

CINDERS POULTRY UNIT, RUABON

AMMONIA EMISSIONS: IMPACT ASSESSMENT

August 2026

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1.0 INTRODUCTION

Isopleth Ltd has been commissioned by Roger Parry & Partners LLP, on behalf of Soaltar Ltd to carry out a detailed assessment of ammonia impacts associated with a proposed extension to an existing poultry unit on land at Cinders Poultry Unit, Ruabon, Wrexham, LL14 6HL. Site layout and location plans are shown in Appendix A of this report.

1.1 Background

The potential ammonia impacts on local ecological sites associated with the development of an extension to an existing new poultry (broiler) building at Cinders Poultry Unit has been assessed.

The site lies within the administrative area of Wrexham County Borough Council (planning) and Natural Resources Wales are responsible for regulating the site under an Environmental Permit.

Two new buildings are proposed. The new facility would therefore consist of:

- 4 existing buildings, the stocking of each reducing from a maximum of 56,250 birds to 46,625 birds; and
- 2 new buildings each housing a maximum of 46,625 birds.

The total capacity of the site would therefore increase from a maximum of 225,000 birds to a maximum of 279,750 birds. The building layouts and husbandry for the extension would remain the same as for the existing unit, albeit at the reduced stocking rate to bring the site in line with the latest RSPCA Standards.

1.2 Previous Applications / Assessments

The site benefits from planning permission for four houses for which Permission was granted 4th March 2019 (Application P/2018/0577):

'erection of four agricultural buildings for rearing livestock (poultry), ancillary buildings and plant, associated infrastructure, landscaping and access arrangements'

The planning application included a detailed assessment of ammonia impacts:

'Modelling of the Dispersion and Deposition of Ammonia from the Proposed Broiler Chicken Rearing Houses at Cinders Farm' produced by AS Modelling & Data Ltd

The Environment and Planning team at Wrexham County Borough Council had no additional comments to make in relation to ammonia. The unit was fully operational by the summer of 2021.

1.3 Approach

An assessment of ammonia impacts against critical levels and critical loads for nutrient nitrogen has been completed:

- Critical levels are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.
- Critical loads are a quantitative estimate of exposure to deposition of one or more pollutants, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.

The type, source and significance of potential impacts have been identified and detailed modelling undertaken in line with the latest NRW Guidance¹.

1.4 Scope

This report is aimed at comparing the predictions of the ammonia modelling with limit values described by Natural Resources Wales and Wrexham County Borough Council. Interpretation of the results and the screening thresholds to be used by the Natural Resources Wales, for example in relation to screening distances and impact thresholds are relevant for both planning and Permitting. This assessment is therefore aimed at meeting the requirements of NRW and therefore also the requirements of Wrexham County Borough Council.

¹ <https://naturalresources.wales/guidance-and-advice/business-sectors/farming/ammonia-assessments/?lang=en>

2.0 APPROACH

2.1 General Approach

NRW has released a web-based guidance suite focussed on the assessment of ammonia emissions from farming. This draws together previous NRW guidance^{2 3 4} into a series of technical notes specific to the size and location of development and the sensitivity of the environment:

- Ammonia assessments for developments that require a permit or planning permission;
- Ammonia assessments: initial screening and evidence gathering (GN 020);
- How to carry out detailed modelling of ammonia emissions (GN 036);
- Detailed modelling of ammonia emissions stages 1 and 2 (GN 036);
- How to interpret the results from your screening or modelling exercise for Ammonia Emissions (GN 020);
- Ammonia scrubber design and use;
- Applications that reduce the impact or risk of pollution (GN 020);
- Emission factors for modelling and reporting; and
- Reducing ammonia emissions from agriculture.

The NRW Guidance suite only requires that the ammonia calculations are undertaken. There is no requirement for the calculation of nutrient nitrogen critical load or acidification as the calculation of the ammonia and nutrient N forms the more stringent test. In this case, calculations of Nutrient N have also been included as these are often requested by local authorities.

NRW guidance 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. In line with the requirements of NRW and consistent with the data presented in the OpenData maps, screening for sensitive ancient woodland site in Wales has also been completed.

The 'development' (i.e. the extension) will house a maximum of 93,250 birds in two houses. When added to the existing houses the maximum number of birds on the farm would be

² 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

³ 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

⁴ NRW Modelling the concentration and deposition of ammonia emitted from intensive farming Reference number: GN036 (version 1.0, December 2019)

279,750. As such, the NRW Guidance suggests that an ecological screening distance of 10 kilometres is used. This applicable for all broiler sites housing over 200,000 birds.

2.2 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 2-1
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)

The critical levels used in this assessment are based on data from APIS and NRW open data on access, flood, habitats, hydrology, landscapes, marine, designated land, water quality, and woodlands⁵ (i.e. NRW opendata sensitivity maps). The opendata sensitivity maps provide additional information to confirm which of the ancient woodland sites in Wales are ammonia sensitive (and therefore the critical level of $1.0 \mu\text{g}/\text{m}^3$ is appropriate) and which are not, where they may be disregarded according to NRW Guidance.

2.3 Critical Loads

Critical loads are set for the deposition of various substances to sensitive ecosystems. 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) website⁶. The contribution to critical loads for Nitrogen deposition are recorded as KgN/ha/yr.

Deposition rates were calculated using dispersion modelling results processed by following empirical methods recommended by the Environment Agency / NRW.

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 stated in NRW *Modelling the concentration and deposition of ammonia emitted from intensive farming Reference number: GN036* (version 1.0, December 2019) and repeated in the May 2021 web-based Guidance, An applied deposition velocity for ammonia of 0.005m/s for water bodies has been accepted by the NRW for other poultry schemes although for most sites there is no applicable critical load for sites where the designated features are aquatic.

⁵ [NRW Open Access Map](https://nrw.maps.arcgis.com/) available at <https://nrw.maps.arcgis.com/>

⁶ www.apis.ac.uk

2.4 Other Sources of Ammonia

NRW Guidance states that:

'The background level of ammonia you get from the APIS website includes sources of ammonia up to the date of publication. You need to check the local authority planning portal for any other sources that have been built or are applying for permission to be built that could affect the sensitive sites within your screening distance. In order to do this assessment each sensitive site needs to be placed at the centre of search area.

You can find out background values from the Air Pollution Information Service (APIS) website

APIS background is given as a three year data set, you should only include sources of ammonia that have been operational after the 31st Dec of the mid year within the three-year average dataset. Sources operational before that date will be considered as part of the background.'

It is understood that the four existing houses were first populated by April 2021, meaning that the emissions from these houses will be encompassed within the APIS background values (mid-year 2023).

2.5 Significance: Interpretation of Results

The NRW Guidance states the following:

'If the process contribution and background levels do not exceed the critical level and there are no other sources to consider then normally the application can proceed.

There will be occasions where the critical level is close to being reached. It is important to note that the critical level is not a target but a level that we want to avoid. Where the background is close to the critical level we may advise against the development even if the critical level is not exceeded.

If the process contribution plus the background level reaches or exceeds the critical level then abatement must be used to reduce the process contribution to below 1% of the critical level, in order for the application to proceed. Assuming there are no other sources of ammonia to consider.

If your process contribution is below 1% of the critical level and there are no other sources of ammonia to consider, the application can proceed regardless of the background level.'

Therefore, where process contributions are up to 1% of the designated site Critical Level or Load, then it should be determined that there is no significant environmental effect/no likely significant effect/damage to a designated site.

3.0 SITE SETTING AND OPERATIONS

3.1 Location

Cinders Farm poultry unit is located in Ruabon, Wrexham at OS GR 332375, 344030. Drawing ECO1 shows the site location in relation to the area.

3.2 Description of Development

Two new buildings are proposed. The new facility would therefore consist of:

- 4 existing buildings, the stocking of each reducing from a maximum of 56,250 birds to 46,625 birds; and
- 2 new buildings each housing a maximum of 46,625 birds.

The total capacity of the site would therefore increase from a maximum of 225,000 birds to a maximum of 279,750 birds. The building layouts and husbandry for the extension would remain the same as for the existing unit, albeit at the reduced stocking rate to bring the site in line with the latest RSPCA Standards.

The farm will be operated in accordance with best practice and BAT standards in EPR 6.09.

- A computer automatically will control ventilation and heating so that heat is not wasted by being drawn out of the building.
- Litter will be kept loose and friable and the manure belts will ensure that it is regularly removed. The quality will be regularly inspected to ensure it does not become excessively wet or dry.
- Temperature in the sheds will meet the health and welfare needs for the age and number of the birds. Heaters will be spaced regularly within the sheds to prevent cold spots and extremes of temperature. The fans are fitted with back draft shutters to prevent drafts and unnecessary heat loss.
- Feed will be delivered from a UKASTA accredited feed mill and blown into bulk feed bins situated adjacent to the house. From the feed bins the feed will be piped into the house and distributed to the birds via a pan feeding system.
- Fallen stock will be recorded daily and securely stored in vermin proof containers awaiting regular collection by a licenced renderer.

Ammonia emissions within the buildings will be reduced through a diet based on 'ideal' protein feed and maintaining good environmental conditions.

3.3 Model Scenarios

Two scenarios have been modelled:

- Scenario 0: Existing site (as built) with 225,000 birds in four houses; and
- Scenario 1: Proposed site with 279,750 birds in six houses.

3.4 Dispersion Modelling Inputs

Detailed dispersion modelling has been completed in line with the NRW ammonia guidance suite. The BREEZE AERMOD model has been used.

3.4.1 Meteorology

The May 2021 NRW Ammonia guidance states that the model should be run using 5 years (minimum 3 years if not possible) of representative meteorological data from the meteorological station nearest to the proposed site. In accordance with this guidance, 5 years (2019 – 2023) of meteorological data from Hawarden, WMO Identifier 3321 (14m AoD), has been used.

None of these sites is ideal for the proposed development location, however the closest of these data sets with good quality data is Shawbury. This site lies approximately 25km from the proposed development site.

Meteorological data was obtained in .met format and converted to .sfc and .pfl formats for use in AERMOD using AERMET Pro according to US EPA methodology. Surface roughness length, Bowen ratio and albedo have been calculated. A roughness length of 0.2625m has been used for the modelling.

3.4.2 Topography

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 set on ground at approximately 100m 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.

3.4.3 Buildings

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.

**Table 3-1
Building Details**

Building	Width (m)	Length (m)	Height (m)	Angle (°)
Existing building 1	25.0	113.5	5.96	0.0
Existing building 2	25.0	113.5	5.96	0.0
Existing building 3	25.0	113.5	5.96	0.0
Existing building 4	25.0	113.5	5.96	0.0
Proposed Building 1	25.0	113.5	5.96	0.0
Proposed Building 2	25.0	113.5	5.96	0.0

3.4.4 Source Parameters

Modelling inputs for the existing and proposed buildings are shown in Appendix B. The emission parameters are as shown in Table 3-2 below. Although the buildings are fitted with multiple stacks, these will not all operate continuously. Modelling has therefore assumed that the average flow (and therefore velocity) will be from 3 stacks at maximum capacity:

**Table 3-2
Stack Details**

Building	Stack height (m)	Stack diameter (m)	Velocity (m/s)
Existing building 1	6.83	1.0	11.0
Existing building 2	6.83	1.0	11.0
Existing building 3	6.83	1.0	11.0
Existing building 4	6.83	1.0	11.0
Proposed Building 1	6.83	1.0	11.0
Proposed Building 2	6.83	1.0	11.0

The temperature of all emissions has been taken as 23°C for all hours of the year.

3.4.5 Emission Rates

The process contribution is calculated as a result of the emissions from the existing and proposed buildings. The SCAIL emission rate for broilers of 0.024 NH₃ kg/pl/yr has been used. The emission rates are shown below for Scenario 0.

**Table 3-3
Stack Emission Rates: Scenario 0**

Stack	Birds	Emission (kg/yr)	Emission (g/s)
Existing building 1	56250	1350.0	0.04281
Existing building 2	56250	1350.0	0.04281
Existing building 3	56250	1350.0	0.04281
Existing building 4	56250	1350.0	0.04281
Total	225000	5400.0	0.17123

The emission rates are shown below for Scenario 1.

Table 3-4
Stack Emission Rates: Scenario 1

Stack	Birds	Emission (kg/yr)	Emission (g/s)
Existing building 1	46625	1119.0	0.03548
Existing building 2	46625	1119.0	0.03548
Existing building 3	46625	1119.0	0.03548
Existing building 4	46625	1119.0	0.03548
Proposed Building 1	46625	1119.0	0.03548
Proposed Building 2	46625	1119.0	0.03548
Total	279750	6714.0	0.21290

3.5 Ecological Receptors

Ecological site searches have been completed using the Opendata maps, as required by NRW Guidance. A screening distance of 10km has been used to identify any sensitive ecological sites in Wales that may have to the potential to be impacted by the proposed scheme. The screening confirmed that the following sites are of potential interest:

- Stryt Las a'r Hafod / Johnstown Newt Sites SSSI / SAC;
- River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid (Wales) SSSI / SAC;
- River Dee and Bala Lake / River Dee (England) SSSI / SAC;
- Nant-y-Belan and Prynela Woods SSSI;
- Sontley Marsh SSSI;
- Shell Brook Pastures SSSI;
- Berwyn and South Clwyd Mountains / Llantysilio Mountains and Minera SSSI / SAC;
- Gatewen Marsh SSSI;
- Castell y Waun a'i Barcdir / Chirk Castle and Parkland SSSI;
- Cloy Brook Pastures SSSI;
- Dinas Bran SSSI;
- Coedwig Ffossil Brymbo Fossil Forest SSSI; and
- Caeau Pen-y-coed SSSI.

There are also ammonia sensitive ancient woodland sites shown on the NRW Opendata database. Drawing ECO1 shows the receptor points modelled. The Coedwig Ffossil Brymbo Fossil Forest SSSI is not ammonia / nutrient N sensitive.

3.5.1 Receptor Co-ordinates

The OS Grid references of the locations of the 20 discrete receptors representing the ecological sites of biological interest are shown in the table below. These are also shown in Drawing ECO1.

**Table 3-6
Receptor Points**

ID	Site	OS Xm	OS Ym	Elevation (m)
ECO1	Ancient Woodland 1	330657.0	338344.0	93.1
ECO2	Ancient Woodland 2	327829.0	338507.0	131.1
ECO3	Stryt Las a'r Hafod	330782.0	345193.0	105.4
ECO4	Johnstown Newt Sites	330782.0	345193.0	105.4
ECO5	River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid (Wales)	334555.0	341746.0	31.1
ECO6	Afon Dyfrdwy (River Dee)	334555.0	341746.0	31.1
ECO7	River Dee and Bala Lake	334575.0	341711.0	27.8
ECO8	River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid (England)	334575.0	341711.0	27.8
ECO9	River Dee (England)	334575.0	341711.0	27.8
ECO10	Nant-y-Belan and Prynela Woods	330884.0	341070.0	102.7
ECO11	Sontley Marsh	333766.0	347410.0	67.9
ECO12	Shell Brook Pastures	335832.0	339571.0	57.1
ECO13	Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains	326294.0	346319.0	301.5
ECO14	Ruabon / Llantysilio Mountains and Minera	326294.0	346319.0	301.5
ECO15	Gatewen Marsh	332147.0	351098.0	89.0
ECO16	Castell y Waun a'i Barcdir / Chirk Castle and Parkland	327660.0	338692.0	140.4
ECO17	Cloy Brook Pastures	339201.0	342145.0	38.1
ECO18	Dinas Bran	322721.0	343283.0	237.8
ECO19	Coedwig Ffosil Brymbo Fossil Forest	329543.0	353398.0	211.5
ECO20	Caeau Pen-y-coed	322712.0	341656.0	111.4

3.6 Baseline Concentration / Deposition

The farm was fully operational by April 2021, hence the impacts of the existing farm should not be considered to be encompassed within the latest APIS background data.

The existing baseline values for each of the designated site types (i.e. roughness class) are as follows.

Table 3-7
Baseline Conditions

Site		NH ₃ concentration (µg/m ³)	Total N deposition (kg/ha/yr)
ECO1	Ancient Woodland 1	2.1	33.1
ECO2	Ancient Woodland 2	1.6	30.3
ECO3	Stryt Las a'r Hafod	1.9	32.3
ECO4	Johnstown Newt Sites	1.9	18.5
ECO5	Afon Dyfrdwy a Llyn Tegid (Wales)	2.5	19.8
ECO6	Afon Dyfrdwy (River Dee)	2.5	19.8
ECO7	River Dee and Bala Lake	2.5	19.8
ECO8	River Dee and Bala Lake	2.5	19.8
ECO9	River Dee (England)	2.5	19.8
ECO10	Nant-y-Belan and Prynella Woods	2.1	33.0
ECO11	Sontley Marsh	2.4	19.1
ECO12	Shell Brook Pastures	2.5	19.9
ECO13	Berwyn a Mynyddoedd De Clwyd	1.1	17.5
ECO14	Ruabon / Llantysilio Mountains and Minera	1.1	17.5
ECO15	Gatewen Marsh	2.0	18.2
ECO16	Castell y Waun a'i Barcdir	1.6	30.3
ECO17	Cloy Brook Pastures	2.7	19.7
ECO18	Dinas Bran	1.1	16.2
ECO19	Coedwig Ffossil Brymbo Fossil Forest	1.4	17.3
ECO20	Caeau Pen-y-coed	1.1	15.8

The existing concentration of ammonia all sites is below the upper critical level limit of 3 µg/m³ but above the limit for sites designated for epiphytes and bryophytes of 1 µg/m³.

4.0 IMPACTS: PROCESS CONTRIBUTION

The results of the ammonia modelling for the Cinders Farm site is presented below.

4.1 Scenario 0: Baseline

The dispersion modelling results for each ecological receptor location are shown in the tables below. This Scenario presents the existing situation, with 4 existing houses.

4.1.1 Results: Critical Levels

The ammonia impacts for the baseline scenario are shown below.

Table 4-1
Results: Critical Levels ($\mu\text{g}/\text{m}^3$)

ID	Site	Result	Critical Level	% of C.L.
ECO1	Ancient Woodland 1	0.005	1.0	0.53%
ECO2	Ancient Woodland 2	0.003	1.0	0.30%
ECO3	Stryt Las a'r Hafod	0.044	not sensitive	
ECO4	Johnstown Newt Sites	0.044	not sensitive	
ECO5	Afon Dyfrdwy a Llyn Tegid (Wales)	0.035	1.0	3.54%
ECO6	Afon Dyfrdwy (River Dee)	0.035	1.0	3.54%
ECO7	River Dee and Bala Lake	0.035	1.0	3.47%
ECO8	River Dee and Bala Lake	0.035	1.0	3.47%
ECO9	River Dee (England)	0.035	1.0	3.47%
ECO10	Nant-y-Belan and Prynella Woods	0.011	1.0	1.11%
ECO11	Sontley Marsh	0.023	3.0	0.78%
ECO12	Shell Brook Pastures	0.016	3.0	0.52%
ECO13	Berwyn a Mynyddoedd De Clwyd	0.001	1.0	0.08%
ECO14	Ruabon / Llantysilio Mountains and Minera	0.001	1.0	0.08%
ECO15	Gatewen Marsh	0.015	3.0	0.49%
ECO16	Castell y Waun a'i Barcdir	0.003	1.0	0.28%
ECO17	Cloy Brook Pastures	0.008	3.0	0.26%
ECO18	Dinas Bran	0.000	not sensitive	
ECO19	Coedwig Ffosil Brymbo Fossil Forest	0.004	not sensitive	
ECO20	Caeau Pen-y-coed	0.002	3.0	0.06%

4.1.2 Results: N Nitrogen Critical Load

The nutrient nitrogen critical load result at each ecological receptor location is shown in table 4-2.

Table 4-2
Results: N Deposition (kgN/ha/yr)

ID	Site	Result	Critical Load	% of C.L.
ECO1	Ancient Woodland 1	0.042	10.0	0.42%
ECO2	Ancient Woodland 2	0.023	10.0	0.23%
ECO3	Stryt Las a'r Hafod	0.342	10.0	3.42%
ECO4	Johnstown Newt Sites	0.228	not sens	
ECO5	Afon Dyfrdwy a Llyn Tegid (Wales)	0.046	2.0	2.30%
ECO6	Afon Dyfrdwy (River Dee)	0.046	2.0	2.30%
ECO7	River Dee and Bala Lake	0.045	2.0	2.26%
ECO8	River Dee and Bala Lake	0.045	2.0	2.26%
ECO9	River Dee (England)	0.180	not sens	
ECO10	Nant-y-Belan and Prynela Woods	0.086	10.0	0.86%
ECO11	Sontley Marsh	0.122	5.0	2.44%
ECO12	Shell Brook Pastures	0.081	10.0	0.81%
ECO13	Berwyn a Mynyddoedd De Clwyd	0.004	5.0	0.08%
ECO14	Ruabon / Llantysilio Mountains and Minera	0.004	5.0	0.08%
ECO15	Gatewen Marsh	0.077	10.0	0.77%
ECO16	Castell y Waun a'i Barcdir	0.022	10.0	0.22%
ECO17	Cloy Brook Pastures	0.041	10.0	0.41%
ECO18	Dinas Bran	0.002	10.0	0.02%
ECO19	Coedwig Ffosil Brymbo Fossil Forest	0.023	not sens	
ECO20	Caeau Pen-y-coed	0.009	10.0	0.09%

4.2 Scenario 1: Proposed

The dispersion modelling results for each ecological receptor location are shown in the tables below for the proposed 6 house layout.

4.2.1 Results: Critical Levels

The ammonia impacts for the proposed scenario are shown below.

Table 4-3
Results: Critical Levels (µg/m³)

ID	Site	Result	Critical Level	% of C.L.
ECO1	Ancient Woodland 1	0.007	1.0	0.67%
ECO2	Ancient Woodland 2	0.004	1.0	0.37%

ID	Site	Result	Critical Level	% of C.L.
ECO3	Stryt Las a'r Hafod	0.057	not sens	
ECO4	Johnstown Newt Sites	0.057	not sens	
ECO5	Afon Dyfrdwy a Llyn Tegid (Wales)	0.044	1.0	4.37%
ECO6	Afon Dyfrdwy (River Dee)	0.044	1.0	4.37%
ECO7	River Dee and Bala Lake	0.043	1.0	4.28%
ECO8	River Dee and Bala Lake	0.043	1.0	4.28%
ECO9	River Dee (England)	0.043	1.0	4.28%
ECO10	Nant-y-Belan and Prynella Woods	0.014	1.0	1.39%
ECO11	Sontley Marsh	0.029	3.0	0.97%
ECO12	Shell Brook Pastures	0.019	3.0	0.64%
ECO13	Berwyn a Mynyddoedd De Clwyd	0.001	1.0	0.10%
ECO14	Ruabon / Llantysilio Mountains and Minera	0.001	1.0	0.10%
ECO15	Gatewen Marsh	0.018	3.0	0.61%
ECO16	Castell y Waun a'i Barcdir	0.003	1.0	0.35%
ECO17	Cloy Brook Pastures	0.010	3.0	0.33%
ECO18	Dinas Bran	0.000	not sens	
ECO19	Coedwig Ffossil Brymbo Fossil Forest	0.005	not sens	
ECO20	Caeau Pen-y-coed	0.002	3.0	0.07%

4.2.2 Results: N Nitrogen Critical Load

The nutrient nitrogen critical load result at each ecological receptor location is shown in table 4-4.

Table 4-4
Results: N Deposition (kgN/ha/yr)

ID	Site	Result	Critical Load	% of C.L.
ECO1	Ancient Woodland 1	0.052	10.0	0.52%
ECO2	Ancient Woodland 2	0.029	10.0	0.29%
ECO3	Stryt Las a'r Hafod	0.441	10.0	4.41%
ECO4	Johnstown Newt Sites	0.294	not sens	
ECO5	Afon Dyfrdwy a Llyn Tegid (Wales)	0.057	2.0	2.84%
ECO6	Afon Dyfrdwy (River Dee)	0.057	2.0	2.84%
ECO7	River Dee and Bala Lake	0.056	2.0	2.78%
ECO8	River Dee and Bala Lake	0.056	2.0	2.78%
ECO9	River Dee (England)	0.223	not sens	
ECO10	Nant-y-Belan and Prynella Woods	0.108	10.0	1.08%
ECO11	Sontley Marsh	0.151	5.0	3.01%
ECO12	Shell Brook Pastures	0.100	10.0	1.00%
ECO13	Berwyn a Mynyddoedd De Clwyd	0.005	5.0	0.10%
ECO14	Ruabon / Llantysilio Mountains and Minera	0.005	5.0	0.10%

ID	Site	Result	Critical Load	% of C.L.
ECO15	Gatewen Marsh	0.095	10.0	0.95%
ECO16	Castell y Waun a'i Barcdir	0.027	10.0	0.27%
ECO17	Cloy Brook Pastures	0.051	10.0	0.51%
ECO18	Dinas Bran	0.002	10.0	0.02%
ECO19	Coedwig Ffossil Brymbo Fossil Forest	0.028	not sens	
ECO20	Caeau Pen-y-coed	0.011	10.0	0.11%

4.3 Difference: Process Contribution

The process contribution represents the change in concentration / deposition rate resulting from the proposed changes to the development (in this case, the reduction in stocking rate and addition of 2 further houses).

4.3.1 Results: Critical Levels

The ammonia process contribution (i.e. difference between scenarios) is shown below.

Table 4-5
Results: Critical Levels ($\mu\text{g}/\text{m}^3$)

ID	Site	Result	Critical Level	% of C.L.
ECO1	Ancient Woodland 1	0.001	1.0	0.13%
ECO2	Ancient Woodland 2	0.001	1.0	0.07%
ECO3	Stryt Las a'r Hafod	0.013	not sens	
ECO4	Johnstown Newt Sites	0.013	not sens	
ECO5	Afon Dyfrdwy a Llyn Tegid (Wales)	0.008	1.0	0.83%
ECO6	Afon Dyfrdwy (River Dee)	0.008	1.0	0.83%
ECO7	River Dee and Bala Lake	0.008	1.0	0.81%
ECO8	River Dee and Bala Lake	0.008	1.0	0.81%
ECO9	River Dee (England)	0.008	1.0	0.81%
ECO10	Nant-y-Belan and Prynella Woods	0.003	1.0	0.28%
ECO11	Sontley Marsh	0.005	3.0	0.18%
ECO12	Shell Brook Pastures	0.004	3.0	0.13%
ECO13	Berwyn a Mynyddoedd De Clwyd	0.000	1.0	0.02%
ECO14	Ruabon / Llantysilio Mountains and Minera	0.000	1.0	0.02%
ECO15	Gatewen Marsh	0.004	3.0	0.12%
ECO16	Castell y Waun a'i Barcdir	0.001	1.0	0.07%
ECO17	Cloy Brook Pastures	0.002	3.0	0.06%
ECO18	Dinas Bran	0.000	not sens	
ECO19	Coedwig Ffossil Brymbo Fossil Forest	0.001	not sens	
ECO20	Caeau Pen-y-coed	0.000	3.0	0.01%

Process contribution impacts at all of the assessed locations are predicted to be below 1% of the critical load.

4.3.2 Results: N Nitrogen Critical Load

The nutrient nitrogen critical load result at each ecological receptor location is shown in table 4-6.

Table 4-6
Results: N Deposition (kgN/ha/yr)

ID	Site	Result	Critical Load	% of C.L.
ECO1	Ancient Woodland 1	0.010	10.0	0.10%
ECO2	Ancient Woodland 2	0.006	10.0	0.06%
ECO3	Stryt Las a'r Hafod	0.099	10.0	0.99%
ECO4	Johnstown Newt Sites	0.066	not sens	
ECO5	Afon Dyfrdwy a Llyn Tegid (Wales)	0.011	2.0	0.54%
ECO6	Afon Dyfrdwy (River Dee)	0.011	2.0	0.54%
ECO7	River Dee and Bala Lake	0.011	2.0	0.53%
ECO8	River Dee and Bala Lake	0.011	2.0	0.53%
ECO9	River Dee (England)	0.042	not sens	
ECO10	Nant-y-Belan and Prynela Woods	0.022	10.0	0.22%
ECO11	Sontley Marsh	0.029	5.0	0.57%
ECO12	Shell Brook Pastures	0.020	10.0	0.20%
ECO13	Berwyn a Mynyddoedd De Clwyd	0.001	5.0	0.02%
ECO14	Ruabon / Llantysilio Mountains and Minera	0.001	5.0	0.02%
ECO15	Gatewen Marsh	0.018	10.0	0.18%
ECO16	Castell y Waun a'i Barcdir	0.005	10.0	0.05%
ECO17	Cloy Brook Pastures	0.010	10.0	0.10%
ECO18	Dinas Bran	0.000	10.0	0.00%
ECO19	Coedwig Ffosil Brymbo Fossil Forest	0.006	not sens	
ECO20	Caeau Pen-y-coed	0.002	10.0	0.02%

Process contribution impacts at all of the assessed locations are predicted to be below 1% of the critical load.

5.0 IN-COMBINATION EFFECTS

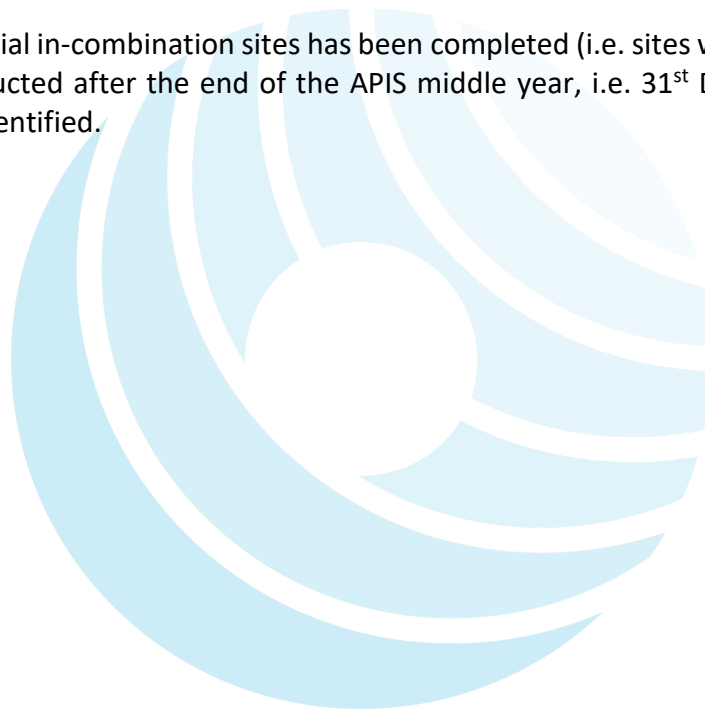
The following NRW Guidance is relevant in this case:

'If your process contribution is below 1% of the critical level and there are no other sources of ammonia to consider, the application can proceed regardless of the background level.'

The dispersion modelling of the proposed extension indicates that, the increase in birds will result in the following:

- Impacts at sites where the critical level applies are predicted to be below 1% of the critical level. The impact is therefore insignificant at these sites; and
- Impacts at sites where the critical load applies are predicted to be below 1% of the critical load. The impact is therefore insignificant at these sites.

A review of potential in-combination sites has been completed (i.e. sites with permission that have been constructed after the end of the APIS middle year, i.e. 31st December 2023. No sites have been identified.



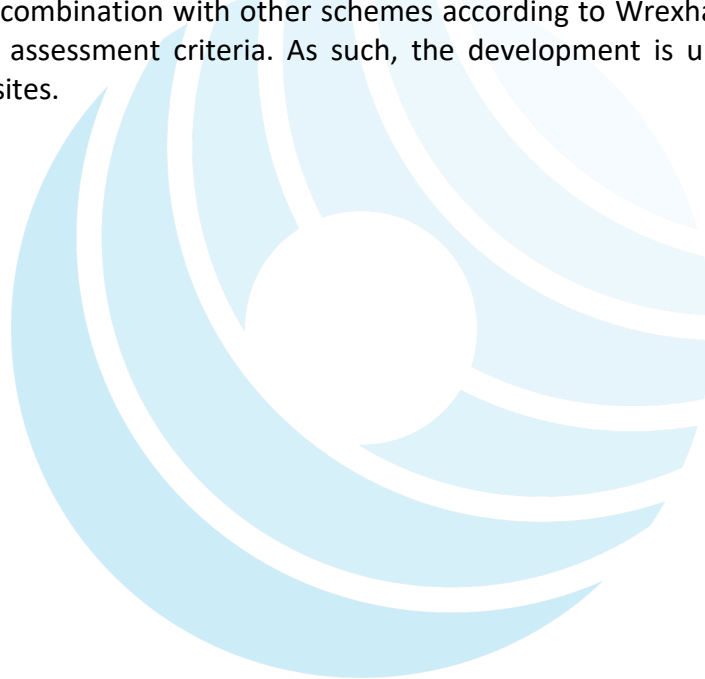
6.0 CONCLUSIONS

Isopleth Ltd has been commissioned by Roger Parry & Partners LLP, on behalf of Soaltar Ltd to carry out a detailed assessment of ammonia impacts associated with a proposed extension to an existing poultry unit on land at Cinders Poultry Unit, Ruabon, Wrexham, LL14 6HL.

The type, source and significance of potential impacts have been identified and detailed modelling undertaken in line with guidance issued by Natural Resources Wales.

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 shows that impacts at all designated ecological sites will be below 1% of the relevant critical level and nutrient nitrogen critical load and are therefore below the thresholds NRW apply in their assessment of potential impact on protected sites. The impacts of ammonia from the proposed development site are therefore predicted to be acceptable either alone or in-combination with other schemes according to Wrexham County Borough Council and NRW assessment criteria. As such, the development is unlikely to adversely impact protected sites.



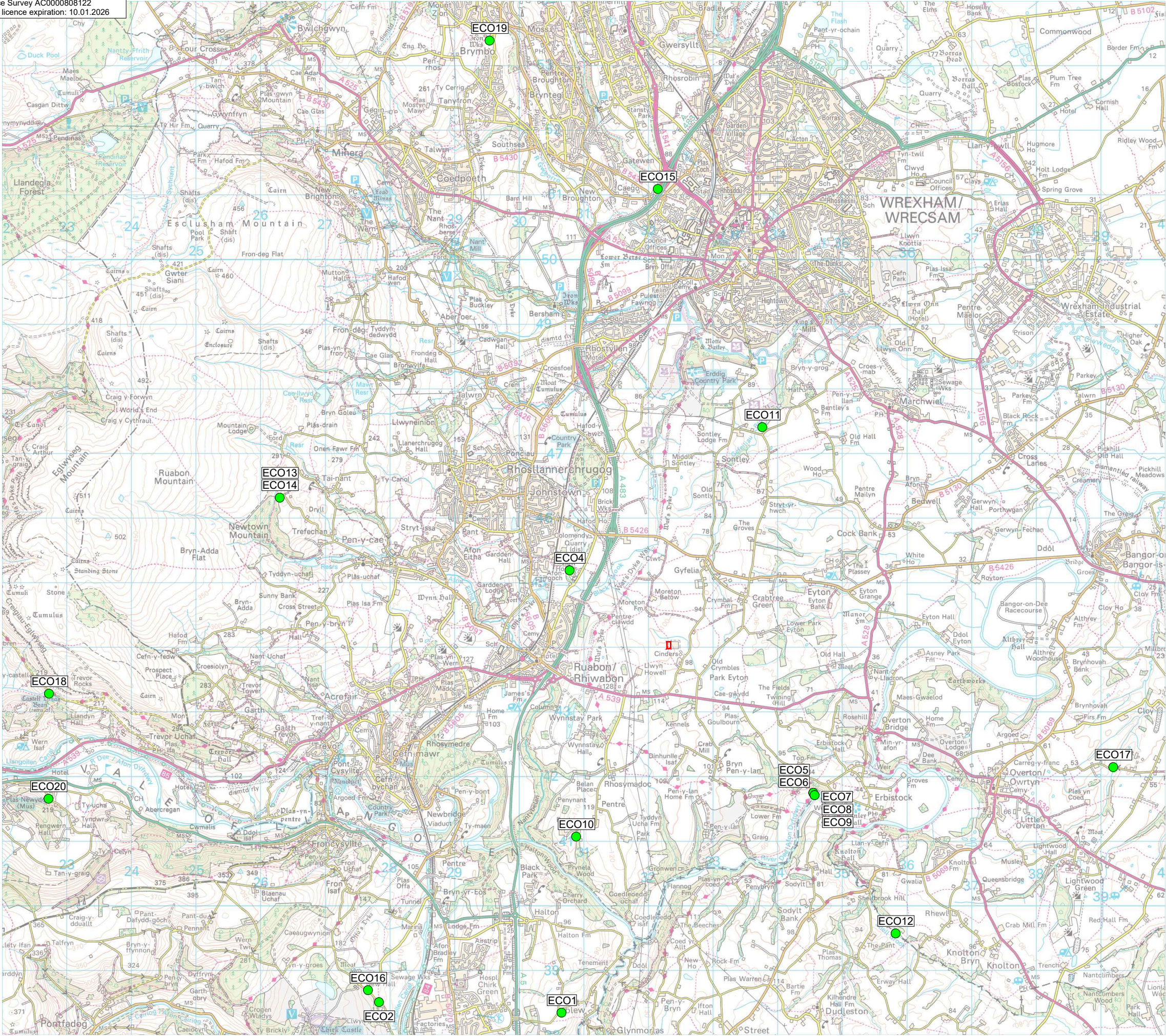
Notice:

This report was produced by Isopleth Ltd to present the results of an air quality constraints assessment for a proposed poultry facility at Cinders Farm.

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DRAWING ECO1





LEGEND



ECOLOGICAL RECEPTOR LOCATION

Soaltar Ltd

SITE

Cinders Poultry Unit, Ruabon, Wrexham, LL14 6HL

PROJECT

Air Quality Assessment

DRAWING TITLE

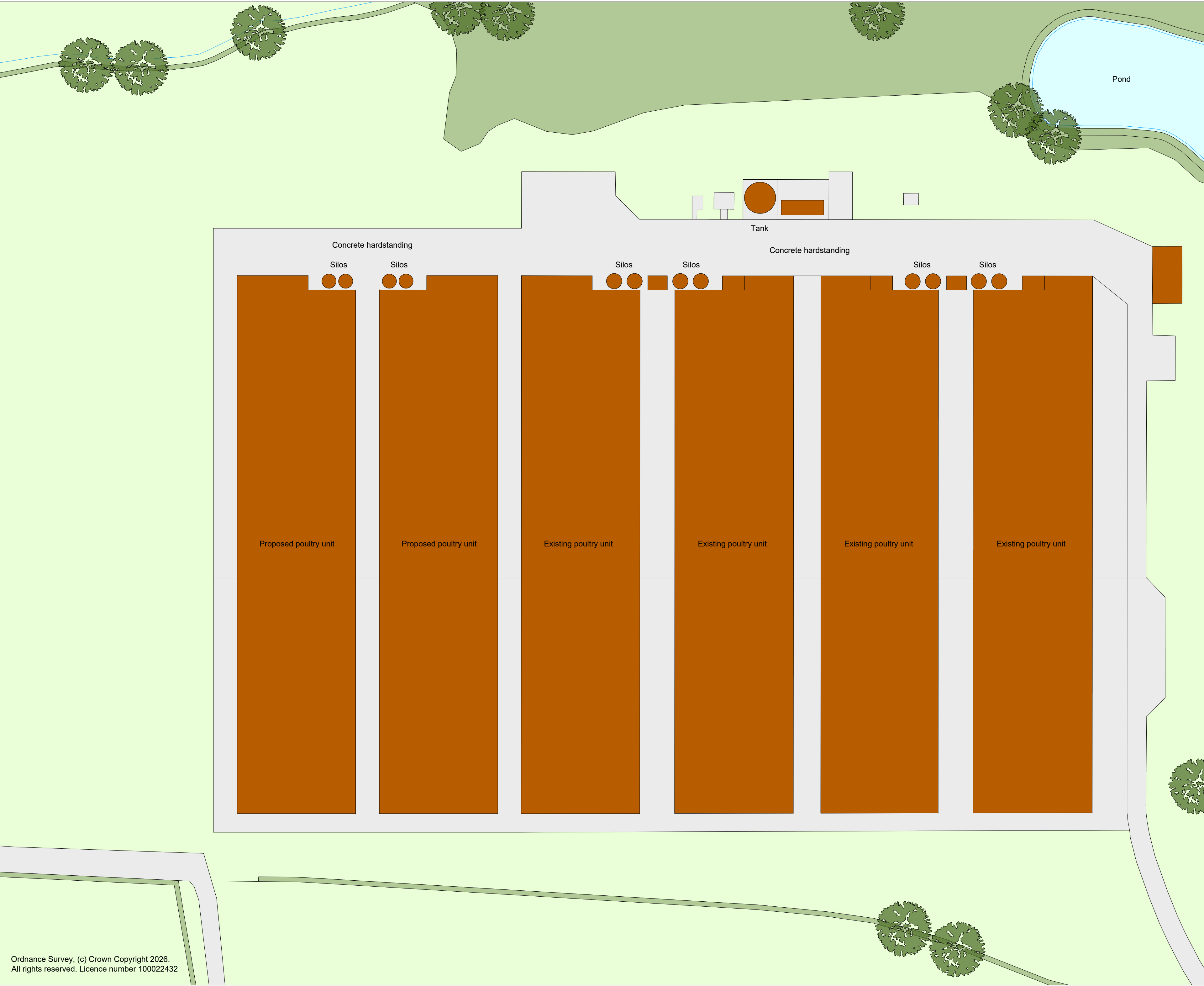
Site Setting and Ecological Receptor Locations

DRAWING NUMBER	REVISION
ECO1	0
SCALE	DATE
1:60000 @ A3	07.08.2026



APPENDIX A





THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELATED DRAWINGS. ALL DIMENSIONS MUST BE CHECKED AND VERIFIED ON SITE BEFORE COMMENCING ANY WORK OR PRODUCING SHOP DRAWINGS. THE ORIGINATOR SHOULD BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY. THIS DRAWING IS COPYRIGHT AND REMAINS THE PROPERTY OF ROGER PARRY & PARTNERS.

-	-	-	-
Rev	Description	Date	By



Residential - Agricultural - Commerical			
Project	Proposed erection of 2no poultry units & all associated works		
Drawing Title	Proposed Block Plan		
Location	Cinders Poultry Unit, Ruabon, Wrexham, LL14 6HL		
Client	Mr Williams-Wynn		
Scale	1:500 @ A2		
Drawing No	81018 / RJC / 003	Rev	-
Drawn By	NB	Date	2026/07/14

MERCIAN HOUSE, 9 & 10 DARWIN COURT, OXON
BUSINESS PARK, SHREWSBURY, SY3 5AL
Tel: 01743 791336
E-mail: mail@rogerparry.net
Web address: www.rogerparry.net
Roger Parry & Partners LLP partnership no. OC212203
Registered Office: 9 & 10 Darwin Court, Oxon Business Park, Shrewsbury, SY3 5AL
Registered in England and Wales.
A list of members of the LLP is available at the above address.



APPENDIX B

Table B-1
Source Locations: Existing Buildings

Stack ID	Location (OS Xm)	Location (OS Ym)	Basal Height (mAoD)
B1S1	332455.50	344001.98	100
B1S2	332455.50	344030.35	100
B1S3	332455.50	344058.73	100
B2S1	332423.10	344001.98	100
B2S2	332423.10	344030.35	100
B2S3	332423.10	344058.73	100
B3S1	332392.60	344001.98	100
B3S2	332392.60	344030.35	100
B3S3	332392.60	344058.73	100
B4S1	332359.90	344001.98	100
B4S2	332359.90	344030.35	100
B4S3	332359.90	344058.73	100

Table B-2
Source Locations: Proposed Buildings

Stack ID	Location (OS Xm)	Location (OS Ym)	Basal Height (mAoD)
B5S1	332330.10	344001.98	100
B5S2	332330.10	344030.35	100
B5S3	332330.10	344058.73	100
B6S1	332300.00	344001.98	100
B6S2	332300.00	344030.35	100
B6S3	332300.00	344058.73	100



Isopleth Ltd
Ulverston,
53 Englishcombe Lane,
Bath
BA2 2EE
www.isopleth.co.uk

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