G & A POWELL

POULTRY UNITS AT GLANMEHELI FARM, GLANMEHELI FARM, NEWTOWN, POWYS.

ODOUR IMPACT ASSESSMENT

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CONTENTS

1.0 INTRODUCTION

Additional poultry rearing (broiler) sheds are proposed on land adjacent to an existing free range (laying) shed at Glanmeheli Farm, Kerry, Newtown SY16 4LN. This farm lies within the administrative area of Powys Council. When complete, it is planned that the site capacity will increase to a maximum of 200,000 birds in 4 buildings.

This assessment presents the result of the detailed dispersion modelling exercise aimed at predicting the odour impact of the proposed facility.

1.1 Site Location

The application site is located south of the A489 approximately 5km ESE km Newtown at OS GR 316550, 289780. The site setting can be seen in Appendix A, which are drawings submitted with the planning application and have been reproduced courtesy of Berrys.

The land at Glanmeheli Farm and is farmed by Geraint and Anabel Powell and family trading as G & A Powell. The 550-acre farm is a mixed organic holding, with a herd of Limousin-cross suckler cows and a flock of Welsh Mule ewes and 200 pigs. The animals cattle are reared on home-produced spring barley and spring wheat, winter barley and grass silage with turnips for the sheep flock. The site also includes a 16000 bird free-range layer unit in a single house. There is a range of agricultural buildings on the farm including livestock buildings, crop storage buildings and silos.

The closest residences to the poultry facility are those associated with Glanmeheli Farm (i.e. the applicant, family and tenants). Glanmeheli Farm is shown, alongside assessed receptors which are not associated with the farm, in Drawing OIA1.

1.2 Proposed Development

The site currently consists of a single free-range laying building, housing 16,000 birds. The applicant is now seeking to adapt the existing building to accept broilers as well as constructing 3 additional houses for a total maximum capacity of 200,000 birds across the 4 sheds.

The broilers will be brought in as day old chicks at a 50-50 mix of males and females. The 37 day growth period will lead to birds being around 1.9kg in weight by clearout.

The new buildings will each measure approximately 101m by 24m with a height to the eaves of approximately 2 metres, 5.75 metres to the ridge and 6.4 metres at the top of the fans which is the highest point of each new shed.

For the comfort and productivity of the birds the temperature within the houses must be regulated. The ventilation is based on a Fancom ‘Minimum Transitional Tunnel’ (MTT) design, which uses ridge ventilation at the early stage of the cropping cycle transferring to a tunnel ventilation system (i.e. gable fan driven) at the end of the cycle.

The fans will operate at a variable rate dependent upon the age of the birds and will only be switched off when the sheds are vacant.

There is sufficient fan capacity (including back-up systems) to ensure that the comfort of the birds is maintained even in the event that the outside ambient temperature rises above 30ºC.

The facility will be of modern design, utilising the current best practice control measures for minimisation of odour impact. This includes optimisation of diet for the growing birds and the use of nipple drinkers to reduce litter moisture content, for example. High litter moisture content, low oxygen levels, small particle size, high temperatures and low pH encourage anaerobic bacterial activity and the generation of odours and the facility will be operated in a manner which discourages such activity.

1.3 Environmental Permitting

The Planning and Environmental Permitting processes are separate, but complementary, as discussed further in section 3.2 of this report. At the time of writing, an application for an Environmental Permit to cover the broiler facility has yet to be made to Natural Resources Wales (NRW). An Odour Management Plan aimed at ensuring that the operation of the facility will be acceptable in relation to odour will be prepared in support of that application. application.

Paragraph 5.13.3 of Planning Policy Wales (Edition 10, December 2018) requires that the local planning authority must assume that the Permit will operate effectively in preventing unacceptable levels of odour at relevant receptor locations.

1.4 Scope and Limitations

The scope of this OIA is limited to the prediction, through atmospheric dispersion modelling, of impacts at local sensitive receptors based on design information and desktop emission rates.

Assessment of impacts associated with emissions of ammonia on sensitive ecological sites is outside the scope of this report, which deals with issues of odour only.

1.5 Aims and Objectives

The objectives of the assessment are as follows:

- To identify the odour sources which will be present at the facility;
- To estimate odour emissions from the proposed facility with additional sheds and birds;
- To quantify impacts on sensitive receptors based upon the emission values; and
- To assess the significance of these impacts.

2.0 ASSESSMENT METHODOLOGY

2.1 General Approach

The approach taken in this assessment is consistent with that for other broiler applications in Powys, where the same general approach has been regarded as acceptable, for example:

1. Application Ref. No: P/2017/1109. Proposed erection of a broiler shed to include 2 no. feed silos and associated works. Ddole Farm, Llanbister LD1 6SS.
2. Application Ref. No: P/2017/1031 Erection of an agricultural building for free range broiler production and associated works. Tanhouse Dolau, Llandrindod Wells LD1 5TL.
3. Application Ref. No: P/2017/0325. Proposed erection of 2 no. Poultry buildings for broiler breeder rearing, four no. feed bins, new access track, improvements to existing entrance, creation of one new passing place installation of septic tank and associated development. Cwmroches, Llandrindod Wells, LD1 5SY.

In the above cases Powys Council has referred to the requirement for an NRW Environmental Permit and therefore has complied with Paragraph 5.13.3 of Planning Policy Wales thus avoiding duplication between the two regulatory regimes.

2.2 Assessment of Odour Exposure

In the UK, odour assessments for poultry facilities are most commonly undertaken using the concept of the European Odour Unit (ou_E), as defined in BS EN 13725[1]. This approach allows impact assessment of any odorous gas as it is independent of chemical constituents and centres instead on multiples of the detection threshold of the gas in question.

As the odour unit is a Standard Unit in the same way as gram or milligram, the notation used in odour assessment follows the conventions of any mass emission unit as follows:

- concentration: ou_E/m^3
- emission: ou_E/s
- specific emission (emission per unit area): $ou_E/m^2/s$

Like air quality standards for individual pollutants, exposure to odour is given in terms of a percentile of averages over the course of a year. The exposure criteria most accepted in the UK at present is given in terms of (concentration) European Odour Units as a 98th percentile (C_{98}) of hourly averages. This allows 2% of the year when the impact may be above the limit criterion (175 hours). The notation for impact is therefore: $C_{98,\ 1\ hour}$ X ou_E/m^3.

[1] BS EN 13725:2003 *Air Quality – Determination of Odour Concentration by Dynamic Olfactometry.*

Odour perception, annoyance and nuisance is related to more than simply odour impact, the five 'FIDOL' factors[2] must also be considered when assessing the acceptability of a scheme and the appropriateness of a limit criterion.

2.3 Identification of Odour Sources

Potential sources of odorous emissions from the proposed facility have been identified on the basis of a review of the proposed development design. This involves identifying sources of potential releases to atmosphere. The identified potential odour sources are as follows:

- Point sources (from the broiler house ventilation); and
- Waste product handling and spillages etc.

Control of fugitive / intermittent releases of odour will be addressed by a site Odour Management Plan as part of the Permitting process.

2.4 Derivation of Emissions

The anticipated odour emissions for the proposal have been estimated using values given in published literature in the UK and Europe for similar facilities. Ventilation flows are based on standard best practice design for UK broiler houses.

The odour emission rates applied should be considered worst case as they have been measured at facilities which do not apply the same odour prevention measures as will be adopted at the facility at Glanmeheli Farm. In reality emission rates would be expected to be significantly lower.

2.5 Quantification of Odour Impact

Data derived from the previous stages is input to an atmospheric dispersion model. For this assessment the AERMOD model[3] has been applied with due consideration to relevant guidance[4]. This model is widely used and accepted by the NRW and UK planning authorities for undertaking such assessments and its predictions have been validated against real-time monitoring data by the USEPA. It is therefore considered a suitable model for this assessment.

Dispersion modelling guidance indicates that at least 3 (and ideally 5) years of meteorological data should be applied to ensure that infrequent weather conditions do not unduly bias the results. This results in a range of predicted impacts for different years of meteorological data and the average value is used to assess compliance, with the range of impacts used to assess likely variation between years and the risk of shorter-term impacts. This is particularly

[2] The FIDOL factors are defined as **F**requency, **I**ntensity (and therefore concentration), **D**uration, relative **O**ffensiveness (hedonic tone/character) and **L**ocation,

[3] Software used: BREEZE AERMOD Pro, v8.1.0.17

[4] USEPA, Aermod Implementation Workgroup, Aermod Implementation Guide, (EPA-454/B-18-003 April, 2018).

important in relation to odour, where acceptability of impacts is assessed by receptor over long time periods rather than as a result of infrequent or unusual meteorological conditions.

2.6 Assessment Scenarios

Two scenarios have been modelled to represent the existing emissions from the free-range layer facility and also the typical operation of the proposed facility, with the maximum proposed number of broilers on a 37 day cycle with thinning at day 32.

The results of the dispersion modelling have been presented in the form of:

- illustrations of the odour footprint as isopleths (contours of concentration) for the criteria selected enabling determination of impact at any locations within the study area; and
- tabulated odour concentrations ($C_{98,\ 1\text{-}hour}$ X ou_E/m^3) at discrete receptor locations to facilitate the discussion of results.

3.0 REGULATORY STANDARDS AND GUIDELINES

Currently, in the UK there are no statutory numerical standards for assessing the acceptability of predicted odour impacts from quantitative odour impact assessments. On this basis, odour impact criteria are typically based upon guideline documents (predominately based on research from outside of the UK), case law and research which differ depending on the regime i.e. planning (to avoid significant detriment to amenity) or permitting (to avoid unacceptable pollution).

The numerical limits applied have largely been derived from the findings of a limited number of epidemiological assessments where modelled odour impacts have been compared to the findings of quality of life surveys; a dose-effect study. These dose-effect studies have only been undertaken for a limited number of odour types; however they have been used as the foundation for the setting of acceptable odour standards in many countries.

The actual acceptable level of impact will be dependent on the nature (offensiveness) of the odour and the broad sensitivity of the population. To account for this differing numerical limits are often set not only depending on the offensiveness of the odour but also the broad sensitivity of the environment.

3.1 UK Guidance

UK guidance identifies a range of odour impact criteria depending primarily on the nature of the odour (i.e. its pleasantness/unpleasantness) and the likelihood of causing unacceptable impacts based on the 98th percentile of predicted hourly average concentrations over a year.

It is therefore evident that such criteria apply only to locations where an individual's exposure is likely to occur for prolonged periods of time i.e. residential properties. Where exposure is more transient (i.e. roads, footpaths etc.) the direct application of such criteria should be treated with caution and further consideration should be given to how the duration and frequency of exposure of the individual will influence the acceptability of the predicted impact.

3.2 Planning vs. Permitting: National Planning Policy Framework (NPPF)

The Welsh Government released Planning Policy Wales (Edition 10) in December 2018. As described above, this includes information for sites which will fall under the Environmental Permitting regime, regulated by NRW:

> *'5.13.3 Planning authorities, other relevant local authority departments and Natural Resources Wales (NRW) must work closely together to ensure that conditions attached to planning permissions and those attached to Environmental Permits are complementary and do not duplicate one another. Sufficient information should accompany development proposals in order for planning authorities to be satisfied that proposals are capable of effective regulation. NRW should assist the planning authority in establishing this position through the provision of appropriate advice. The parallel tracking of planning and environmental permitting applications should be the*

preferred approach, particularly where proposals are complex, so as to assist in mitigating delays, refusal of applications or conditions which may duplicate the permit/licence.'

This is the approach that has been adopted in relation to similar applications in Powys.

3.3 NRW H4 guidance

NRW has published a number of guidance documents relating to odour assessment. These include the Horizontal Guidance EPR H4 – Odour Management[5].

The H4 guidance proposes the use of installation-specific exposure criteria (benchmarks) on the basis that not all odours are equally offensive, and not all receptors are equally sensitive. The conditions of a Permit will balance these installation-specific odour exposure criteria against what is realistically achievable in accordance with the concept of Best Available Techniques (BAT).

The Guidance states:

'..benchmarks are based on the 98th percentile of hourly average concentrations of odour modelled over a year at the site/installation boundary. The benchmarks are:

1.5 odour units for most offensive odours;

3 odour units for moderately offensive odours;

6 odour units for less offensive odours.'

Examples of these three categories are:

'Highly offensive:

processes involving animal or fish remains
processes involving septic effluent or sludge
biological landfill odours

Moderately offensive:

intensive livestock rearing
fat frying (food processing)
sugar beet processing
well aerated green waste composting

Less offensive:

brewery
confectionery
coffee roasting
bakery'

These benchmark limits are precautionary and may be relaxed in cases where the source is familiar to the location. This is particularly the case in relation to intensive agriculture in a rural setting. For example, research relating to broiler farms indicates that a more representative nuisance threshold for an agricultural area should be anywhere from 3.3 – 8.8

5 H4 Odour Management: How to comply with your environmental permit.

ou_E/m^3 as a 98th percentile of hourly means[6], or even 9.7 ou_E/m^3 (as a 98th percentile)[7]. This is consistent with guidance published by the EA in relation to nuisance thresholds as a function of site setting[8,9] and also regulation applied in Ireland, where the Environmental Protection Agency (EPA, Ireland) recommended criterion is 6.0 ou_E/m^3 as a 98th percentile of hourly means for existing units. The H4 (and IPPC SRG 6.02, below) benchmarks should therefore be seen as a guide of the relative likelihood of an odour issue being caused rather than an absolute limit value, particularly in an agricultural setting.

3.4 IAQM Odour Guidance[10]

On 20th May 2014 the Institute of Air Quality Management released guidance on the assessment of odour for planning. This was updated in 2018.

The guidance is for assessing odour impacts for planning purposes. It provides background information relating to requirements for odour impact assessments and suitable impact criteria and draws from other sources of information such as that described in the H4 guidance (Section 3.3, above).

The IAQM odour guidance requires a degree of professional judgement when considering potential effects of environmental odours. Given the site setting and the number of residences potentially affected, the IAQM odour guidance may be used to classify to the impact from an intensive agricultural facility (i.e. for a 'moderately offensive odour') in an agricultural setting as:

- 'negligible' at, or below 3 ou_E/m^3 as a 98th percentile of hourly means; or
- 'slight adverse' from 3 ou_E/m^3 - 5 ou_E/m^3 as a 98th percentile of hourly means; or
- 'moderate adverse' impact above from 5 ou_E/m^3 as a 98th percentile of hourly means.

Only a moderate impact (or greater) would be regarded as 'significant' for purposes of environmental assessment when considering the overall planning balance.

This document is not intended to provide guidance on odour for environmental protection regulatory purposes (e.g. Environmental Permitting).

[6] Misselbrook, Clarkson and Pain (1993) *Relationship between concentration and intensity of odours for pig slurry and broiler houses.*

[7] Hayes, E.T., Curran, T.P and Dodd, V.A. (2006) *Odour and ammonia emissions from intensive poultry units in Ireland*. Bioresource Technology 97 pp933-939

[8] EPA (2001) Odour Impacts and Odour Emission Control Measures for Intensive Agriculture. R&D REPORT SERIES No. 14. pp31.

[9] Environment Agency (2002) Assessment of Community Response to Odorous Emissions. R&D Technical Report P4-095/TR. pp63

[10] IAQM (2018) *Guidance on the assessment of odour for planning*

4.0 RECEPTORS, VENTILATION FLOWS AND EMISSIONS

4.1 Site Setting

Discrete receptor locations have been selected for comparative purposes to facilitate the discussion of predicted odour impacts; in general they represent the closest residential locations in each direction. These are as presented in Table 4-1 and shown in Drawing AQ1.

Table 4-1
Discrete Receptor Locations Modelled

Reference	Description	National Grid Reference	
		OS Xm	OS Ym
D1	Glanmule 1	316199.9	290349.1
D2	Glanmule 2	316273.3	290354.1
D3	Glanmule 3	316380.3	290355.3
D4	Glanmule 4	316440.1	290364.0
D5	Glanmule 5	316519.7	290370.3
D6	Glanmule 6	316744.9	290204.7
D7	Plasgwyn	317113.3	289999.4
D8	Snowfields	317078.4	289749.3
D9	Pen-Y-Bryn	317586.2	290075.3
D10	Drefor Farm	316944.0	289209.2
D11	Lynwood	316859.4	289163.2
D12	Keepers Cottage	316199.9	289356.0
D13	Old Wagonors Cottage	315860.1	289656.0

The occupants of Glanmeheli Farm have a vested (economic) interest in the success of this development and also are in a position to directly affect the emissions from the facility and their movements in relation to them. They must therefore not be regarded as sensitive receptors for purposes of odour assessment.

In addition to assessment of impact at discrete receptors, a receptor grid has been used to allow the production of and odour isopleth drawing.

4.2 Ventilation flows

Ventilation is important for the birds' health and will therefore affect production levels. It is applied when cooling is required, and for maintaining the composition of the indoor air at the required levels. Directive 2007/43/EC lays down minimum requirements for environmental parameters that need to be ensured, namely:

- NH_3 concentration not exceeding 20 ppm;
- CO_2 concentration not exceeding 3 000 ppm;

- indoor temperature, when the outside temperature measured in the shade exceeds 30 ºC, not exceeding this outside temperature by more than 3 °C; and
- indoor average humidity, measured over 48 hours, not exceeding 70 % when the outdoor temperature is below 10 °C.

Design ventilation flows have been provided by the designers of the facility (J.F. McKenna).

The MTT system works in three phases (text below taken from Fancom documents):

- **MTT minimum phase**. Accurate minimum ventilation is essential maintained through use of ridge fans for prevention of heat stress and cold (minimum ventilation) during cold nights to extract CO_2, NH_3, moisture and dust and to introduce oxygen rich air. The MTT system enables precise control of the airflow, which is distributed evenly throughout the house even at low air speeds;
- **MTT transitional phase**. If the ventilation rises, MTT automatically switches to the transitional phase, the gradual transition to tunnel ventilation whereby the birds can slowly get accustomed to a changing airflow pattern; and
- **MTT tunnel phase**. With tunnel ventilation the air flows over the birds and creates a cooling effect. If required, pad cooling or misting can also be incorporated into the MTT system.

The 6 No. roof ridge fans per building will be Fancom 800mm units, each capable of moving a maximum of 17500m^3/hr (4.9m^3/s). As these ridge units are only used during the first stages of the cropping cycle (the MTT minimum phase into the transitional phase), they will typically operate at low extraction rates, even on the hottest days.

The 14 No. Fancom 34132 (54”) gable end tunnel fans are used during the latter stages of the cropping cycle (the MTT tunnel phase) as the ventilation transforms from ridge-driven to tunnel-driven flow.

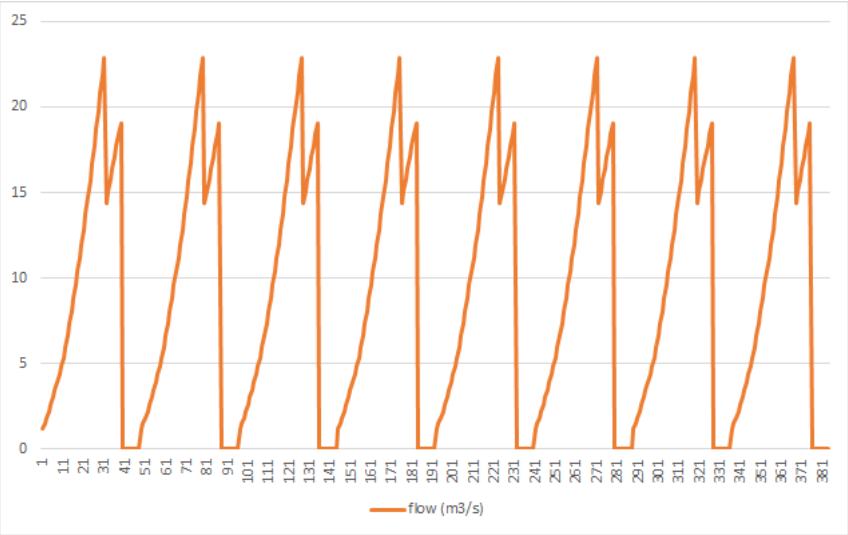
For purposes of modelling, the following ventilation assumptions have been applied:

Table 4-2
Modelled Proportion of Flow: Crop Cycle

Phase	Day (start)	Day (End)	Ridge Fans	Gable Fans
MTT minimum phase	1	20	100%	0%
MTT transitional phase	21	29	65%	35%
MTT tunnel phase	30	40	30%	70%

The variation in ventilation rate is based on the welfare needs of the birds and is a function of external temperature and bird age / size. Figure 4-1 below presents the variation in flow (m^3/s) per shed against the days over 8 complete crop cycles for a minimum ventilation rate. The drop at day 32 in the graph relates to the reduced numbers after thinning of the crop.

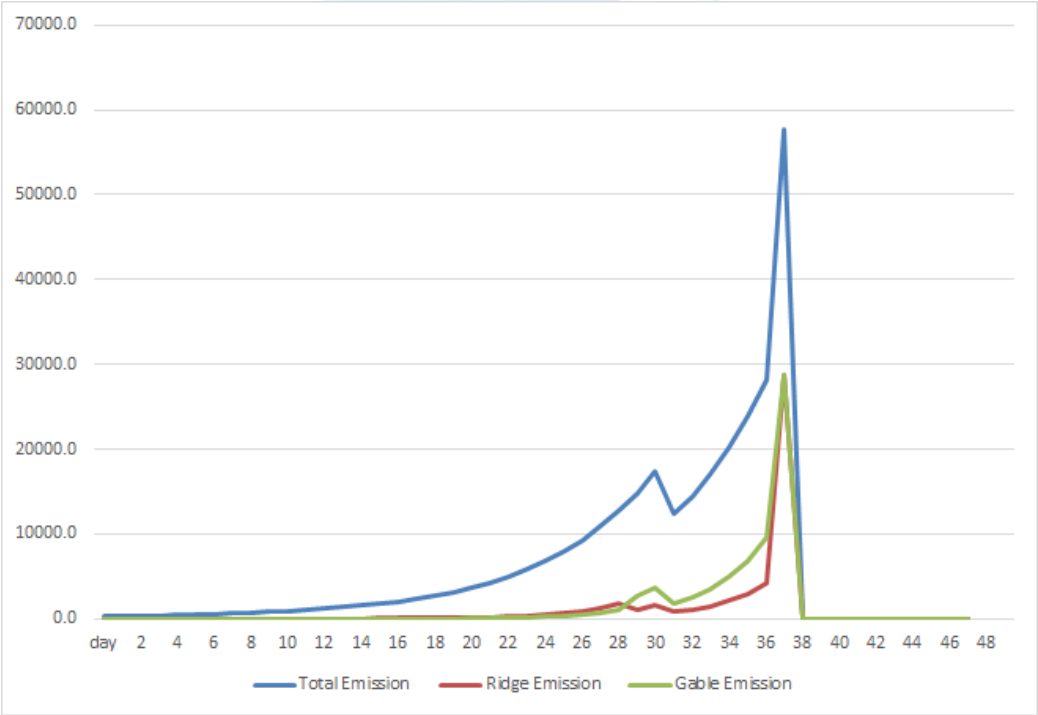
Figure 4-1
Required Ventilation Rate (total)



4.3 Emission Rates

The emission rates used are calculated from an internal concentration of odour taken from published values which indicate a likely range for a well run modern farm of 300ou_E/m^3 – 2300 ou_E/m^3 across a 37 day growth cycle. The time varying emission rates used represent the emissions for each sheds (housing 50,000 birds) is as shown below.

Figure 4-2
Emission rate (ou_E/s per house)



It can be seen in Figure 4-2 that the relative proportion of emissions will vary across the cycle, with the peak during clearing out (as would be expected).

Research has shown that the use of indirect heating, will result in a significantly improved building environment and lower emissions, particularly of ammonia and carbon dioxide. This in turn improves the growth rate and performance of the birds. The quality of the litter and in particular the moisture content, will also determine the overall odour emission.

5.0 ODOUR IMPACT ASSESSMENT

The dispersion model was constructed based on the input parameters described below.

5.1 Model Domain

Modelling was carried out at 40m resolution over a 1.2 km by 1.2 km grid. In addition, the identified potentially sensitive locations, detailed in Table 4-1, were modelled as discrete receptors.

Other receptors may be relevant, such as other individual residences in Glanmule and for these receptors, the odour isopleths are available.

5.2 Model Assumptions

The temperature of the flows from the fan units has been assumed at 25ºC, which is at the lower end of the range for the entire cycle (the younger birds will typically be housed at a temperature slightly above this). The velocity from the ridge fans has been taken as 3m/s which is regarded as cautious in terms of dispersion. The gable end fan releases towards the end of the cycle have been represented as area sources with no vertical velocity.

5.3 Building Downwash / Entrainment

The movement of air over and around buildings and other structures generates areas of flow re-circulation that can lead to increased ground level concentrations of pollutants close to the source. Where the stack height is less than 2.5 times the height of any nearby building (within 5 stack heights), downwash effects and entrainment can be significant.

The 4 No. broiler houses have been incorporated into the dispersion model as detailed in the modelling files. The houses have a pronounced ridge which cannot be incorporated into the model. The roof height modelled is 4.5m.

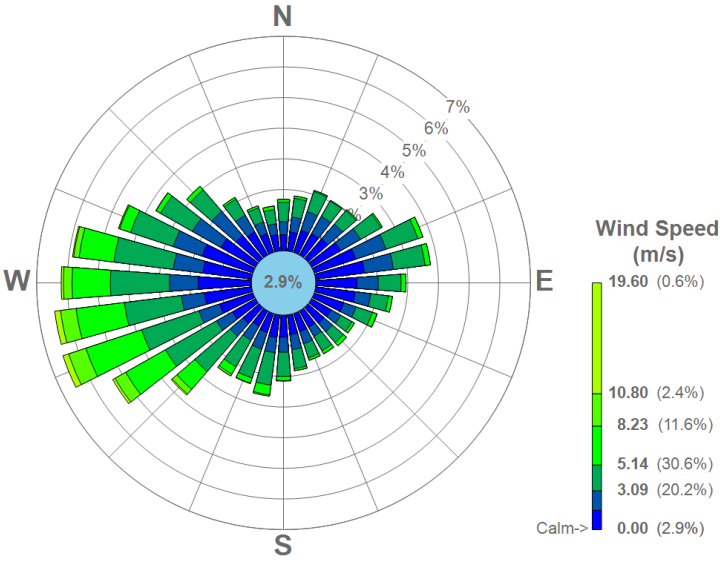
5.4 Local Wind Speed and Direction Data

The most important meteorological parameters governing the atmospheric dispersion of pollutants are wind direction, wind speed and atmospheric stability.

The impact has been modelled using a 5 year meteorological data set for the years 2014 – 2018 from the recording station at Shobdon, located approximately 35km to the south east of Glanmeheli Farm. This is regarded as a large distance for purposes of dispersion modelling (although there is no set limit) however this is the closest station at which data is recorded.

A windrose providing the frequency of wind speed and direction for 5 years of data is presented in Figure 5-1, below.

Figure 5-1
Shobdon: Windrose (5 years)



5.5 Temperature

Analysis of 5 years (2014-2018) meteorological data recorded at Shobdon (the closest recording site) shows that temperatures very rarely exceed 25°C. Missing data has been excluded.

Table 5-1
Shobdon Meteorological Summary (5 years data)

Minimum Temp °C	Maximum Temp °C	Number of Hours	% of year	% of year cumulative	Average hours per year
	<-10	4	0.01%	0.01%	1
-10	-5	100	0.2%	0.24%	20
-5	0	1753	4.0%	4.26%	351
0	5	7198	16.5%	20.80%	1440
5	10	13071	30.0%	50.82%	2614
10	15	12726	29.2%	80.04%	2545
15	20	6914	15.9%	95.92%	1383
20	25	1545	3.5%	99.47%	309
25	30	225	0.5%	99.99%	45
30		6	0.0%	100.00%	1
	TOTAL	**43542**	**100%**		**8708**

5.6 Met Data Preparation

Meteorological data was obtained in .met format and converted to .sfc and .pfl formats for use in AERMOD using AERMET Pro. Shobdon meteorological data has been processed according to US EPA methodology[11]. Surface roughness length is based upon land use characteristics 1km from the point source.

The determination of Bowen ratio and albedo is defined by a 10km by 10km region around the site. The surrounding land use has been characterised as grassland and cultivated land.

5.7 Topography

The topography of the surrounding area within the modelling grid is variable, lying between approximately 169AoD towards the north west and 221m AoD in the south east.

Site elevation data has been included in the dispersion model, with the base of the facility lying between 195 (building 1) and 197.5m AoD (building 4).

5.8 Modelled Release Parameters

The release parameters for each stack are as shown in Appendix B.

For the gable fans, the total emission has been divided by the source area to provide a specific emission rate for modelling purposes. This is simply a calculated value to allow the most realistic modelling release parameters for the gable fans.

[11] US Environmental Protection Agency (2008). AERMOD Implementation Guide, AERMOD Implementation Group.

6.0 RESULTS

Results may be compared against the benchmark criterion of 3 ou_E/m^3 as a 98th percentile of hourly means appropriate for a 'moderately offensive' odour although this should be regarded as precautionary as should the emission rates. Given the site setting and the number of residences potentially affected, the IAQM odour guidance would regard the impact as:

- 'negligible' at, or below this concentration; or
- 'slight adverse' from 3 ou_E/m^3 - 5 ou_E/m^3 as a 98th percentile of hourly means; or
- 'moderate adverse' impact above from 5 ou_E/m^3 as a 98th percentile of hourly means.

The 5-year average odour exposures predicted as a result of emission from the facility are presented in Table 6-1 below and Appendix C.

Table 6-1
Results

Ref	Description	Existing Impact (ou_E/m^3)	Future Impact (ou_E/m^3)
D1	Glanmule 1	<0.01	0.14
D2	Glanmule 2	<0.01	0.16
D3	Glanmule 3	<0.01	0.22
D4	Glanmule 4	0.01	0.26
D5	Glanmule 5	0.01	0.33
D6	Glanmule 6	0.01	0.82
D7	Plasgwyn	0.02	1.27
D8	Snowfields	0.04	2.57
D9	Pen-Y-Bryn	0.01	0.46
D10	Drefor Farm	0.01	0.27
D11	Lynwood	0.01	0.18
D12	Keepers Cottage	0.01	0.46
D13	Old Wagonors Cottage	0.01	0.79

The odour impacts of the existing layer operation are predicted to be extremely low (negligible).

The highest average predicted impacts from the 200000 bird broiler facility are at the nearest houses to the east, at Plasgwyn and Snowfields. As described in section 3.7 of this report, this would be considered as a 'slight adverse' effect. Occasional odour will be perceived these locations (i.e. they will not be 'odour free'), however this will not be at a level which would normally be considered unacceptable at this location according to IAQM Guidance or NRW.

Furthermore, if additional measures are taken to mitigate this odour, particularly in relation to prevention of odour within the houses through effective litter management (particularly

when cleaning out the buildings at the end of the cropping cycle) this would be reduced still further.

These additional operational measures (i.e. control of processes or emissions) remain matters for the environmental permitting process and therefore regulated through the Environmental Permit as detailed in a site Odour Management Plan to be submitted with the Permit application.

7.0 CONCLUSIONS

This report presents a detailed odour impact assessment (OIA) of the proposed extension to the poultry development at Glanmeheli Farm.

Dispersion modelling has been completed, which predicts that the occasional odour will be perceived the closest locations, however the proposed development is unlikely to lead to odour impacts at a level which would be regarded as unacceptable, when operated in accordance with best practice.

Should the odour control measures detailed in a site odour management plan be followed during typical operation and abnormal events, these potential impacts will be reduced even further.

APPENDIX A

(plans reproduced courtesy of Berrys)

APPENDIX B

Table B-1
Modelled Release Parameters (proposed layout)

Stack Ref	OS GR X	OS GR Y	Base Height (mAoD)	Release Height (m above ground)
E1V1	Building 1 vent 1	316504.9	289777.4	195.0
E1V2	Building 1 vent 2	316511.0	289772.0	195.0
E1V3	Building 1 vent 3	316517.2	289766.6	195.0
E1V4	Building 1 vent 4	316523.4	289761.3	195.0
E1V5	Building 1 vent 5	316529.5	289755.8	195.0
E1V6	Building 1 vent 6	316535.7	289750.5	195.0
E1V7	Building 1 vent 7	316541.9	289745.1	195.0
E1V8	Building 1 vent 8	316548.0	289739.8	195.0
E1V9	Building 1 vent 9	316554.0	289734.4	195.0
E1V10	Building 1 vent 10	316560.4	289728.9	195.0
E1V11	Building 1 vent 11	316566.4	289723.5	195.0
E1V12	Building 1 vent 12	316572.5	289718.1	195.0
N2V1	Building 2 vent 1	316525.5	289800.8	196.0
N2V2	Building 2 vent 2	316537.6	289789.9	196.0
N2V3	Building 2 vent 3	316550.0	289779.3	196.0
N2V4	Building 2 vent 4	316562.3	289768.5	196.0
N2V5	Building 2 vent 5	316574.6	289757.7	196.0
N2V6	Building 2 vent 6	316587.0	289746.9	196.0
N3V1	Building 3 vent 1	316546.6	289825.3	196.0
N3V2	Building 3 vent 2	316559.0	289814.4	196.0
N3V3	Building 3 vent 3	316571.5	289803.5	196.0
N3V4	Building 3 vent 4	316583.7	289792.9	196.0
N3V5	Building 3 vent 5	316595.9	289782.2	196.0
N3V6	Building 3 vent 6	316608.3	289771.4	196.0
N4V1	Building 4 vent 1	316574.1	289856.4	197.5
N4V2	Building 4 vent 2	316586.5	289845.6	197.5
N4V3	Building 4 vent 3	316598.8	289834.5	197.5
N4V4	Building 4 vent 4	316611.0	289824.0	197.5
N4V5	Building 4 vent 5	316623.3	289813.2	197.5
N4V6	Building 4 vent 6	316635.7	289802.5	197.5

APPENDIX C