

R.M & C.A BRIGHT
POULTRY UNITS AT GROES-Y-GARREG, BERRIEW, POWYS.

AMMONIA ASSESSMENT

May 2020
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1.0 INTRODUCTION

Isopleth Ltd has been commissioned by Berrys, on behalf of R.M & C.A Bright, to carry out a detailed assessment of ammonia impacts associated with a poultry operation at Groes-Y-Garreg, Berriew, Welshpool, Powys SY21 8AU. The farm lies within the administrative area of Powys Council and the location is shown in Appendix A.

1.1 Background

New poultry rearing (broiler) sheds are proposed on land adjacent to the farm. When complete, it is planned that the site capacity will house a maximum of 100,000 birds in 2 buildings.

1.1.1 Initial Report: May 2019

An assessment of ammonia impacts against critical levels and critical loads (for nutrient nitrogen and acid deposition) was therefore been completed by Isopleth Ltd in May 2019 and reported at that time. The proposals did not include for the fitting of ammonia scrubbers on the buildings.

The type, source and significance of potential impacts were identified and detailed modelling undertaken in line with NRW Guidance:

*NRW (December 2018) Assessing the impact of ammonia and nitrogen on designated sites from new and expanding intensive livestock units. Technical guidance for determining environmental permit applications or responding to planning application consultations. Reference number: **GN020***

Also:

*NRW (March 2017) Assessment of ammonia and nitrogen impacts from livestock units when applying for an Environmental Permit or Planning Permission. Reference number: **OGN 41***

Predicted ground level concentrations of ammonia, nutrient nitrogen and acid deposition were compared with relevant air quality standards and guidelines for the protection of sensitive habitats.

Section 4.3 of the January 2019 report explained that:

'Powys Council has not yet been approached to identify other agricultural installations which, in their view, could potentially act in combination with the proposed development, such as:

- 1. Applications for planning or permitting that are submitted but not yet determined;*
- 2. Developments that have planning permission and/or permits but are not yet (fully) operating;*

3. Developments that started operating after the most recent update of background levels.'

Indications at that time from Powys Council were that pre-application discussions would be required where such information would be provided.

1.1.2 Addendum Report: March 2020

Powys Council and Natural Resources Wales (NRW) requested the information relating to potential in-combination sites and a further report was provided which represented an addendum to the Isopleth Ltd January 2019 report, with this additional information presented.

Natural Resources Wales (NRW) also requested that a further in-combination site was added (and other sites removed as they formed part of the latest APIS background figure). Despite NRW stating in relation to other projects that the Montgomery Canal is not sensitive to nutrient nitrogen impacts, they provided a statement in relation to this scheme which indicates that the Montgomery Canal it is sensitive. For this reason, the Montgomery Canal was added to the March 2020 assessment, where it was previously removed for the reasons stated at that time.

The NRW responses are included as Appendix B.

1.1.3 Scheme Design Changes and Current Requirements

The applicant has reviewed the progress of other poultry applications in Wales, including those within Powys. As a result of this it has been decided that the houses will be fitted with IPT Technology Ltd VentMax 1200 Acid Scrubbers in order to reduce the emissions of ammonia from each house by 90% or more.

Details of the VentMax 1200 scrubbers are included as Appendix C.

1.2 Scope

The scope of this addendum is limited to providing the additional information requested by Powys Council and NRW in relation to ammonia and nutrient nitrogen impacts on the sites of ecological interest.

1.3 Objectives

The objectives of the assessment are to:

- Quantify the emissions from the proposed facility (with scrubbers);
- Predict, through dispersion modelling, the impacts of ammonia and nutrient nitrogen from the proposed scheme on sites of ecological interest identified by NRW;
- Identify (and model) in-combination sites where impacts from the proposed scheme are not insignificant; and
- Compare predicted impacts against relevant critical levels and critical loads.

2.0 SITE SETTING AND OPERATIONS

2.1 Description

The application site is located to the North of Red Lane, between the B4285 to the East and the B4390 to the West. Located at OS GR 317135, 302735, 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 closest residences to the poultry facility are those associated with Groes-Y-Garreg Farm (i.e. the applicant, family and tenants).

The site is not currently developed and the applicant is now seeking to construct 2 houses for a total maximum capacity of 100,000 birds across the 2 sheds. The broilers will be brought in as day old chicks at a 50-50 mix of males and females. The 36 day growth period (with thinning at day 30) will lead to birds being around 2.0kg in weight by clearout. The new buildings will each measure approximately 98m by 24.5m with a height to the eaves of 2.638 metres, 4.818 metres to the ridge (average 3.728m).

The buildings and fitted with IPT Technology Ltd VentMax 1200 Acid Scrubbers to achieve a 90% reduction in ammonia release rates. The facility will be of modern design, utilising the current best practice control measures for minimisation of ammonia impact in addition to the Ventmax scrubbers. 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 ammonia and the facility will be operated in a manner which discourages such activity.

2.2 Ecological Receptors

Ecological site searches 2km (local sites and AW) and 5km (SSSI and European sites) are included as Appendix D. These confirmed that the following sites are of interest:

- Mongtomery Canal SAC and SSSI;
- Caeau Glyn SSSI;
- Coed Byrwydd SSSI;
- Glyn Wood LWS;
- Numerous ancient woodland sites.

Natural Resources Wales (NRW) also requested that the potential in-combination impacts on the Caeau Glyn SSSI and Coed Byrwydd SSSI were to be assessed for the previous scheme which did not include for the fitting of ammonia scrubbers on the buildings.

2.2.1 *Mongtomery Canal SAC and SSSI*

The JNCC describes the Mongtomery Canal SAC as consisting of:

- Inland water bodies (Standing water, Running water) (73.6%);
- Heath, Scrub, Maquis and Garrigue, Phygrana (2.4%);
- Dry grassland, Steppes (21.6%); and
- Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites) (2.4%).

There are no 'annex I' habitats within this SAC / SSSI, however there is one Annex II species that is a primary reason for selection of this site, which is Floating water-plantain *Luronium natans*:

'This is the largest and the most extensive population of floating water-plantain Luronium natans in Britain and is a highly significant lowland population. In favourable management conditions the species can be dominant over kilometre lengths of canal, carpeting the shallow bed and flowering and setting seed in abundance...'

Luronium natans occurs as two forms: in shallow water with floating oval leaves, and in deep water with submerged rosettes of narrow leaves. As such, any species on the canal banks are not key to the Mongtomery Canal SAC and SSSI designation.

The NRW response (dated 16/12/2019) to Powys planning application 19/1490/FUL for erection of a 32,000 free range egg production unit including silos and all associated works at Trederwen Hall, Trederwen Lane, Arddleen, Llanymynech, SY22 6RZ confirmed that the Mongtomery Canal is not sensitive to nutrient nitrogen deposition: *'The Montgomery Canal SAC does not need a nitrogen deposition assessment as it is not sensitive to it'*¹. For that application an ammonia critical level of 3µg/m³ was assigned and this is also used in this report.

2.2.2 *Caeau Glyn SSSI*

The Caeau Glyn SSSI consists of bracken, grassland and woodland. The land is farmed in accordance with the requirements of the SSSI designation with the young calves and has previously it has been grazed with sheep. It is not regarded as being highly sensitive to ammonia impacts.

2.2.3 *Coed Byrwydd SSSI*

Coed Byrwydd SSSI consists of semi-natural oak-ash woodland.

¹ NRW ref: CAS-90979-S2B6, Planning Ref: P/2017/1509 MAJ, Date: 28/06/2019

3.0 APPROACH

3.1 General Approach

NRW guidance GN 020 and OGN 41 has been followed for this assessment in relation to sites of European and National interest (i.e. 'Natura 2000' sites). Predicted ground level concentrations of ammonia, nutrient nitrogen and acid deposition are compared with relevant air quality standards and guidelines for the protection of sensitive habitats. For local sites and ancient woodland, Guidance *Intensive farming risk assessment for your environmental permit* (May 2018) is used.

On 5th May 2020 NRW published a *Consultation on changes to guidance for assessing the impact of ammonia and nitrogen from agricultural developments*. The consultation end date is August 31st 2020 and as the contents of the final guidance document are unknown at this time, the existing NRW Guidance has been used.

3.2 Critical Levels

Critical levels for the protection of vegetation and ecosystems are specified within relevant European air quality directives and corresponding UK air quality regulations.

Table 3-1
Ammonia Critical Level

Concentration ($\mu\text{g}/\text{m}^3$)	Habitat and Averaging Period
1	Annual mean. Sensitive lichen communities & bryophytes and ecosystems where lichens & bryophytes are an important part of the ecosystem's integrity
3	For all higher plants (all other ecosystems)

NRW has confirmed that the critical level of 3 $\mu\text{g}/\text{m}^3$ should be applied at the sites assessed in this report, including the Montgomery Canal (see section 2.2).

3.3 Critical Loads

Critical loads are set for the deposition of various substances to sensitive ecosystems. The AQTAG procedure defines the dispersion modelling approach in terms of receptor location and arrays, use of topographical and terrain data, the calculation of deposition fluxes, how these should be considered alongside the background conditions and relevant critical levels and loads.

Predicted contributions to nitrogen deposition have been calculated and compared with the relevant critical load range for the habitat types associated with each designated site as derived from the UK Air Pollution Information System (APIS) website². The contribution to critical loads for Nitrogen deposition are recorded as KgN/ha/yr.

² www.apis.ac.uk

Deposition rates were calculated using dispersion modelling results processed by following empirical methods recommended by the Environment Agency in AQTAG and summarised below.

Firstly, calculate dry deposition flux using the following equation:

$$\text{Dry deposition flux } (\mu\text{g}/\text{m}^2/\text{s}) = \text{ground level concentration } (\mu\text{g}/\text{m}^3) \times \text{deposition velocity } (\text{m}/\text{s})$$

The applied deposition velocity for ammonia is 0.020 for grassland and 0.030 for woodland. This may be adapted based on the overall concentration of ammonia as a process contribution however this value is appropriate for concentrations below 10 $\mu\text{g}/\text{m}^3$, as shown in Table 3-2 below.

Table 3-1
Recommended Ammonia Dry Deposition Velocity

NH3 concentration ($\mu\text{g}/\text{m}^3$)	<10	10-20	20-30	30-80	>80
Deposition Velocity	0.02 or 0.03*	0.015	0.01	0.005	0.003

[*for short or tall vegetation]

For sites such as water bodies, this deposition velocity may be reduced still further, with a value of 0.005 m/s having been applied (and accepted) for previous planning applications within Powys.

The units are then converted from $\mu\text{g}/\text{m}^2/\text{s}$ to units of kg/ha/year by multiplying the dry deposition flux by a standard conversion factor for ammonia of 259.7.

NECR report 210 *Assessing the effects of small increments of atmospheric nitrogen deposition (above the critical load) on semi-natural habitats of conservation importance* (2016) summarises the relationships between N deposition and species richness. For a site where a new scheme increases the N deposition on a habitat, the additional deposition required to reduce the species richness is shown.

Wet deposition occurs via the incorporation of the pollutant into water droplets which are then removed in rain or snow, and is not considered significant over short distances compared with dry deposition and therefore for the purposes of this assessment, wet deposition has not been considered.

3.4 Limits and Significance

Natural Resources Wales guidance GN 020 (v1.0, Oct 2017) describes the steps needed to carry out the assessment on the following designated sites:

- European sites
 - Special Areas of Conservation (SAC);
 - Special Protection Areas (SPA); and
 - Ramsar Sites (as a matter of government policy).
- Sites of Special Scientific Interest (SSSI)

The guidance is to be used in conjunction with OGN41 Assessment of ammonia and nitrogen from livestock units. The guidance does not replace existing guidance for assessing the impact of emissions on local nature reserves (LNRs), local wildlife sites (LWSs) and ancient woodland (AW).

The limits to be applied are therefore as follows in relation to both ammonia and N deposition:

1. Where process contribution is below 1% the impact is insignificant;
2. Where process contribution is between 1% and 8% the background must also be considered:
 - a. Where the background is not exceeding the critical level / load and if the PEC does not cause an exceedance of the ammonia critical level or nitrogen critical load then further assessment is not required.
 - b. Where the background and / or background is exceeding the critical level / load, and / or the PEC does cause an exceedance of the ammonia critical level or nitrogen critical load then further mitigation is likely to be required.

GN 020, OGN 41 and Intensive farming risk assessment for your environmental permit only requires that the nutrient nitrogen critical load calculations are undertaken. There is no requirement for the calculation of acidification.

For local nature reserves (LNRs), local wildlife sites (LWSs) and ancient woodland (AW), if the PC meets both of the following criteria they're insignificant and there is no requirement for further assessment:

- the short-term PC is less than 100% of the short-term environmental standard; and
- the long-term PC is less than 100% of the long-term environmental standard.

There is no requirement to calculate PEC for local nature sites.

4.0 ASSESSMENT: INPUTS

Modelling has been completed in line with the requirements of *Guidance on modelling the concentration and deposition of ammonia emitted from intensive farming. Air Quality Modelling and Assessment Unit, 22 November 2010, v3*. The BREEZE AERMOD model has been used.

4.1 Receptors

Modelling was carried out with discrete receptors representing the ecological sites of biological interest. For larger sites (or linear sites perpendicular to the proposed development), multiple discrete receptor locations have been used. The receptor locations are shown on drawing AQ1 and also Table 4-1 below.

Table 4-1
Ecological Receptor Locations

Receptor	Site	OS Coordinate Xm	OS Coordinate Ym	Height (m AoD)
Montgomery Canal SAC / SSSI				
D1	Mongomery Canal SAC 1	318831	300579	88.5
D2	Mongomery Canal SAC 2	319435	301579	86.6
D3	Mongomery Canal SAC 3	319673	302071	87.9
D4	Mongomery Canal SAC 4	320197	302785	84.9
D5	Mongomery Canal SAC 5	320657	303706	83.7
Caeau Glyn SSSI				
D6	Caeau Glyn SSSI 1	317836	302809	152.5
D7	Caeau Glyn SSSI 2	317959	302907	143.9
D8	Caeau Glyn SSSI 3	317963	303043	163.2
D9	Caeau Glyn SSSI 4	317899	303134	158.2
Coed Byrwydd SSSI				
D10	Coed Byrwydd SSSI 1	315942	303975	239.9
D11	Coed Byrwydd SSSI 2	316090	304032	231.7
D12	Coed Byrwydd SSSI 3	316138	304051	226.9
D13	Coed Byrwydd SSSI 4	316246	304085	225.1
D14	Coed Byrwydd SSSI 5	316305	304085	229.0
D15	Coed Byrwydd SSSI 6	316365	304179	227.5
D16	Coed Byrwydd SSSI 7	316417	304287	203.7
D17	Coed Byrwydd SSSI 8	316499	304334	194.5
Glyn Wood LWS				
D18	Glyn Wood LWS 1	318134.7	303152.7	146.7
D19	Glyn Wood LWS 2	318112.4	303085.9	139.2
D20	Glyn Wood LWS 3	318093.2	303018.1	136.5

Receptor	Site	OS Coordinate Xm	OS Coordinate Ym	Height (m AoD)
D21	Glyn Wood LWS 4	318083.1	302964.5	132.6
D22	Glyn Wood LWS 5	318108.4	302899.7	130.2
D23	Glyn Wood LWS 6	318144.8	302820.8	128.6
D24	Glyn Wood LWS 7	318147.9	302726.7	125.7
D25	Glyn Wood LWS 8	318139.8	302638.6	126.4
D26	Glyn Wood LWS 9	318151.9	302543.5	127.3
D27	Glyn Wood LWS 10	318156	302431.2	126.7
D28	Glyn Wood LWS 11	318186.3	302340.1	120.6
D29	Glyn Wood LWS 12	318271.3	302272.4	119.0
D29	Glyn Wood LWS 12	318271.3	302272.4	119.0
Ancient Woodlands				
D30	The Ffridd AW1	317123.2	303215.6	197.9
D31	The Ffridd AW2	317238.8	303190.8	190.6
D32	The Ffridd AW3	317348.9	303182.5	180.9
D33	The Groestyn AW	317644.9	303167.4	170.0
D34	Glyn Cil AW	317936.7	302691.1	176.9
D35	Cil Wood AW	317559.5	301756.5	163.4
D36	Arthurs Wood AW	317362.7	301662.9	171.3
D37	Cocked Hat Wood AW	317094.3	301536.3	147.1
D38	Wyle Cop Wood AW1	316918.1	301801.9	188.8
D39	Wyle Cop Wood AW2	316736.4	301890	183.4
D40	Castle Fluke Wood AW	316616.6	302030.4	148.6
D41	Gilfach Wood AW1	316337.2	302155.7	159.3
D42	Gilfach Wood AW2	316302.8	302319.5	195.9
D43	Gilfach Wood AW3	316136.2	302341.5	187.0
D44	Pant-Y-Fridd Hill AW1	315953.2	302684.3	245.4
D45	Pant-Y-Fridd Hill AW2	315739.8	302894.9	282.8
D46	Pant-Y-Fridd Hill AW3	315697.1	303101.3	277.0

There are no APIS critical load values or NRW citations for local sites (e.g. LWS) or ancient woodland. Therefore robust nutrient nitrogen and acid critical load results are presented for the SAC / SSSI only and these values have been agreed with NRW (appendix B).

4.2 Model inputs

In relation to the Groes-Y-Garreg site, a single scenario has been modelled. This represents the proposed broiler facility with 100,000 birds housed in 2 buildings and fitted with IPT Technology Ltd VentMax 1200 Acid Scrubbers to achieve a 90% reduction in ammonia release rates.

The presence of elevated terrain can significantly affect ground level concentrations of pollutants emitted from sources in a number of ways. Elevated terrain reduces the distance between the plume centre line and the ground level, thereby increasing ground level concentrations. Elevated terrain can also increase turbulence and, hence, plume mixing with the effect of increasing concentrations near to a source and reducing concentrations further away.

The site is located at approximately 201m AOD. Information relating to the topography of the area surrounding the site has been used to assess the impact of terrain features on the dispersion of emissions from the site. Topographical data has been obtained in digital (.ntf) format and incorporated into the assessment. Buildings have been incorporated into the dispersion model as detailed in the modelling files at a height of 3.728m (the average of eaves to ridge). This compares with the 4.0m stack heights modelled (4 per building as per the VentMax design).

The emissions of ammonia from the poultry buildings have been calculated using the Environment Agency / NRW ammonia emission factors with an abatement factor of 90% applied which is consistent with that accepted by NRW for other applications within Wales.

The ammonia emitted from the farm with the standard factor of 0.034 kg NH₃/animal place/year (reduced by 90% to 0.0034 kg NH₃/animal place/year) as shown in Table 4-2. Each of the buildings has been assumed to house 50000 birds (i.e. even distribution at the maximum capacity) which is a worst case assumption as mortality throughout the crop will mean that fewer birds are in the final crop.

Table 4-2
Emission Rates (g/s)

Receptor	Emission
House 1 (proposed)	0.0013477 g/s per fan (4 fans total)
House 2 (proposed)	0.0013477 g/s per fan (4 fans total)

The (standard) emission parameters per stack are as shown in Table 4-3 below for all stacks modelled.

Table 4-3
Emission Parameters

Stack height (m)	Temp (°C)	Velocity (m/s)	Stack Diameter (m)
4.0	25	7.368	1.2

5.0 ASSESSMENT: RESULTS

5.1 Results: Critical Levels

The dispersion modelling results are shown in the tables below. The results shown represent the maximum impact at any point modelled within the identified site (see table 4-1 for the list of discrete receptors).

Table 5-1
PC Results: Critical Levels

Site	NH ₃ Concentration (µg/m ³)	% of Critical Level
Mongomery Canal SAC / SSSI	0.004	0.1%
Caeau Glyn SSSI	0.015	0.5%
Coed Byrwydd SSSI	0.003	0.1%
Glyn Wood LWS	0.011	0.4%
The Ffridd AW	0.015	0.5%
The Groestyn AW	0.014	0.5%
Glyn Cil AW	0.013	0.4%
Cil Wood AW	0.002	0.1%
Arthurs Wood AW	0.002	0.1%
Cocked Hat Wood AW	0.001	0.0%
Wyle Cop Wood AW	0.003	0.1%
Castle Fluke Wood AW	0.003	0.1%
Gilfach Wood AW	0.004	0.1%
Pant-Y-Fridd Hill AW	0.002	0.1%

The dispersion modelling results at the modelled points within the SAC and SSSI are shown in the tables below.

Table 5-2
PC Results: Critical Levels

Site	NH ₃ Concentration (µg/m ³)	% of Critical Level
Mongomery Canal SAC 1	0.001	0.05%
Mongomery Canal SAC 2	0.002	0.08%
Mongomery Canal SAC 3	0.003	0.10%
Mongomery Canal SAC 4	0.004	0.12%
Mongomery Canal SAC 5	0.003	0.10%
Caeau Glyn SSSI 1	0.015	0.52%
Caeau Glyn SSSI 2	0.013	0.44%
Caeau Glyn SSSI 3	0.013	0.43%
Caeau Glyn SSSI 4	0.013	0.42%
Coed Byrwydd SSSI 1	0.001	0.04%
Coed Byrwydd SSSI 2	0.002	0.08%

Site	NH ₃ Concentration (µg/m ³)	% of Critical Level
Coed Byrwydd SSSI 3	0.003	0.09%
Coed Byrwydd SSSI 4	0.003	0.10%
Coed Byrwydd SSSI 5	0.003	0.10%
Coed Byrwydd SSSI 6	0.002	0.08%
Coed Byrwydd SSSI 7	0.002	0.06%
Coed Byrwydd SSSI 8	0.002	0.06%

The result for each of the designated sites (European, national or local) is below 1% of the applicable critical level. All impacts resulting from the proposed site are therefore insignificant.

5.2 Results: N Nitrogen Critical Load

The dispersion modelling results are shown in the tables below. The results shown represent the maximum impact at any point modelled within the identified site.

Table 5-5
PC Results: Critical Levels

Site	Conc (µg/m ³)	N Dep kg/ha/yr	% of Lower C.L.	% of Upper C.L.
Caeau Glyn SSSI	0.015	0.08	0.4%	0.3%
Coed Byrwydd SSSI	0.003	0.02	0.2%	0.1%
Glyn Wood LWS	0.011	0.09	0.6%	0.4%
The Ffridd AW	0.015	0.11	0.8%	0.6%
The Groestyn AW	0.014	0.11	0.7%	0.6%
Glyn Cil AW	0.013	0.10	0.7%	0.5%
Cil Wood AW	0.002	0.02	0.1%	0.1%
Arthurs Wood AW	0.002	0.02	0.1%	0.1%
Cocked Hat Wood AW	0.001	0.01	0.1%	0.0%
Wyle Cop Wood AW	0.003	0.02	0.2%	0.1%
Castle Fluke Wood AW	0.003	0.02	0.1%	0.1%
Gilfach Wood AW	0.004	0.03	0.2%	0.1%
Pant-Y-Fridd Hill AW	0.002	0.01	0.1%	0.1%

The dispersion modelling results against nutrient nitrogen critical load at the modelled points within the SSSI are shown in the table below.

Table 5-6
PC Results: N Critical Loads

Site	Conc ($\mu\text{g}/\text{m}^3$)	N Dep kg/ha/yr	% of Lower C.L.	% of Upper C.L.
Caeau Glyn SSSI 1	0.015	0.08	0.40%	0.27%
Caeau Glyn SSSI 2	0.013	0.07	0.34%	0.23%
Caeau Glyn SSSI 3	0.013	0.07	0.34%	0.23%
Caeau Glyn SSSI 4	0.013	0.07	0.33%	0.22%
Coed Byrwydd SSSI 1	0.001	0.01	0.06%	0.05%
Coed Byrwydd SSSI 2	0.002	0.02	0.12%	0.09%
Coed Byrwydd SSSI 3	0.003	0.02	0.14%	0.10%
Coed Byrwydd SSSI 4	0.003	0.02	0.15%	0.12%
Coed Byrwydd SSSI 5	0.003	0.02	0.15%	0.12%
Coed Byrwydd SSSI 6	0.002	0.02	0.13%	0.10%
Coed Byrwydd SSSI 7	0.002	0.01	0.10%	0.07%
Coed Byrwydd SSSI 8	0.002	0.01	0.09%	0.07%

NRW has confirmed that the relevant critical loads are:

- Caeau Glyn SSSI: Low and medium altitude hay meadows 20 - 30 Kg N/ha/year;
- Coed Byrwydd SSSI: Meso- and eutrophic Quercus woodland 15 - 20 Kg N/ha/year;

The results are as follows:

- The highest PC impact at the Caeau Glyn SSSI is below 1% of the upper and lower critical loads; and
- The highest PC impact at the Coed Byrwydd SSSI is below 1% of the upper and lower critical loads.

All impacts resulting from the proposed site are therefore insignificant.

5.3 Predicted Environmental Concentration

All impacts resulting from the proposed site, fitted with acid scrubbers to mitigate ammonia emissions, are predicted to be insignificant. As such, according to the NRW and Powys Guidance, no further assessment is required for:

- In combination sites; or
- Existing background concentrations.

6.0 CONCLUSIONS

The potential ammonia impacts of an expansion to Groes-y-Garreg on relevant ecological sites has been assessed.

The applicant is seeking to construct 2 houses for a total maximum capacity of 100,000 birds across the 2 sheds. The houses will be fitted with IPT Technology Ltd VentMax 1200 Acid Scrubbers for the abatement of ammonia from the sheds.

An assessment of ammonia impacts against critical levels and critical loads (for nutrient nitrogen) has been completed in accordance with Powys and NRW Guidance. Predicted ground level concentrations of ammonia and nutrient nitrogen are compared with relevant air quality standards and guidelines for the protection of sensitive habitats.

The assessment indicates that:

- All impacts from the proposed site will be below 1% of the relevant limits at all designated sites when acid scrubbers are fitted to the sheds for the abatement of ammonia;
- The N deposition process contribution from the proposed scheme is insignificant.
- The ammonia impacts at the Montgomery Canal European site are insignificant.

For the above reasons the proposed development is considered acceptable in relation to ammonia impacts when fitted with acid Scrubbers for the abatement of ammonia from the sheds.

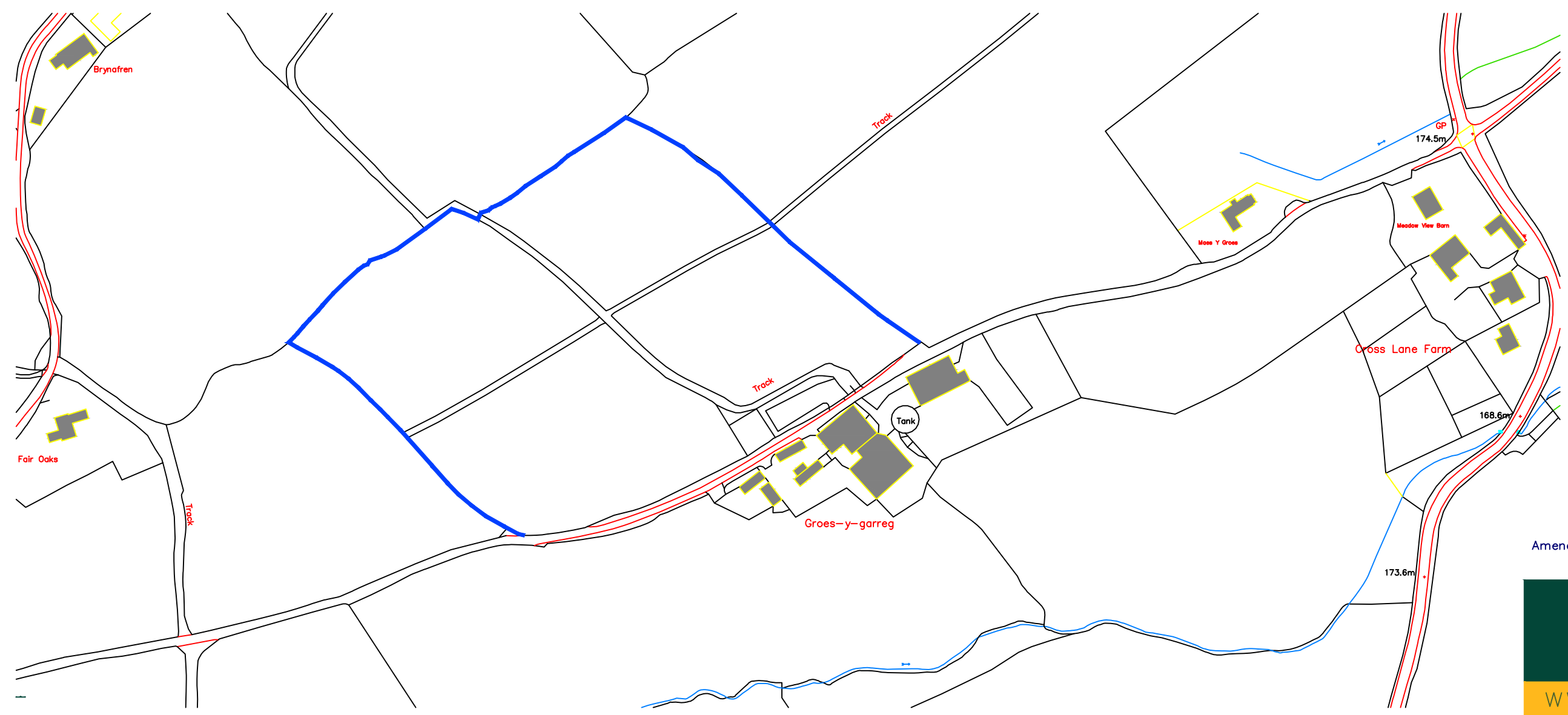
Notice:

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APPENDIX A





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1:2500 @ A3



Amendments:

BERR

PROPERTY | BUSINESS |
PLANNING
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6FG

www.berrys.uk.com

Client:
R.M & C.A Bright

Project:
Proposed Poultry Units at
Groes-y-Garreg, Berriew

Drawing:
Location Plan

Drawing:	Rev.	Scale	Paper	Drawn By:	Date:
SA 31747 01		1:2500	A3	PH	07.02.2019

APPENDIX B



Dyddiad/Date: 29/10/2019

Annwyl / Dear Louise Evans,

Proposal: Erection of two broiler poultry buildings and blending shed, associated infrastructure, highways improvements and landscaping

Location: Groes-y-Garreg, Berriew, Powys

Thank you for consulting Cyfoeth Naturiol Cymru / Natural Resources Wales about the above, which we received on 07/10/2019

We have significant concerns with the proposed development as submitted. We recommend you should only grant planning permission if the following requirements are met and you include the following document within the condition identifying approved plans and documents on the decision notice. Otherwise, we would object to this planning application.

Requirement 1: A detailed in combination assessment which considers other intensive livestock units and other sources of ammonia and nitrogen deposition will need to be undertaken by the decision-making authority in consultation with NRW, along with consideration and implementation of further mitigating measures by the applicant to ensure damage does not occur to the protected sites.

Requirement 2: Manure Management Plan

Requirement 3: Manure Contingency Plan

Approved plans/documents:

- Knight, C (2019) Groes y Garreg R01-Preliminary Ecological Appraisal-Rev01

Protected Sites and aerial emissions

Intensive agricultural units have the potential to impact protected sites through aerial emissions (ammonia and nitrogen deposition). NRW assesses the air quality impact a unit may have on European protected sites and Sites of Special Scientific Interest (SSSIs) within a screening distance of 5km of the unit.

The detailed atmospheric modelling report submitted in support of the proposal ('Ammonia Emissions: Impact Assessment - Poultry Units at Groes y Garreg, Berriew, Powys by Isopleth Ltd. May 2019. Ref: 01.0127.001/AQ v3) indicates that the poultry unit will exceed the 1% process contribution.

It should be noted that there seems to be an error within the first paragraph of section 4.3.1 Model inputs (p12) it states "...100,000 birds housed in 4 buildings...". We note, however, throughout the modelling that 2 buildings are used. It again states in section 1.0 Introduction (p3) that there will be "...100,000 birds in 2 buildings..." This is also stated within the Environmental Statement (6.1 Potential AQ, Health, Climate Change Effects of Poultry Buildings p 21) also says 2 houses. We have taken the proposal to be 100,000 birds housed in 2 buildings. Therefore, the first paragraph of section 4.3.1 Model inputs should be amended to avoid confusion.

We note that Ground source heat pumps are to be used and a 35% reduction to emissions has been applied for the detailed modelling.

The detailed modelling predicts that the process contribution of the proposed extended poultry house to ammonia concentrations would exceed the 1% threshold of the relevant Critical Level at Table 4-6 Results: Critical Levels (p15) gives the process contribution (PC) against both the $3\mu\text{g}/\text{m}^3$ and $1\mu\text{g}/\text{m}^3$, however, NRW confirm we have reviewed the model under $3\mu\text{g}/\text{m}^3$ for the protected sites. The threshold for the Critical Level are all above the 1%, especially Caeau Glyn SSSI with 11%. Background NH_3 is below CLe at $1.7\mu\text{g}/\text{m}^3$ at these sites. Therefore, GN20 Step 4 Detailed consideration with background indicates that if background is below NH_3 -CLe then the poultry unit's process contribution needs to be considered in the context of background ammonia concentration at the sensitive receptors. This is termed the predicted environmental concentration (PEC) and includes the addition of the PC of the unit being assessed with other sources (sumPCs) and with the background levels.

No in-combination assessment with other sources has been submitted for review to date.

In addition, the detailed modelling predicts the exceedance of the 1% threshold percentage of the relevant Critical Load at Table 4-7 Results: N Deposition (p17) gives the PC for N Deposition. For Caeau Glyn the N-CLo should be 20 – 30kgN/ha/yr (MG5a & MG5b low to medium altitude hay meadow), therefore, the PC is 8.6%. Coed Byrwydd the N-CLo is 15 – 20kgN/ha/yr (W9a & W10e meso- & eutrophic *Quercus* woodland), therefore, the PC is 1.9%. As the background level already exceeds Coed Byrwydd SSSI, NRW agrees with section 6.0 Conclusion p.20 that further mitigation is needed.

Therefore, further mitigation measures will need to be explored and implemented to reduce the emission from the unit to an acceptable level.

Requirement 1: A detailed in combination assessment which considers other intensive livestock units and other sources of ammonia and nitrogen deposition will need to be undertaken by the decision-making authority in consultation with NRW, along with consideration and implementation of further mitigating measures by the applicant to ensure damage does not occur to the protected sites.

The in-combination/cumulative assessment must be undertaken by the decision-making authority, which in this instance is Powys Local Planning Authority.

For the detailed modelling the following intensive agriculture units should be considered:

- Those submitted but not yet determined,
- Authorised but not yet started,
- Started but not yet completed,
- Livestock units that started operating after the most recent updates of background levels

A detailed in combination assessment which considers other intensive livestock units and other sources of ammonia and nitrogen deposition will need to be undertaken by the decision-making authority. Please see appendix 1 for an example of the in-combination assessment.

However, it should be noted that as this unit's process contribution alone exceeds the background critical load for Coed Byrwydd SSSI, further mitigating measures must be considered and implemented to ensure damage does not occur to the protected sites. An amended detailed modelling report will need to be submitted which considers any further proposed mitigation measures, this is in order to show the appropriate reduction in emissions.

Manure Management Plan

We note that no manure management plan has been submitted, however, it is stated in section 4.6 and 10.4 of the Environmental Statement that "All of the chicken manure produced in the buildings will be taken straight off the holding after clear-out"

Within section 4 Conclusions of the Pre-Application Consultation Report it states: "A Manure Management Plan will be produced as part of the permitting application and will be submitted with the planning application. This will follow the initial submission. It is proposed to export all the manure to an anaerobic digester plant."

Requirement 2: Manure Management Plan

We require a manure management plan to be submitted in order to see how much manure is produced and exported. More clarity is needed in the form of a full on-farm manure management plan with all livestock considered and then the export of poultry manure included.

To note, the farm is not within a Nitrate Vulnerable Zone and, therefore, this error needs to be corrected to avoid confusion.

Requirement 3: Manure Contingency Plan

We note a loose contingency plan within sections 4.6 and 10.4 for the Environmental Statement. No contingency for wash water during/after disease outbreak has been provided.

Applications need to demonstrate that there is contingency for storing any manure, slurry and dirty water produced at times when spreading may not be possible, for example due to

APPENDIX C





VentMax 1200 Acid Scrubbers for Poultry

Introduction

IPT VentMax end of house wet acid scrubbers are identified as an appropriate BAT for reducing ammonia emissions to air from broiler, broiler breeder houses and layers (Commission Implementing Decision (EU) 2017/302 – **BAT 31 c.1**)

These units are designed to provide all the ventilation needs of the fully stocked houses across the normal range of operating conditions. Each air scrubber unit is equipped with 4 high-velocity fans mounted for a high velocity throw as required. Air is drawn into the houses via inlets located along the sides of the building. It is then drawn into the air scrubber units through a single large internal inlet where it passes through a filter system before being expelled through the fans.

Each poultry house will require roof ridge mounted high-velocity fans and gable end fans which are provided as emergency back-up to the continuous ventilation system. Under the normal range of operating conditions, the ridge fans and gable-end fans are shut down. The emergency back-up system is available to maintain the house environment and ensure bird welfare in the event of extreme heat or system failure.

The whole ventilation system is automatically controlled via the shed “building management system” that is normally accessed from the main electronic panel located in the control room/entrance to each house. Continuous recording via an electronic logbook is in place and can be accessed remotely.

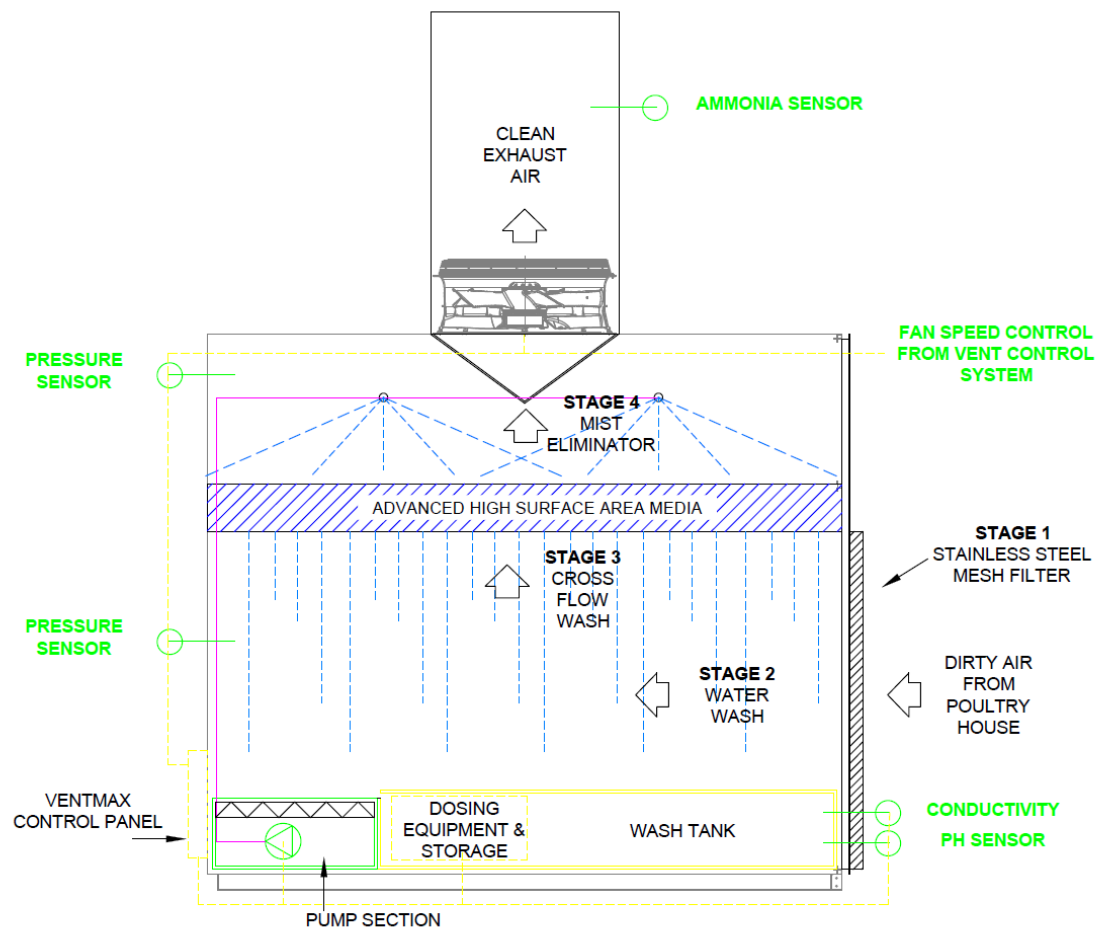
Ammonia Scrubbing Technology

1. General

A continuous ventilation system draws air (by suction principle) through a single point of outlet from the poultry house and across the air scrubber. Ammonia in the air extracted from the house reacts with and dissolves into the acidic substrate within the reactor core. The wet acid scrubber units use sulphuric acid (96%) to maintain a pH value below 4 in the scrubbing liquid at the reactor. The solution is sprayed over a filter media as the air is passed through the system and extracted through high pressure fans and end of house chimneys. The solution is automatically dosed and regulated using a PH sensor. A dirty water filtration system and electrolytic metering ensures continuous operation while discharging treated water to the dirty water tank storage system.

2. How it Works - Scrubber Unit Components

- Air is drawn in through an opening at the end of the poultry house through a stainless-steel filter mesh which removes large particulates. **Stage 1**
- The air is then passed through a water cascade which removes dust and particulate matter before being drawn up through the media filter. **Stage 2**
- The air is then passed through a cross flow packed filter arrangement also known as the reactor. (Advanced High Surface Media), where more dust is removed, and the ammonia gas reacts and is absorbed into the water. **Stage 3**
- The air is finally passed through a mist eliminator to ensure water droplets remain within the unit, before being expelled to atmosphere through a high-pressure fan. **Stage 4**
- A wash tank with pump provides continuous distribution and recirculation of water to the top of the packed tower.
- A self-cleaning and replaceable in-line filtration system removes any solids and replacement with fresh water.
- A dosing station to introduces the chemical to the wash cycle to react with and remove ammonia.
- The scrubber has a built-in acid storage tank for no handling problems which are delivered using a specialist contractor according to use but normally once every 2 months
- The dirty water must be discharged into an onsite dirty water storage tank and removed accordingly once full.
- The unit will require a three-phase electrical supply, connection to a drain to dirty water tank and fresh water supply.





IPT Technology Ltd
Corbett Business Park
Shaw Lane
Stoke Prior
Bromsgrove
B60 4EA

VentMax 1200 Scrubber Data sheet

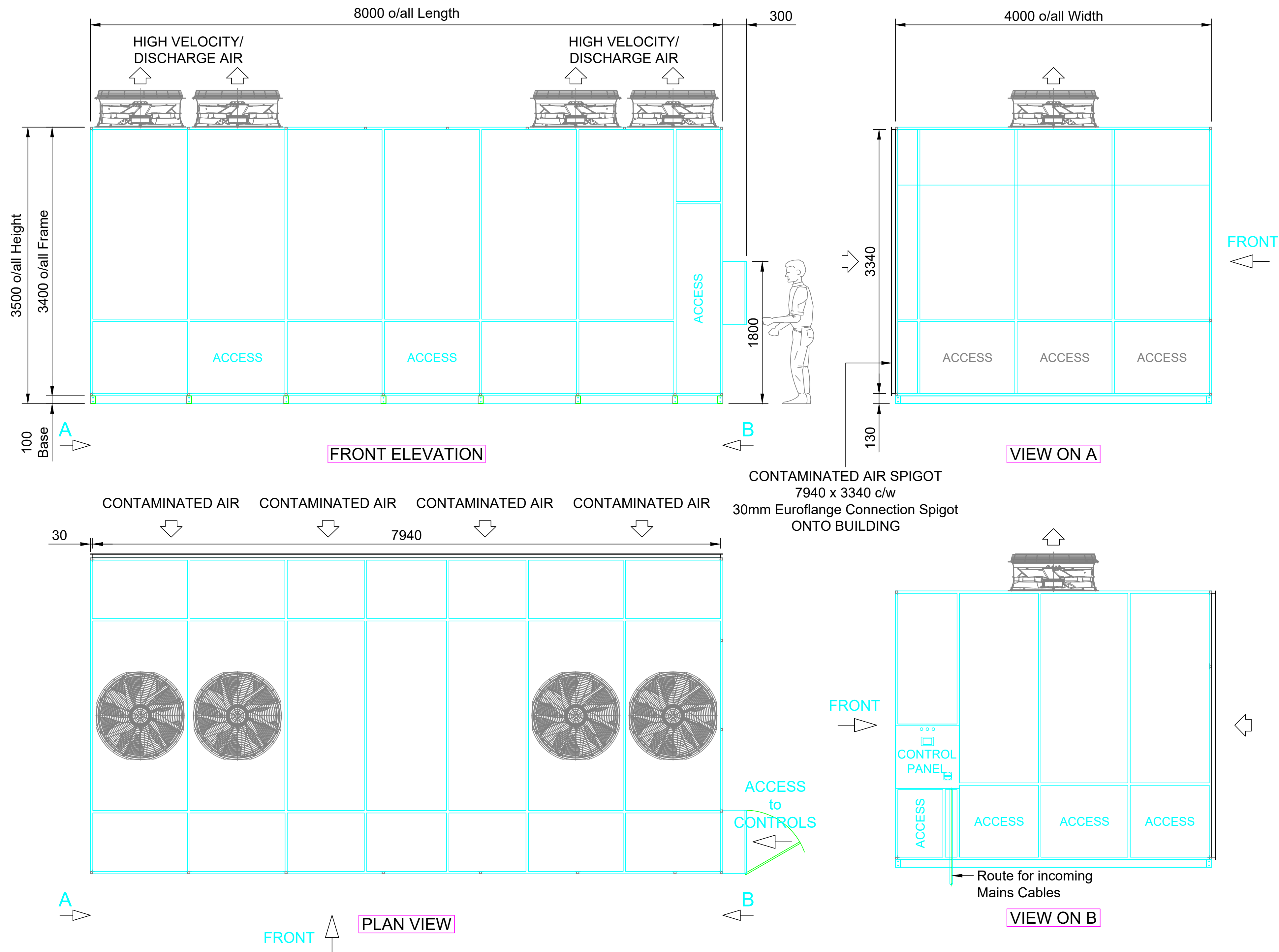
Capacity	Maximum Air Capacity	A30/H65	120,000 m ³ /h
	Minimum Air Capacity	A30/H65	24,000 m ³ /h
	Scrubbing residence time	A30/H65	0.76 sec
	Outlet concentration	NH ₃ 7 @ 33m ³ S	2.00 PPM
	Number of fans		4.00
	Packed filter media		9.60 m ³
	Packed Bed Surface		150.00 m ²
	Maximum Power Consumption	400V	15.00 kW
	Acid holding tank	(B2/W45)	800 ltr

Operating efficiency	Maximum Removal Efficiency	NH ₃	100 %
	Minimum Removal Efficiency	NH ₃	76 %
	Average Removal Efficiency	NH ₃	92 %
	Average Dust Removal Efficiency	PM _{2.5}	97 %
	Average Odour Removal Efficiency	ouE	40 %
	Average water consumption	Fresh	1 m ³ /d
	Average acid consumption	96%	7 ltrs/d
	Maximum Power Consumption	Daily	290 kWh
	Average Power Consumption	Annual	35 MWh

Sensors and monitoring	Water PH Value control	Continuous - pH sensor AO
	Water discharge control	Continuous - EC meter DO
	Ammonia sensors	Continuous - Mid range sensor AO
	Wash tank low level sensor	Continuous - Level sensor AO
	Air temperature sensor	Continuous - temperature sensor
	Pressure Sensors	Continuous - Pressure sensors AO

System	Frame	Stainless Steel
	Wash Tank	Fibreglass
	Lining	Plastic
	Controls	Carell
	Pipework	Stainless Steel
	Acid Tank	Plastic double lined
	Filter media	Plastic

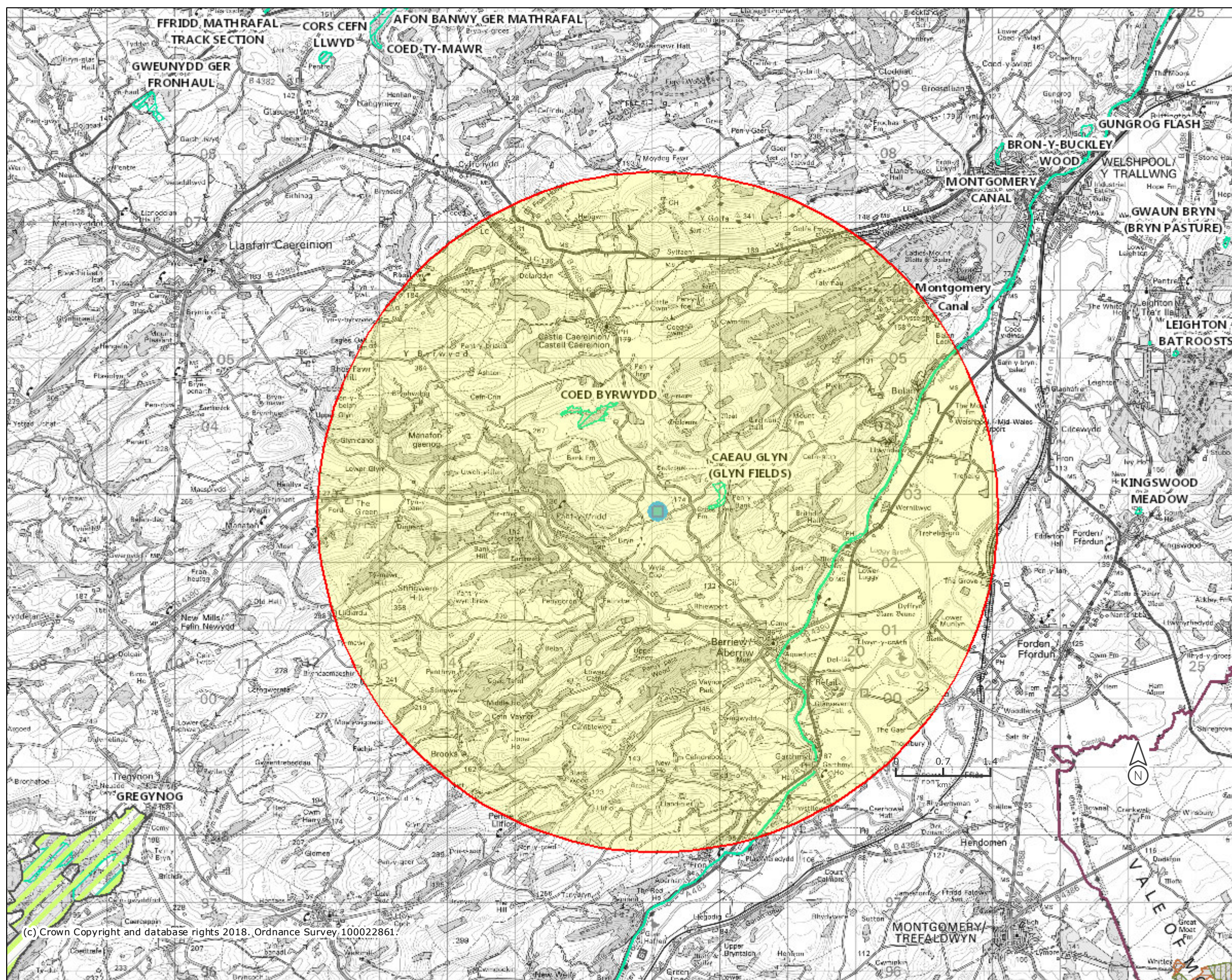
Dimensions	Height (mm)	3500 Length (mm)	8000
	Width (mm)	4000 Weight (kg)	4000



As built drawing	Date	
Working drawing	Date	
For approval	Date	
Preliminary drawing	Date	01-02-2020
IPT Technology Ltd, Cooper House, Cribbet Business Park, Stoke Prior, B60 4EA Tel: 01527 492770 / fax: 01527 492744 www.iptentech.co.uk		
Building VENTMAX Unit		Issue
DESIGNER H Best	01-02-2020	Drawing
CHKD, APPD N.Surname	01-01-2015	VentMax 1200
CLIENT APPD N.Surname	01-01-2015	1
SHEET SIZE Client: IPT	Project No.	Sheet Scale
A1	Drawing Title	1 NTS

APPENDIX D





Legend

- Local Nature Reserves (England)
- National Nature Reserves (England)
- National Nature Reserves (Wales)
- Ramsar Sites (England)
- Proposed Ramsar Sites (England)
- Ramsar Sites (Wales)

Sites of Special Scientific Interest Units (England)

- Favourable Condition
- Unfavourable Recovering
- Unfavourable no change
- Unfavourable Declining
- Part Destroyed
- Destroyed
- Not Assessed

Sites of Special Scientific Interest (Wales)

- Special Areas of Conservation (England)
- Possible Special Areas of Conservation (England)
- Special Areas of Conservation (Wales)
- Special Protection Areas (England)
- Potential Special Protection Areas (England)
- Special Protection Areas (Wales)
- Biosphere Reserves (England)
- Biosphere Reserves (Wales)

Ancient Woodland (England)

- Ancient and Semi-Natural Woodland
- Ancient Replanted Woodland

Projection = OSGB36

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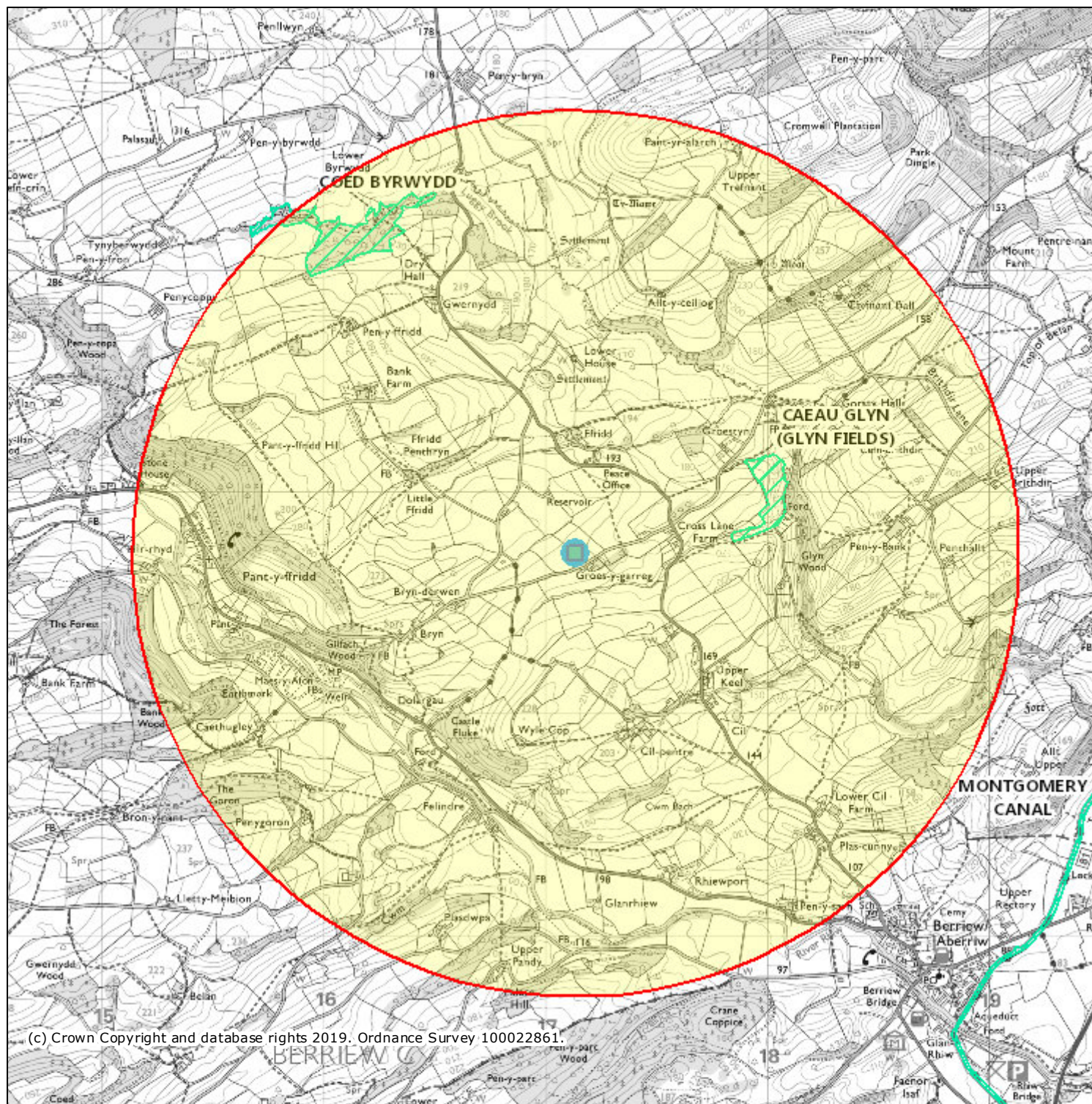
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xmax = 329500

ymax = 308800

Map produced by MAGIC on 13 December, 2018.

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Legend

 Sites of Special Scientific Interest (Wales)

0 0.75 1.5
km

Projection = OSGB36

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ymin = 299900

xmax = 322600

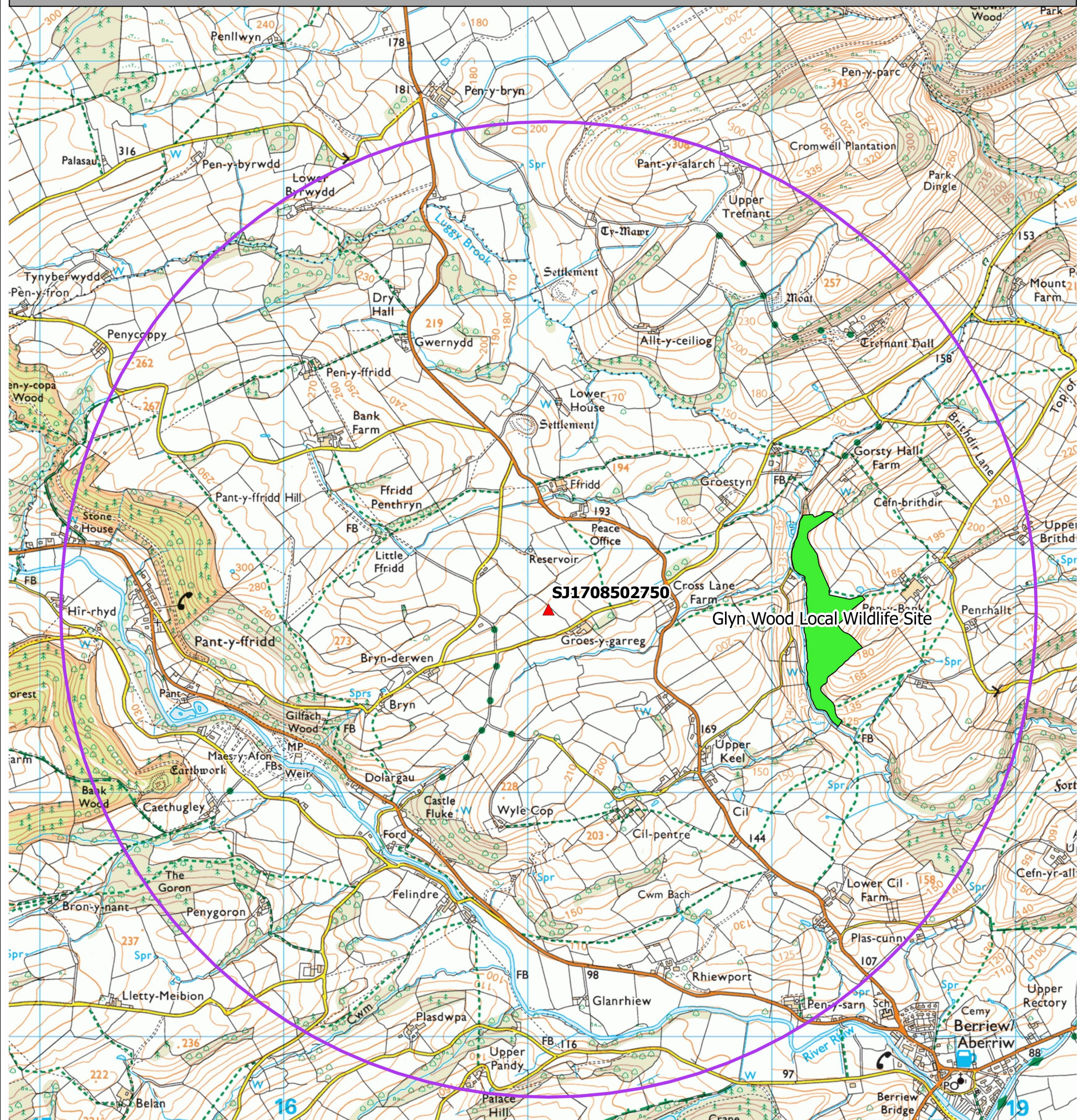
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Map produced by MAGIC on 12 March, 2019.

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Isopleth Data Search - Local sites within 2km of three sites

Site SJ1708502750 - Near Pant-y-ffridd



- Sites of Interest to Nature Conservation (SINCs) and Local Wildlife Sites (LWS)
- 2km Buffer
- ▲ Sites

Glyn Wood Local Wildlife Site

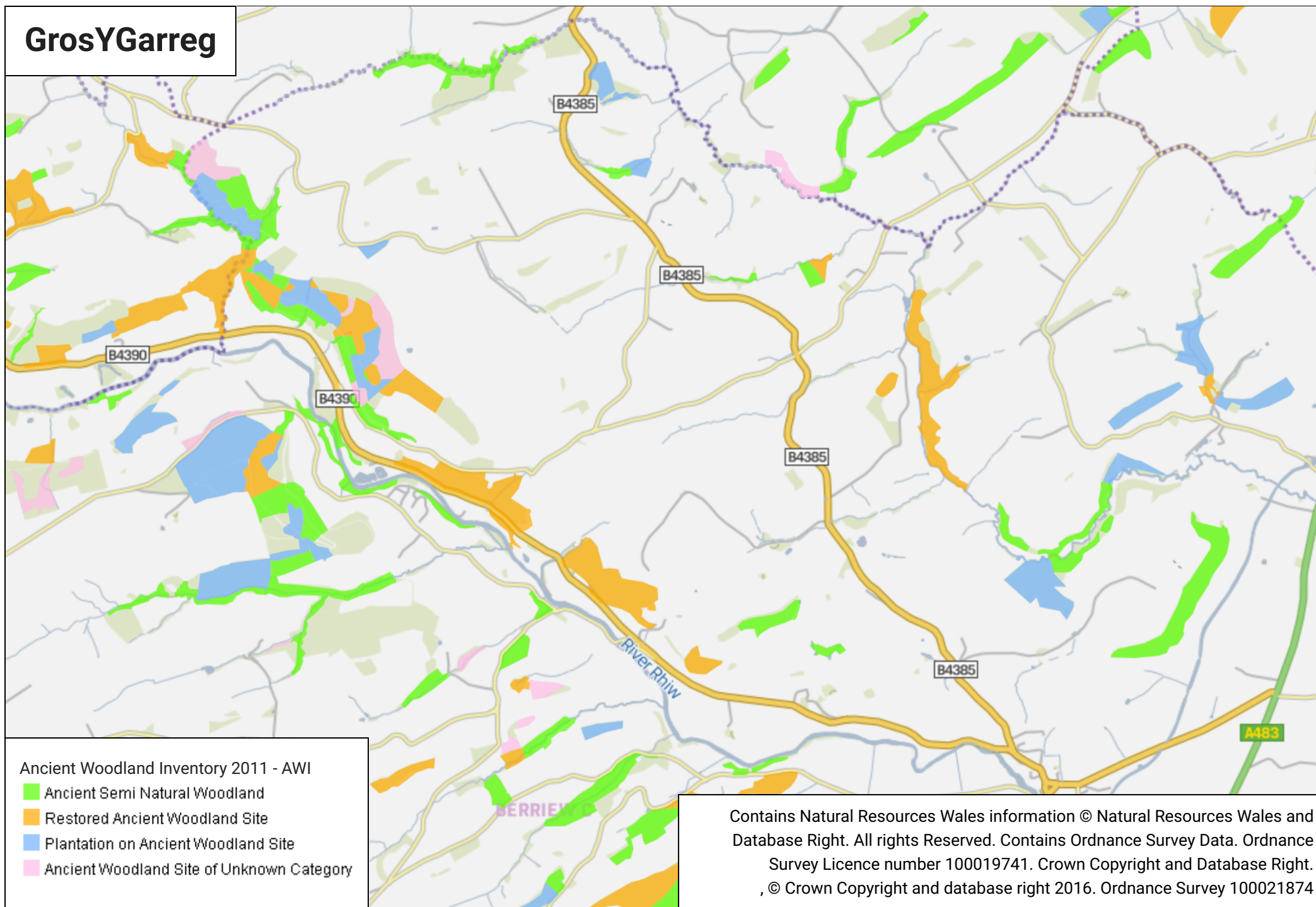
Reason: Meets Powys wildlife site criteria for broadleaved woodland
 Habitats: Broadleaved woodland
 Area: 9.7 Ha
 Status: Adopted



BIODIVERSITY INFORMATION SERVICE
 FOR POWYS AND BRECON BEACONS NATIONAL PARK
GWASANAETH GWYBODAETH FIOAMRYWIAETH
 POWYS A PHARC CENEDLAETHOL BANNAU BRYCHEINIOG

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 Ordnans © Hawlfraint y Goron 2017 Cedwir pob hawl. Rhif trwydded 10048397.

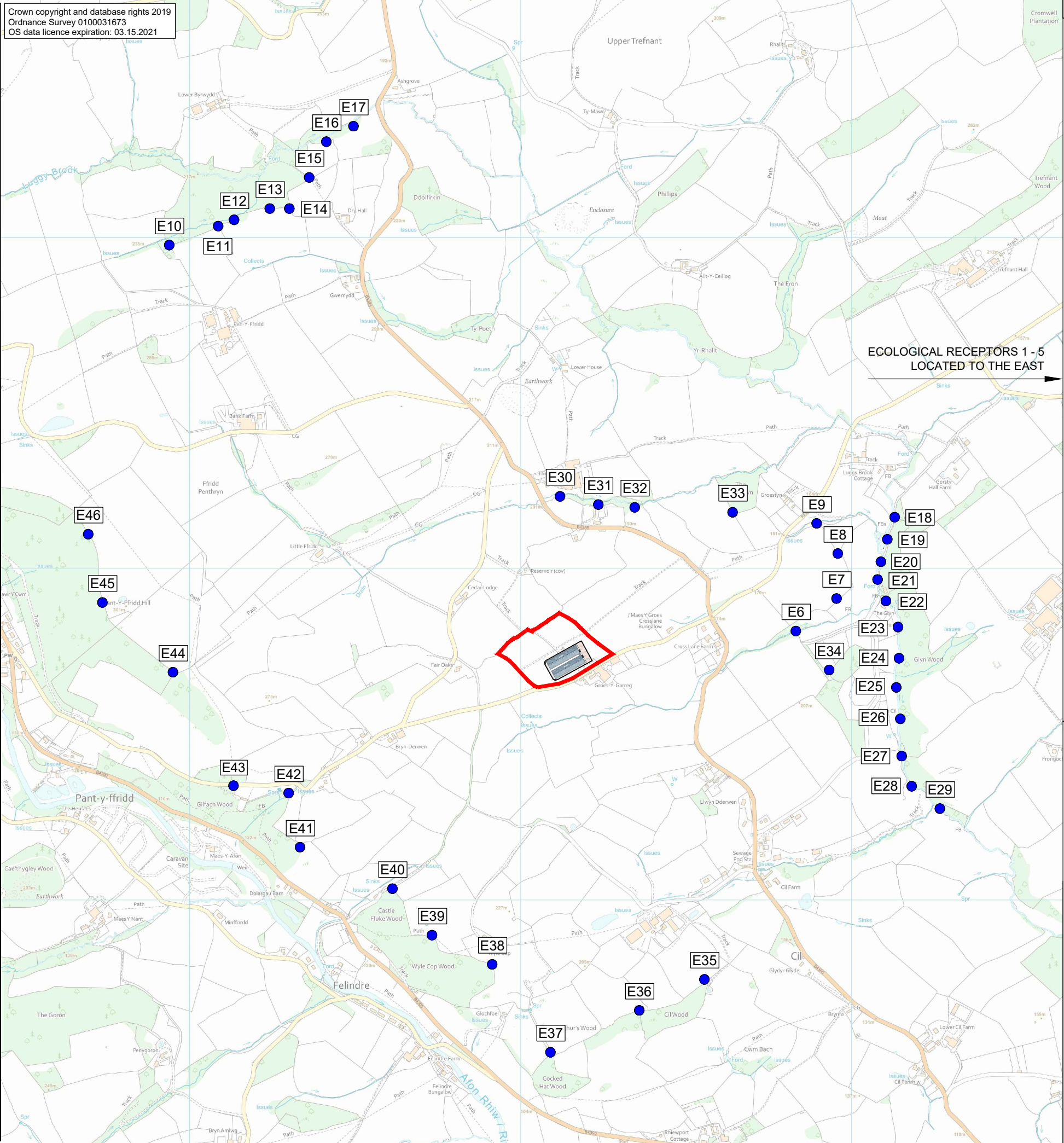
GrosYGarreg



DRAWING AQ1



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E44	315953.2	302684.3
E45	315739.8	302894.9
E46	315697.1	303101.3



LEGEND

SITE BOUNDARY

ECOLOGICAL RECEPTOR LOCATIONS

R.M & C.A Bright

SITE

Proposed Poultry Units at Groes-y-Garreg, Berriew

PROJECT

Air Quality Assessment - 01.0127.003

DRAWING TITLE

Ecological Receptor Locations

DRAWING NUMBER

AQ1

SCALE

1:12500 @ A3

REVISION

0

DATE

26.05.2020



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