.e. not being moved) have been shown to be considerably lower than active processes, being 2-3 log lower (Taha, 2006). Having said this, since the application was submitted, Enviresource Consulting Limited have revised the forecast maximum tonnage to 13,163 tonnes, with a total of up to 15 windrows, 12 on the new hard standing area and three on the existing working area. As the proposed tonnages of material to be moved have been reduced, our assessment of potential bioaerosol emissions is still applicable.

It is also worthy to note that the additional static windrows that would be created by the increased capacity at the site would be located on the new hard standing area. This lies 180m from the sensitive receptor, Maindiff Court cottages, at its closest point. There is therefore an increased separation distance between the proposed hard standing and Maindiff Court cottages, resulting in greater dilution of bioaerosol between the extension to the operational area and the sensitive receptor.

Schedule. Item 2.

We are pleased to note that the AQMRAT NRW team acknowledge that the 'Standardised Protocol' has been adhered to in our report documentation. We offer the following information in relation to the queries raised with the July 2013 report and the sampling for gram negative bacteria in the November 2013 report.

We recognise the limitations of the monitoring process stated in the standardised protocol and that this provides a snap shot of anticipated bioaerosols at the monitoring locations. These limitations are well documented and the methods of assessment are currently under review.

It is unfortunate that at the time of monitoring the changes in wind direction resulted in the monitoring location not being in the downwind location for a significant period for specific samples. Unfortunately, this is an unavoidable element of field sampling and assessment. Numerous sampling days have been postponed due to our assessment of the meteorological conditions on-site and every effort is made to provide a representative downwind assessment. Having said this, the monitoring conducted on 07th March 2014 and 15th September 2014 when the samplers were consistently downwind of the working area for the full sampling period provided the results in the tables below.

Table 1: Summary monitoring data from downwind location on 07th March 2014

Downwind.

Site: Maindiff Court Farm, Abergavenny — Site Operator: Mr Andrew Lewis

Sampling Date: 07/03/2014 — Commissioning Laboratory: Cardiff Met, Western Avenue, Llandaff, Cardiff

Estimated Mass of Material: — Type of Material Processed on site: Green Waste

Location:	Sampling Reference Number:	Difference from boundary of operational area or tuning / screening operation (m)	Difference in bearing location of samplers from boundary / source and mean direction wind blows to (o)	Sampling time: (hh:mm)	Sampling duration (min)	Microbial type	Site activity	Material processed	Calculated concentration of airborne micro-organisms (cfu m-3)	Arithmetic mean of parallel samples (cfu m-3)	Comments relating to any activities occurring during the sampling period that might affect the concentration of airborne micro-organisms
Downwind	AF DW 1	65.0	6	10.25	15	AF	Shredding green waste and forming windrow	Green waste	214	223	Potential sources of bioaerosol within 6m of monitoring location (wood, animal waste and harvested fodder beet).
Downwind	AF DW 2	65.0	6	10.25	15	AF			231		
Downwind	MB DW 1	65.0	12	10.44	15	MB			191	226	
Downwind	MB DW 2	65.0	12	10.40	15	MB			261		
Downwind	GN DW 1	65.0	5	11.02	15	GN			42	55	
Downwind	GN DW 2	65.0	5	11.02	15	GN			68		
Downwind	AF DW Passive	65.0	6	10.25	15	AF	Shredding green waste and forming windrow	Green waste	9*	n/a	*Presumptive count per plate
Downwind	MB DW Passive	65.0	12	10.44	15	MB			4*	n/a	
Downwind	GN DW Passive	65.0	5	11.02	15	GN			0*	n/a	

Table 2: Summary monitoring data from downwind location on 15th September 2014

Downwind.

Site: Maindiff Court Farm, Abergavenny
Site Operator: Mr Andrew Lewis
Sampling Date: 15/09/2014
Commissioning Laboratory: Cardiff Met, Western Avenue, Llandaff, Cardiff
Estimated Mass of Material:
Type of Material Processed on site: Green Waste

Location:	Sampling Reference Number:	Difference from boundary of operational area or tuning / screening operation (m)	Difference in bearing location of samplers from boundary / source and mean direction wind blows to (o)	Sampling time: (hh:mm)	Sampling duration (min)	Microbial type	Site activity	Material processed	Calculated concentration of airborne micro-organisms (cfu m-3)	Arithmetic mean of parallel samples (cfu m-3)	Comments relating to any activities occurring during the sampling period that might affect the concentration of airborne micro-organisms
Downwind	AF DW 1	60.0	13	10.07	15	AF	Shredding green waste and forming windrow in building.	Green waste	205	191	20+ Sheep in close proximity to samplers during monitoring.
Downwind	AF DW 2	60.0	13	10.07	15	AF			177		
Downwind	MB DW 1	60.0	14	10.24	15	MB			577	570	
Downwind	MB DW 2	60.0	14	10.24	15	MB			563		
Downwind	GN DW 1	60.0	30	10.44	15	GN			158	155	
Downwind	GN DW 2	60.0	30	10.44	15	GN			151		
Downwind	AF DW Passive	60.0	13	10.07	15	AF	Shredding green waste and forming windrow in building.	Green waste	0*	n/a	*Presumptive count per plate
Downwind	MB DW Passive	60.0	14	10.24	15	MB			11*	n/a	
Downwind	GN DW Passive	60.0	30	10.44	15	GN			0*	n/a	

Stability of prevailing wind.

In support of the stated risk control measures in the SSBRA, relating to limiting activities based on wind direction, the details /interpretation of the prevailing wind conditions are provided below.

When carrying out our bioaerosol monitoring, a portable meteorological station with a data logging capability is used. In order to allow samples to start whenever required, the data logging interval is set to record at 1 minute intervals. Wind speed and direction are converted in to vector components to calculate the average wind speed and direction over a given sampling period. The 1 minute data logging interval can give a false impression of turbulent conditions. An overview of the complete wind data over six monitoring days at Maindiff Court Farm is included below.

Table 3. Wind direction on monitoring day as percentage of daily recorded direction.

Direction	Apr-13	Jul-13	Nov-13	Mar-13	Sep-14	Dec-14
N	0%	10%	20%	0%	13%	23%
NNE	0%	16%	11%	0%	27%	20%
NE	0%	17%	1%	0%	32%	35%
ENE	0%	8%	0%	0%	3%	13%
E	0%	7%	0%	0%	0%	0%
ESE	1%	8%	0%	0%	0%	1%
SE	3%	4%	0%	0%	0%	0%
SSE	4%	0%	0%	0%	0%	0%
S	9%	1%	7%	0%	0%	0%
SSW	9%	7%	34%	0%	0%	0%
SW	19%	4%	0%	2%	0%	0%
WSW	22%	10%	0%	26%	0%	0%
W	23%	1%	1%	43%	0%	0%
WNW	10%	0%	1%	24%	0%	0%
NW	1%	3%	7%	6%	6%	3%
NNW	0%	3%	19%	0%	19%	5%

Figures 1 - 6. - Wind Rose representation of percentage data. Wind rose shows direction wind blows from.

Fig. 1 - April 2013

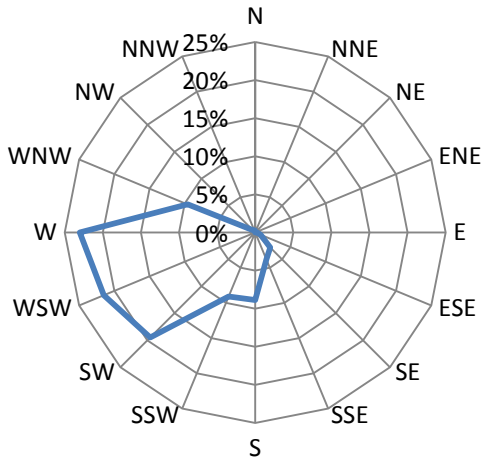


Fig. 2 - July 2013

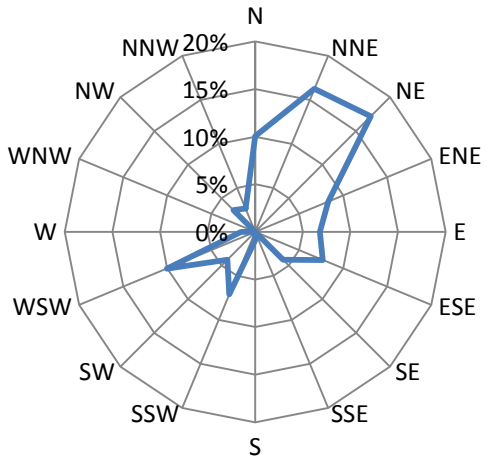


Fig. 3 - November 2013

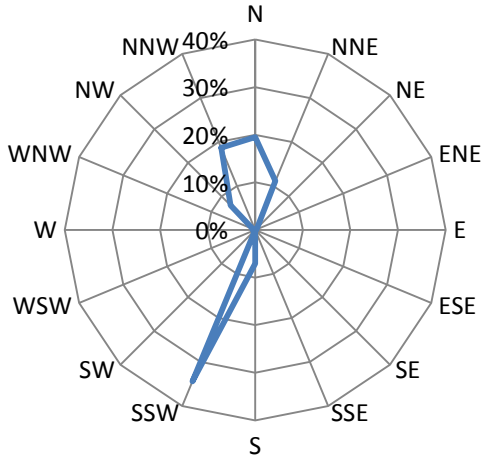


Fig. 4 - March 2014

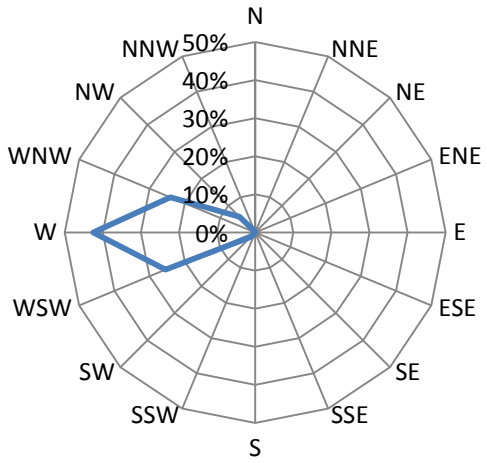


Fig. 5 - September 2014

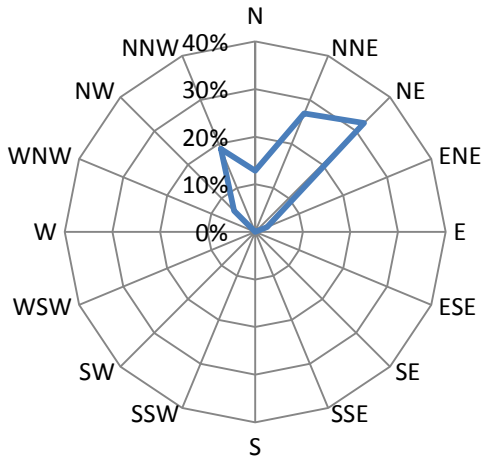
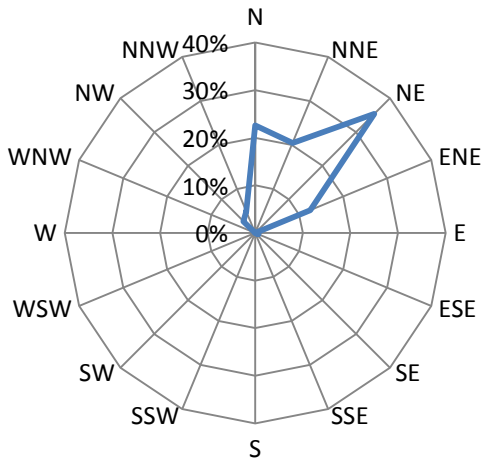


Fig. 6 - December 2014



The wind rose illustrations of the wind data over a whole monitoring day suggest a more stable wind environment than is suggested by the changes in wind direction experienced in some of the time periods when bioaerosol monitoring has been undertaken.

We consider that a control measure to limit working at the facility when the wind blows from the East and South are workable based on these prevailing wind conditions. In order to inform this assertion further we would propose that we submit additional meteorological data from the site, collected from November 2014 to the end of January 2015. We will provide an analysis of this data to supplement our submission.

Gram Negative concentrations:

A question has been raised regarding concentrations of gram negative bacteria downwind of the working area, and the effect of increasing the permitted throughput of the site.

It is our opinion that the concentrations of gram negative bacteria during monitoring at the downwind location for the April 2013 report are likely to have been influenced by the monitoring location selected and the presence of a potential non-compost additional bioaerosol source.

During monitoring for the April 2013 report, a location downwind of the working area was selected, based on the wind direction at the time. The sampling location was on an open area of land, the same distance from the working area as the sensitive receptor, approximately 60m downwind. On the day of monitoring, the prevailing wind meant that this location was on a patch of open unmade ground used for storing farm machinery, wood and manure. It was noted in the bioaerosol report that piles of wood and manure were within 10m of the monitoring location and may make a small contribution to the recorded concentration of bioaerosols at that location.

The downwind location during the monitoring in April 2013 was a similar distance from the working area as the Maindiff Farm Cottages, approximately 60m. However, the topography between the working area and the monitoring point were very different. Maindiff Farm Cottages are separated from the working area by agricultural buildings, approximately 4m high. This provides a screening effect from the working area. The area between the working area and monitoring location on the day was open land with no screening, therefore the bioaerosol concentrations recorded on the day are likely to overestimate the concentration that would be seen at the Maindiff Farm Cottages when they are downwind of the site.

Concentrations of gram negative bacteria at the downwind location are consistently lower than those recorded in April 2013 in all the other rounds of monitoring, see Table 4 below:

Table 4: Summary of gram negative bacteria monitoring data.

		Upwind location				**Downwind location**			
Date	Sample Length (minutes)	Difference in bearing between location of samplers from boundary / source and mean direction wind blows to (o)	Sample 1	Sample 2	Mean	Difference in bearing between location of samplers from boundary / source and mean direction wind blows to (o)	Sample 1	Sample 2	Mean
23/04/2013	20	212	0	0	0	4	217	247	232
23/04/2013	5	208	0	0	0	20	283	219	251
17/07/2013	20	7	11	7	9	100	143	147	145
17/07/2013	5	20	21	21	21	31	14	0	7
28/11/2013	20	158	5	9	7	136	41	37	39
07/03/2014	15	194	0	0	0	5	42	68	55
15/09/2014	15	134	0	0	0	30	158	151	155
01/12/2014	15	203	2	0	1	1	31	21	26

NB:

Difference in bearing between location of samplers from boundary / source and mean direction wind blows to should ideally be 0^{o} at downwind location and 180^{o} at upwind location.

: Issue with suitability of prevailing wind during sample.

Consequently it is our opinion that the 5 minute sampling period on April 2013 was an unusually high concentration for the facility and despite not being a good representation of typical levels was still below the guidance level of 300 cfu/m^3.

The concentration at the downwind location (5 minute sample) on July 2013 was very low (Sample 1 5: 14 cfu/m^3; Sample 2 5: 0 cfu/m^3: mean 7 cfu/m^3) at a location 48m from the working area and a difference in bearing of 31^o between the bearing of the samplers from the direction the wind blows to. This bearing is taken to the centre point of the closest boundary of the working area. In such close proximity, i.e. 48m from the working area, this placed the sampling location directly downwind of the working area. During sampling at the upwind location, the wind veered resulting in the upwind gram negative samples being taken while the location was downwind of the site (7^o and 20^o respectively for the 20 minute and 5 minute samples). Concentrations of gram negative bacteria recorded were low (20 minute sample: mean 9 cfu/m^3, 5 minute sample: mean 21 cfu/m^3).

Since submission of the application to NRW, a further round of bioaerosol monitoring was undertaken in September 2014. Due to the continued warm conditions into September 2014, we consider that this report represents likely bioaerosol concentrations for the summer season at Maindiff Farm, supplementing the data from July 2013. We would like to submit this report for consideration. The concentration of gram negative bacteria at the downwind location was approximately 50% of the guidance value (Sample 1: 158 cfu/m^3; Sample 2: 151 cfu/m^3: mean 155 cfu/m^3) at a location 60m from the working area and a difference in bearing of 30^o between the bearing of the samplers from the direction the wind blows to. This bearing is taken to the centre point of the closest boundary of the working area. In such close proximity, i.e. 60m from the working area, this placed the sampling location directly downwind of the working area. The wind direction during the sample was consistent. The open topography between the working area and sampling location does not match that between the working area and Maindiff Court Cottages receptor which is screened by the farm buildings. As a result this sample is likely to overestimate the concentration found at the receptor were it downwind.

Response to concerns raised in 'Bioaerosols monitoring reports and conclusions' section of request for further information:

Research has shown that the main source of bioaerosols from a composting facility are from processes that actively agitate the waste, namely shredding, screening and turning windrows (Taha, 2006). At the proposed full capacity of the site, approximately 13,200 tonnes per annum, it is the intention to only undertaken one activity that involves agitation of waste, i.e. shredding, turning, screening, at any one time, and such a control measure has been proposed by the SSBRA. The current operation of the facility involves one active process at a time and the data suggests that bioaerosol concentrations at the receptor remain below guidance values. With an increased throughput at the site, the active processing activities would be undertaken more frequently and for slightly longer periods, however there would still only be the one active source operating. Therefore, we consider that with the factors of dispersion and settlement and competent management of the composting operation, we would not envisage the increased length of processing time to result in a significant increase in bioaerosol concentrations

Bioaerosol monitoring report – April 2013

The issues raised with the gram negative bacteria concentrations in the April 2013 are discussed above.

Bioaerosol Monitoring Report – July 2013

The downwind monitoring location for the July 2013 report was in a similar location to that from the April 2013 monitoring, and as such the monitoring location was close to a wood stockpile for the farm's boiler and mounds of animal manure from farming activities. This was noted in the April 2013 report.

During downwind monitoring for Aspergillus fumigatus (20 minute sample) difference in bearing of the location of samplers from boundary / source and mean direction wind blows to was 28^{o}. This is to the centre point of the closest site boundary. At a distance of 48m therefore this provides a good representation of concentrations downwind.

Since the submission of the application to NRW, an additional bioaerosol monitoring report covering Summer 2014 has been prepared. We would like to submit this additional data to support the conclusions of the SSBRA.

Bioaerosol Monitoring Report – November 2013

The summary of the report in the request for additional information states, "However due to the fluctuating wind directions during the monitoring assessment there is little confidence in the downwind or background measured values". This is not in line with the assessment document C034_Wd01, which only refers to the suitability of the downwind sample for gram negative bacteria.

Our report highlighted that the wind had veered during the sample for gram negative bacteria and that as a result this may be an underestimate of the true concentration. The concentration recorded was a mean of 39 cfu/m^3 (sample 1: 41 cfu/m^3, sample 2: 37 cfu/m^3).

A report for Autumn 2014 is under preparation and we would like to submit it shortly to supplement the data relating to Autumn seasonal bioaerosol concentrations.

Bioaerosol monitoring report – March 2014

A discrepancy between the work activity stated in the summary page and the rest of the report has been highlighted. The summary page does make reference to screening being undertaken on the day of monitoring. This was included in error and should refer to shredding green waste material. All sections in the main body of the report refer to the correct process of shredding green waste

undertaken during monitoring. All analysis of results and conclusions were based on the shredding activity. The main body of the report is therefore correct and applicable.

The analysis refers to the reports for April 2013 and March 2014 being carried out when shredding was being undertaken at the site and makes the comment that higher bioaerosol emissions are probably related to turning activities. We do not have any control over the site activities on the day of monitoring. Monitoring is carried out during normal activities at the site, providing that there is an agitation activity, i.e. shredding, turning or screening, or combination of activities being undertaken, in order to comply with the stipulation of the monitoring protocol.

References

Taha, M. P. M., Drew, G. H., Longhurst, P.J., Smith, R. & Pollard, S. J. T., (2006). Bioaerosol releases from compost facilities: evaluating passive and active source terms at a green waste facility for improved risk assessments. Atmos. Environ., 40,1159-1169.