

Appendix 8-2: Terrestrial Ecology Baseline (2023-2024)

Calderdale Energy Park

PEIR Volume 3

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Report

Calderdale Windfarm

Terrestrial Ecology Report

For Calderdale Energy Park Ltd.

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1 Introduction

- 1.1.1 This appendix has been prepared by Logika Consultants Ltd on behalf of Calderdale Wind Farm Ltd (the 'Applicant') to support the Development Consent Order (DCO) application for Calderdale Energy Park (the 'Proposed Development').
- 1.1.2 The Applicant is seeking a DCO for the Proposed Development that comprises:
- The Turbine Area, which comprises up to 35 wind turbines, an onsite substation, internal site access tracks, and other ancillary on-site infrastructure (such as onsite cabling infrastructure);
 - Access routes, including the Eastern Access Route and Western Access Route, that will provide access from the existing highway/road network to the Turbine Area; and
 - Bradford West Cable Corridor, within which underground cabling will connect the Turbine Area to the Point of Connection at the Bradford West Substation.
- 1.1.3 Previous terrestrial ecological surveys have been undertaken of the Proposed Development, focusing on the Turbine Area only. The majority of this work was led by Natural Power. The raw data from the surveys, as well as the internally shared *Confidential Ecological Survey Summary Report*¹ and separate *Fungi Survey Report*² were shared with Logika and reviewed to inform this report. Additional bat surveys were also carried out by Logika Ltd. in 2025 on buildings within 250m of proposed turbines. This report summarises all elements of terrestrial ecology survey work at the Proposed Development to date and is based on the boundaries published as part of the Preliminary Environmental Information Report (PEIR)³.

1.2 Purpose of this report

- 1.2.1 This Terrestrial Ecology Survey Report has been prepared to provide a summary of the existing terrestrial ecological survey work carried out at the Site. The findings of this report are intended to support the planning and design process and to inform the need for any further ecological surveys, mitigation measures, or licensing requirements in accordance with relevant legislation and policy. The results will also form part of the baseline dataset used to produce the assessment of effects in the final Environmental Statement (ES).

¹ Natural Power (2025). Calderdale Renewable Energy Park. Unpublished report for Worldwide Renewable Energy Global Ltd. Natural Power, Madrid, Spain.

² Harrison & Greaves (2024). Walshaw Moor Grassland Fungi (CHEGD) Survey Report. Unpublished report for Natural Power.

³ Logika (2026). Preliminary Environmental Information Report. Draft report for Calderdale Energy Park. Ref: 16617A-30-R01-F01. Logika, Bristol.

2 Survey Methodology

The Turbine area was subject to a range of protected species surveys to develop a baseline for use in assessment of the potential impacts of the Proposed Development. Table 2-1 below provides a summary of all protected species surveys undertaken to date, methodologies used are provided below in Section 2.1 onwards.

Bat activity surveys were completed in 2025, the results of these are detailed in a separate report provided as Appendix 8-4, Bat Survey Report 2025 to this document.

Table 2-1: Summary of protected species surveys undertaken within the Site and coverage details.

Survey Type	Coverage Area	Coverage Detail	Date/period undertaken	Contractor
Amphibians	Turbine Area	5 ponds in southern extent of Turbine Area	June 2024	Independent subcontractor (Rachel Forsyth)
Bat Preliminary Roost Assessment	Turbine Area	Suitable structures within Turbine Area	Sep-Nov 2023	Natural Power
Bat Emergence survey	Turbine Area	Suitable structures within Turbine Area	Aug-Sep 2024	Wardell Armstrong
Bat Emergence survey	Turbine Area	Buildings 1 and 6 located within 250m of proposed turbines	September 2025	Logika
Bat Static survey	Turbine Area	Sampling throughout Turbine Area	April—Nov 2024	Wardell Armstrong
Bat Swarming survey	Turbine Area	2 culverts with roosting potential	Aug-Oct 2024	Wardell Armstrong
Bat Hibernation survey	Turbine Area	2 culverts with roosting potential	Oct 2024 – Feb 2025	Wardell Armstrong
Badger	Turbine Area	Walkover of Turbine Area	Sep-Nov 2023	Natural Power
Fungi	Turbine Area	Targeted grasslands in south, north and east of Turbine Area	Oct-Nov 2024	APUS Ecology
Invertebrates	Turbine Area	Sampling locations targeting suitable habitat within Turbine Area	Sep-Oct 2024	APUS Ecology
Reptiles	Turbine Area	Targeted transects across Turbine Area	July-Sep 2024	Wildscapes CIC
Protected mammals (badger, otter and water vole)	Turbine Area only	Walkover of Turbine Area	Sep-Nov 2023	Natural Power

2.1 Amphibians

- 2.1.1 A Habitat Suitability Index (HSI) assessment was undertaken at five ponds within the Turbine Area, as shown on Figure A1-1. Ephemeral bog pools, which were present within the site boundary, were not surveyed due to difficulties in sampling in shallow water. Additionally, reservoirs were not surveyed as these were considered too large to support great crested newt. Each waterbody was classed on their suitability to support great crested newts, from poor to excellent in different indicators, following methods described in Oldham et al. (2000)⁴ and the Amphibians and Reptile Group (ARG) advice note⁵.
- 2.1.2 Following this, an environmental DNA (eDNA) survey for great crested newt was undertaken at each location following the standard methodology⁶. The aim of these surveys was to determine the presence or likely absence of great crested newt. The eDNA test kits were provided by an approved laboratory (ADAS)⁷. The surveys were undertaken in suitable weather conditions on 25 June 2024 by a Natural England licenced surveyor before being analysed at the approved ADAS laboratory.

2.2 Bats

Preliminary Roost Assessment

- 2.2.1 A Preliminary Roost Assessment (PRA) of suitable structures within the Turbine Area was undertaken following the standard methodology detailed in the Bat Conservation Trust (BCT) guidance (2024)⁸ to determine their suitability and any evidence of occupation.

Bat emergence surveys

All suitable structures identified during the PRA, detailed above were subject to emergence surveys based on roost potential and the proximity to any proposed turbines (at the time of the survey) with surveys focussing on buildings within 500m of proposed turbines.

Bat emergence surveys were carried out in eight locations by Natural Power in 2024, details of which are presented in Table 2-2 below and shown on Figure A1-4.

Table 2-2: Locations where suitable structures for bats were identified within the Turbine Area

Location	Grid reference
1. Barn	SD 94686 33729
2. Bridge	SD 95557 32142

⁴ Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155

⁵ ARG UK (2010) Advice Note 5: Great Crested Newt Habitat Suitability Index. Amphibian and Reptile Groups of the United Kingdom. Available at: [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.arguk.org/info-advice/advice-notes/9-great-crested-newt-habitat-suitability-index-arg-advice-note-5/file](https://www.arguk.org/info-advice/advice-notes/9-great-crested-newt-habitat-suitability-index-arg-advice-note-5/file) (Accessed: 11 October 2024).

⁶ Biggs J et al, 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*)

⁷ Natural England (2021) Technical Advice Note 2: Environmental DNA (eDNA) for Great Crested Newt Surveys. ADAS. Available at: [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://adas.co.uk/wp-content/uploads/2021/01/Natural-England-Technical-Advice-Note-2.pdf](https://adas.co.uk/wp-content/uploads/2021/01/Natural-England-Technical-Advice-Note-2.pdf) (Accessed: 11 October 2024).

⁸ Bat Conservation Trust. (2024). Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition - Guidance for professionals. [online] Available at: <https://www.bats.org.uk/resources/guidance-for-professionals/bat-surveys-for-professional-ecologists-good-practice-guidelines-4th-edition>.

Location	Grid reference
3. Reservoir Buildings	SD 95813 32836
4. Two house buildings	SD 95975 33549
5. Barn	SD 96847 33390
6. Barn	SD 97127 33224
7. Farm building	SD 98660 31441
8. Ruin	SD 99071 33369
9. Culvert	SD 94289 32844
10. Culvert	SD 93857 32815
11. Trees	SD 94799 34119

Experienced surveyors were positioned around the structures with handheld recording devices (EchoMeter Touch and iPad), looking for any evidence of bat emergence/re-entry or interest in the structures (such as investigatory behaviour) and the use of night vision aids. Surveys were conducted during suitable weather conditions. When the weather was unsuitable for dusk emergence surveys, dawn re-entry surveys were carried out.

2025 bat dusk emergence surveys

- 2.2.2 Further bat dusk emergence surveys were carried out at Locations 1 and 6 (Table 2-2) in 2025, as these were within 250m of the proposed turbine areas, and required further survey effort to meet best practice guidelines⁸. At the survey visit, each surveyor was present on either side of the building to ensure adequate coverage of all aspects of the building.
- 2.2.3 The dusk surveys commenced fifteen minutes prior to sunset and ceased at two hours after sunset. The surveyors were equipped with Nightfox Ember Night Vision Binoculars. Recordings were made of any bats seen and/or heard and the species, the timing, activity, location and direction of flight. Where required owing to light levels/visibility, surveyors were assisted by Nightfox Ember Night Vision Binoculars. The surveys were undertaken in accordance with best practice survey guidelines⁸.
- 2.2.4 The bat emergence surveys were undertaken on 23rd and 24th September 2025 by competent ecologists with multiple years' experience in all aspects of ecological surveys. The temperature was under 15 °C, mostly cloudy with a slight breeze at 7mph.
- 2.2.5 The August bat survey was not completed due to poor weather conditions on the Site during that period, the amount of rainfall, temperature at the time of survey was too low, and the wind speed was too high according to best practice guidelines⁸.

Bat static surveys -2023

- 2.2.6 Bat static surveys were undertaken following best practice guidance for wind developments⁹ the bat survey seasons in 2023. At the time of the survey, 65 turbines were proposed, as such 29 acoustic detectors were deployed, in line with the guidance. The detectors were spread across the Turbine Area, covering the variety of different habitats and elevations where practicable, noting that remote

⁹ NatureScot (2021) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation, Original 2019, updated August 2021

parts of the Turbine Area were not accessible to surveyors. The locations of bat detectors are shown on Figure A1-3. Details of the seasonal bat activity surveys are detailed in Table 2-3 below.

Table 2-3: Details of seasonal bat static surveys

Season	Dates
Spring	14/04/2023 – 12/05/2023
Summer	10/07/2023 – 11/09/2023
Autumn	11/10/2023 – 17/11/2023

2.2.7 Full spectrum SM4+Bat detectors were used except for locations 24 and 25 (Figure A1-3) during the summer deployment, for which Anabat Express bat detectors were in place. Weather data from an onsite met mast was used to aid interpretation of all bat activity data.

Bat swarming and hibernation surveys

2.2.8 A 435m stone lined culvert associated with Widdop Reservoir was identified as having suitability for swarming and hibernating bats during the PRA survey. The two culvert entrances, at Locations 9 and 10 (Figure A1-4), are both within the Turbine Area at the following locations:

- Entrance Location 1 (L1) = OS grid reference SD 93863 32815; and
- Entrance Location 2 (L2) = OS grid reference SD 94290 32843.

2.2.9 The culvert was considered unsafe to allow internal access for hibernation surveys. Static surveys were undertaken using full spectrum SM4+ Bat detectors, with one detector installed at either end of the culvert. The detectors were deployed with the microphones as close as possible to the culvert entrances while avoiding the water and in safely accessible places. The survey dates for hibernation and swarming are detailed in Table 2-4 below.

Table 2-4: Swarming and hibernation survey dates

Swarming survey dates	Hibernation survey dates
12/08/2024 – 28/08/2024	11/11/2024 – 26/11/2024
11/09/2024 – 25/09/2024	04/12/2024 – 17/12/2024
15/10/2024 – 30/10/2024	25/01/2025 – 02/02/2025

Data analysis

2.2.10 Acoustic data analysis was undertaken using Kaleidoscope automatic identification software. Signal parameters were 16-120 kHz, 2-500 ms, 500 ms maximum inter-syllable gap with a minimum of two pulses.

2.2.11 The Kaleidoscope software provides automatic identification to species level which were assumed to be correct for common pipistrelles, soprano pipistrelles and noise. Apart from manual quality checks of a small subset (approximately 20%) of noise files, these records were not investigated further. Automatic identification of other bat species records is considered less reliable and manual checks were therefore performed on all other acoustic records.

- 2.2.12 Myotis species were not identified further than genus due to the overlap between species frequency calls. Pipistrelle, long-eared and Nyctalus bats were manually identified to species when possible but at genus level when it was not possible to distinguish call-types to species level.

2.3 Protected mammal surveys

- 2.3.1 Walkover surveys were undertaken by experienced surveyors to detect and record signs and suitability for protected mammals within the Proposed Development.
- 2.3.2 Badger surveys of all suitable habitat (including all woodland) within the Proposed Development were undertaken. The survey consisted of searches for field signs and setts as described by Bang and Dahlstrøm (2001)¹⁰ and Sargent et al. (2003)¹¹, amongst other sources. Signs were recorded following standard guidance on identifying field signs of those species (e.g. as per Neal and Cheeseman 1996¹²).
- 2.3.3 Suitable habitat (i.e. watercourses and the edges of water bodies) that was accessible within the Turbine Area was surveyed for signs of otter and water voles. Surveys for otter followed standard methods as described in Chanin¹³ and surveys for water vole followed methods described by Strachan et al¹⁴. In accordance with guidance¹⁴, the surveys of watercourses were undertaken when water vole breeding territories were established (mid-April – September) and therefore more likely to be marked by latrines.
- 2.3.4 Any evidence of other protected species (e.g. mountain hare) and invasive species (e.g. American mink) was also recorded during the species-specific surveys outlined above.

2.4 Invertebrates

- 2.4.1 Consultation responses from Natural England highlighted the potential for rare invertebrates to be present within the Turbine Area, therefore invertebrate surveys were commissioned at the Site. A total of 19 sampling points were targeted to survey invertebrates from within the Turbine Area. Samples were collected from areas of heathland and bog habitats, with experienced surveyors using professional judgement to identify the most suitable habitats for rare invertebrates. The sampling locations are shown on Figure A1-6.
- 2.4.2 The sample methods varied depending on the habitat, from pond dipping of the bog pools, to sweep netting areas of vegetation, to the use of smaller tools to collect or otherwise identify invertebrates (such as hand lenses). Photographs and ten figure OS grid references were taken at all sample locations as well as the survey method used at each location. Invertebrate samples collected during the survey were analysed in a laboratory by experienced entomologists.

¹⁰ Bang, P. & Dahlstrøm, P. 2001. Animal Tracks and Signs. Oxford University Press, Oxford.

¹¹ Sargent, G., Morris, P. and Troughton, G. 2003. How to Find and Identify Mammals, 3rd Edition. The Mammal Society, Southampton.

¹² Neal, E., Cheeseman, C. (1996). Badgers. Poyser Natural History, London

¹³ Chanin, P. 2003. Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers: Monitoring Series No. 10. English Nature, Peterborough.

¹⁴ Strachan, R., Moorhouse, T. & Gelling, M. 2011. The Water Vole Conservation Handbook. Third Edition, Wildlife Conservation Research Unit, University of Oxford, Abingdon.

2.5 Reptiles

- 2.5.1 Reptile presence-absence surveys were undertaken between July and September 2024. An alternative approach to the industry standard best practice guidelines was used that was proportional to the size and potential of the Site to support reptiles.
- 2.5.2 A total of 400 artificial refugia (a mixture of 0.5 m x 0.5 m squares of roofing felt and corrugated tins) were deployed within the Turbine Area the week commencing 15 July 2024. The refugia were spread across the Turbine Area in 40 groups with ten refugia per group. The refugia were deployed close to existing tracks to minimise disturbance to nesting birds but covered the range of suitable habitats within the Proposed Development including banksides, stone walls, rubble piles suitable for hibernation, watercourses and at vegetation edges.
- 2.5.3 The refugia were left undisturbed for two weeks prior to the first survey. Survey visits were conducted across the week by multiple surveyors to allow them to be undertaken during suitable weather conditions (e.g. dry, with air temperatures were between 9-20 °c). Full survey details are provided in Table 2-5 below.

A map showing the location of refugia transects is shown in Appendix A1 **Error! Reference source not found..**

Table 2-5: Reptile survey information

Date	Start time	End time	Wind speed	Precipitation	Cloud cover	Start temp	End temp
29/07/2024	06:30:00	08:30:00	1	Dry	3	20	-
30/07/2024	19:00:00	21:00:00	1	Dry	2	18	17
30/07/2024	06:30:00	09:00:00	1	Dry	2	15	18
30/07/2024	18:00:00	20:00:00	1	Dry	2	18	17
31/07/2024	06:30:00	09:30:00	1	Dry	3	13	15
12/08/2024	17:00:00	19:00:00	1	Dry	4	18	15
13/08/2024	08:30:00	11:00:00	2	Dry	4	12	18
14/08/2024	09:00:00	10:30:00	1	Dry	5	12	18
27/08/2024	08:30:00	10:45:00	2	Dry		13	16
28/08/2024	16:00:00	18:30:00	1	Dry	5	17	16
28/08/2024	09:00:00	12:00:00	1	Light rain	7	13	19
03/09/2024	07:45:00	17:17:00	3	Dry	3	13	16
04/09/2024	08:00:00	12:37:00	2	Light rain	2	13	15
09/09/2024	16:00:00	17:30:00	3	Dry	2	15	14
09/09/2024	12:30:00	17:30:00	1	Dry	4	11	14
09/09/2024	12:30:00	17:30:00	1	Dry	3	14	15
09/09/2024	12:45:00	14:45:00	1	Dry	3	15	15

Date	Start time	End time	Wind speed	Precipitation	Cloud cover	Start temp	End temp
10/09/2024	10:00:00	14:00:00	2	Dry	5	9	13
10/09/2024	11:15:00	13:00:00	2	Dry	5	9	13
16/09/2024	16:00:00	18:00:00	1	Dry	2	17	15
17/09/2024	09:00:00	18:00:00	1	Dry	1	11	16
17/09/2024	09:00:00	18:00:00	1	Dry	1	18	16
23/09/2024	16:00:00	18:00:00	1	Dry	7	12	12
24/09/2024	10:30:00	14:40:00	2	Dry	2	10	13
24/09/2024	09:11:00	15:11:00	2	Dry	6	10	12
23/09/2024	16:00:00	18:00:00	1	Dry	7	12	12
24/09/2024	10:30:00	14:40:00	2	Dry	2	10	13
24/09/2024	09:11:00	15:11:00	2	Dry	6	10	12

2.6 Fungi

- 2.6.1 The grasslands to the south of the Turbine Area include Local Nature Reserves (LNR) that support rare fungi as well as proposed SSSIs for CHEGD fungi. As a result, targeted fungi surveys were undertaken, with special attention paid to any CHEGD fungi (e.g. Clavarioids, *Hygrocybe* genus, *Entoloma*, *Geoglossum* relatives and *Dermoloma* relatives) within the Turbine Area.
- 2.6.2 A site visit was undertaken on 29 September and 1 October 2024 to identify areas suitable for the targeted surveys and areas likely to support the most diverse grassland fungal populations. Further surveys were undertaken on 10 October and 5 – 7 November 2024. During the survey period, the weather was typically mild and wet. Further surveys planned for November were cancelled as the sub-zero temperatures would have resulted in a paucity of waxcap records.
- 2.6.3 The surveyors focused on those areas which they considered to have the highest potential suitability for CHEGD species, namely in short-sward grasslands, which equated to the mapped transect areas shown on Figure A1-9 and detailed in Table 2-6. Sampling techniques included walking rough transects with periodic deviations from the transect where habitat suitability and fungal density dictated.
- 2.6.4 The areas of highly suitable habitat or areas with abundant or high levels of diversity, were marked on a map during the survey. Photographs of the fungi were taken for future identification and where necessary DNA samples taken to enable DNA barcoding.

Table 2-6: Details of Fungi transects

Transect	Date of Survey	Precipitation	Water level
Fungi Transect 1	29/10/2024	Drizzle	Medium
Fungi Transect 2	01/10/2024	Drizzle	Medium

Transect	Date of Survey	Precipitation	Water level
Fungi Transect 3	01/10/2024	Drizzle	Medium
Fungi Transect 4	02/10/2024	Drizzle	Medium
Fungi Transect 5	03/10/2024	Drizzle	Medium
Fungi Transect 6	05/11/2024	Drizzle	Medium
Fungi Transect 7	03/10/2024	Drizzle	Medium
Fungi Transect 8	04/10/2024	Drizzle	Medium

CHEGD Assessment

- 2.6.5 In 1995, Rald¹⁵ introduced a method for evaluating the ecological value of waxcap grasslands by counting the number of waxcap species found at a site. According to his criteria, sites with 22 or more species are of international importance, 17 or more species are considered nationally important, those with 9–16 species regionally important, 4–8 species locally important, and sites with 3 or fewer species were deemed to have little or no conservation value.
- 2.6.6 This approach was later expanded by Rotheroe and colleagues to encompass a broader range of distinctive grassland fungi. The resulting system, widely used in fungal surveys today, became known as the "CHEGD" assessment system. The acronym stands for the four main groups of fungi typical of these habitats: C for clavarioid fungi (club and coral fungi), H for Hygrocybe species and their relatives (waxcaps), E for Entoloma species (pinkgills), and G for geoglossoid fungi (earthtongues). More recently, the acronym has been updated to "CHEGD" to include additional grassland fungi such as the *Dermoloma*, *Pseudotracheloma*, *Camarophyllopsis*, and *Hodophilus*.

2.7 Limitations

The following limitations and gaps in survey data have been identified from the previous terrestrial ecology survey work:

- Survey access was limited in areas of open moorland and bog habitat due to health and safety constraints associated with unstable ground, deep peat, and waterlogged conditions. Where desk study records or field evidence indicate the presence of protected species, presence will be assumed within the assessment. It is acknowledged that the absence of records does not necessarily confirm absence; however, the most remote and inaccessible areas of bog and open moorland are generally considered to be of low suitability for many protected species, as these habitats are typically less hospitable, with high water levels, peat-dominated substrates, and low overall species diversity.
- Currently all survey work to date has focused on the Turbine Area only and further protected species surveys are required within the Western Access Route and Bradford West Cable Corridor and Eastern Access Route, to assess the potential impacts of the Proposed Development within these areas.

¹⁵ Rald, E., 1985. Vokshatte som indikatorarter for mykologisk værdifulde overdrevslokaliteter. Svampe, 11, pp. 1-9.

- Additional ponds have been identified within the Desk Study Report by Logika¹⁶ which have not been surveyed for protected amphibians, therefore further assessment is required to cover all waterbodies identified within this report.
- The surveys detailed above were based on proposed wind turbine locations at the time of survey and further updates to the design may result in the need for additional areas to be surveyed.

The following survey limitations in Table 2-7 were noted in respect of survey work led by Natural Power.

Table 2-7: Survey limitations form data supplied by Natural Power

Survey	Limitation
Great crested newt survey	<p>The eDNA survey was conducted at the end of the survey window, when the water levels in the ponds were lower and the chances of collecting sediment quite high. This resulted in two inconclusive samples, one of which was from a pond, which when full, is interconnected to the pond for which a positive sample was returned, and thereby likely also used by great crested newts. In the absence of a negative test, it is assumed precautionarily that great crested newts are also present in the other pond for which an inconclusive result was returned.</p> <p>Ephemeral bog pools, which were present within the site boundary, were not surveyed due to difficulties in sampling in shallow water. Additionally, reservoirs were not surveyed as these were considered too large to support great crested newt. Each waterbody was classed on their suitability to support great crested newts, from poor to excellent in different indicators, following methods described in Oldham et al. (2000) and the Amphibians and Reptile Group (ARG) advice note.</p>
Bat static survey	<p>Access for the spring bat static surveys was constrained by the potential presence of breeding birds within the moorland. Detectors were deployed adjacent to existing tracks to reduce disturbance to the moorland habitats.</p> <ul style="list-style-type: none"> • The spring deployment was restricted to 23 detectors rather than the 29 required for a 65-turbine scheme in line with guidance. • The summer and autumn deployments included the full 29 detectors, with the additional six detectors deployed further from the existing tracks to increase the coverage across the Turbine Area. <p>The guidance specifies the use of full spectrum bat detectors however Anabat express zero crossing detectors were used in two locations (24 and 25, Figure A1-3) during the summer deployment as the full spectrum detectors were not available due to unforeseen circumstances. The summer deployment was staggered with detectors 1 - 25 and 27 deployed from 10 – 20 July while detectors 26, 28 and 29 were deployed between 20 July to varying dates in August and September.</p> <p>Some detectors (10, 13, 15, 21, 24-29) experienced technical failures for part of the deployment period. Despite the malfunction of these bat detectors, survey effort and spatial coverage remained sufficient to meet the survey objectives, and the findings are therefore considered reliable and valid.</p>
Bat swarming surveys	<p>No limitations were reported during the swarming surveys though wind speeds above 5 m/s were recorded on six of the surveyed nights.</p>

¹⁶ Logika (2025). *Desk Study Report*. Unpublished report for Calderdale Energy Park. Logika, London.

Survey	Limitation
Bat hibernation survey	The hibernation survey was not undertaken until late in January, as the Proposed Development was inaccessible due to snow for a portion of the month which postponed access for the survey. There was a technical fault at L2 for the January deployment and no recordings were made, but the detectors are assumed to have been fully functional for the rest of the survey period.
Reptile survey	Some meteorological data was missing from the raw data supplied by Natural Power. Missing meteorological information has been filled in using historical weather data online ¹⁷ .
Invertebrate survey	Like fungi, invertebrates are small and difficult to detect, with distribution and abundance varying over the Proposed Development with some species restricted to small areas. The surveys therefore only provide a late season snapshot of the invertebrate assemblage present within the Proposed Development, identifying communities/areas of interest for which longer term monitoring may be required.
Fungi survey	The fruiting bodies of CHEGD fungi are notoriously variable and respond to seasonal weather fluctuations. Fruiting bodies are produced less frequently in dry periods and are susceptible to rapid desiccation during prolonged windy and warmer spells. In addition, fruiting times vary amongst species across and between years. It is therefore seldom possible to gain a full picture of the mycological composition of an area from a single or small number of visits in one year. Ideally subsequent visits made at different times of the fruiting season across more than one year would provide a more accurate indication of CHEGD distribution, diversity and abundance across the Proposed Development. The fungi surveys did however allow for the collection of a species list and identification of key areas and is therefore considered to provide an appropriate level of detail for an initial assessment of the Proposed Development.

¹⁷ Visual Crossing Corporation (2026). Historical weather data available from: <https://www.visualcrossing.com/weather-data/> [accessed 26th February 2026].

3 Survey Results

3.1 Amphibians

Table 3-1 presents the HSI and eDNA results for five ponds within the Turbine Area and the results are shown on Figure A1-1. Great crested newts were confirmed to be present at a single pond (reference number 4). In addition, common toad, common frog, palmate and smooth newts were recorded on Site separately during the reptile survey, locations of which are shown on Figure A1-1.

Table 3-1: Great crested newt survey results Pond Reference HSI score HSI result eDNA result

Pond no.	HSI score	Pond Suitability	eDNA result
1	0.57	Below average	Positive
2	0.61	Average	Indeterminate
3	0.57	Below average	Negative
4	0.63	Average	Indeterminate
5	0.52	Below average	Negative

3.2 Bats

Preliminary Roost Assessment and emergence surveys

- 3.2.1 A total of ten structures suitable for bat roosts at eight locations were identified within the Turbine Area. Emergence/re-entry surveys were conducted at Locations 1-8 in 2024 and repeated at Locations 1 and 6 in 2025 (Figure A1-4). Only one possible emergence was recorded at Location 7 in 2024, although this could not be confirmed by video or sound analysis (Figure A1-4).
- 3.2.2 Details of each location and their Suitability for roosting bats, and emergence survey results is shown in Table 3-2 below, and Figure A1-4.

Table 3-2: Summary of bat emergence, swarming and hibernation survey results within the Turbine Area

Location	Grid reference	Suitability	Survey Effort	Emergence?	Species present and summary of activity
1. Barn	SD 94686 33729	Moderate*	2 dusk emergence surveys in 2024	No	Common pipistrelle, noctule bat, Myotis sp.. Recorded foraging and commuting along the river corridor.
			1 dusk emergence survey in 2025	No	One foraging Natterer's bat
2. Bridge	SD 95557 32142	Moderate	1 dusk emergence survey in 2024	No	No bat activity recorded
3. Reservoir Buildings	SD 95813 32836	Moderate	1 dusk emergence survey in 2024	No	Common pipistrelle, Myotis sp., and noctule bat. Foraging and commuting around buildings.
4. Two house buildings	SD 95975 33549	High	2 dusk emergence surveys in 2024	No	Common pipistrelle commuting throughout survey
5. Barn	SD 96847 33390	High	1 dawn re-entry survey in 2024	No	No bat activity recorded
6. Barn	SD 97127 33224	High	1 dawn re-entry survey in 2024	No	Noctule bat single foraging pass
			1 dusk emergence survey in 2025	No	Two foraging bats Common pipistrelle and Noctule
7. Farm building	SD 98660 31441	High	2 dusk emergence surveys in 2024	Yes	Possible emergence. No other activity recorded.

Location	Grid reference	Suitability	Survey Effort	Emergence?	Species present and summary of activity
8. Ruin	SD 99071 33369	Moderate	1 dusk emergence survey in 2024	No	Single noctule bat pass (faint)
9. Culvert	SD 94289 32844	High	Swarming and hibernation survey in 2024	n/a	Brown long-eared bat, common pipistrelle, Myotis sp., Nathusius pipistrelle, Noctule, Soprano pipistrelle, Unknown sp.. were recorded with the highest number of passes by common pipistrelle.
10. Culvert	SD 93857 32815	High	Swarming and hibernation survey in 2024	n/a	Common pipistrelle, Myotis sp., Nathusius pipistrelle, Noctule, Soprano pipistrelle, were recorded highest number of passes by common pipistrelle.
11. Trees	SD 94799 34119	Negligible	No survey	n/a	
*This was downgraded from 'high' during the emergence surveys in 2025, following the addition of a weather station at the building, and further review of the suitability of the structure at the time of survey.					

Bat Static Surveys - 2023

A total of six species were recorded during the static deployment surveys, these were: Myotis species *Myotis* sp., species, Leisler's bat *Nyctalus leisleri*, common noctule *Nyctalus noctula*, noctule species *Nyctalus* sp., Nathusius pipistrelle *Pipistrellus nathusii*, Common pipistrelle *Pipistrellus pipistrellus*, Soprano pipistrelle *Pipistrellus pygmaeus*, Pipistrelle species *Pipistrellus* sp., and brown long-eared bat *Plecotus auritus*.

Across the surveyed seasons, common pipistrelle activity accounted for 88.55 % of all recorded activity. Detector locations 26, 28 and 29 recorded the highest level of bat activity. 39.96% of all recorded passes were recorded at location 26, which was located on the edge of upland heath and blanket bog habitat, close to a small woodland block and stream. A further 25.72% of activity recorded at location 28, located in the middle of blanket bog, and 16.33% of recorded activity at location 29 in an open area of upland acid grassland. The detectors at locations 4 – 25 each recorded less than 2% of the total activity. Figure A1-3 shows the locations of bat detectors. Detectors 7, 15, 22 and 29 were moved in 2025 and so have two locations shown on the figure.

3.3 Protected mammals

Evidence of several protected mammal species was observed within the Turbine Area during the walkover survey for protected mammal species. The results of the survey are presented on Figure A1-5 and summarised in Table 3-3 below.

Table 3-3: Summary of protected mammal survey results

Species	Survey notes
Water vole	Suitable habitat for water vole was recorded throughout the Turbine Area with a single potential burrow recorded adjacent the Walshaw Dean Lower Reservoir; no other evidence of water voles was recorded.
Otter	A single well used otter holt was recorded with numerous spraints in a cave at the edge of the Walshaw Dean Lower Reservoir in addition to two couches on watercourses in the northern part of the Turbine Area.
Mink	Evidence of American mink was abundant along the Greave Clough and connected watercourses including scat amidst extensive potential dens.

No evidence of other protected species such as badgers or mountain hares has been recorded during the ecological surveys.

3.4 Invertebrates

3.4.1 A total of 138 invertebrate species were recorded during the invertebrate surveys, across six different taxonomic orders. A large proportion of the records (71) were from the order Coleoptera (beetles), followed by Arachnida (28) and Hemiptera (26). A list of each taxonomic order and the number of species within each is provided in **Error! Reference source not found.** below.

Table 3-4: No. of invertebrate species per taxonomic order

Taxonomic order	No. of species
Mollusca	1

Taxonomic order	No. of species
Diptera (True flies)	9
Hemiptera (True bugs)	26
Arachnida	28
Hymenoptera	2
Coleoptera	71
Unknown	1
Total	138

3.4.2 The most widespread species recorded within the survey was *Conomelus anceps* (a species of planthopper) which was recorded in all sample locations. This was followed by *Nemastoma bimaculatum* (a species of harvestman) and *Pachygnatha clercki* (a species of orb weaver spider), which were both recorded in six survey locations.

The following notable or protected species were recorded and are shown on Figure A1-6.

- *Stictonectes Lepidus* (a freshwater beetle)'Near Threatened' in the International Union for Conservation of Nature (IUCN) Red List¹⁸; and
- Notable species *Altica longicollis* (a flea beetle), and *Aquarius najas* (a river skater).

3.5 Reptiles

3.5.1 One species of reptile, common lizard *Zootica vivipara*, was recorded during the reptile survey and was recorded throughout the Site. No other reptile species was recorded on Site throughout the survey; and none were reported by the Estate gamekeepers or other surveyors within the Turbine Area, despite the presence of suitable habitat.

3.5.2 Several amphibians including common frog, common toad, smooth newt and palmate newt were recorded. A summary of all records is provided in Table 3-5 below and Figure A1-8.

3.5.3 The peak count during the survey was for four common lizards under refugia number 288 on 28 August 2024.

Table 3-5: Reptile survey results

Survey date	Grid reference	Species	Sex	Life stage
12/08/2024	SD9675634790	Common lizard	Male	Adult
13/08/2024	SD9479934010	Common lizard	Unknown	Adult
13/08/2024	SD9479633997	Common lizard	Unknown	Unknown
13/08/2024	SD9479333983	Common lizard	Unknown	Juvenile
13/08/2024	SD9790334694	Common lizard	Female	Adult
13/08/2024	SD9648631867	Common lizard	Unknown	Juvenile

¹⁸ Red List GB Post 2001 - Red list conservation status of GB species EXCLUDING BIRDS - based on IUCN guidelines.

Survey date	Grid reference	Species	Sex	Life stage
13/08/2024	SD9651431870	Common lizard	Unknown	Juvenile
13/08/2024	SD9690533384	Common lizard	Unknown	Juvenile
27/08/2024	SD9788734676	Common lizard	Male	Adult
27/08/2024	SD9788734676	Common lizard	Male	Adult
28/08/2024	SD9496734013	Common lizard	Female	Adult
28/08/2024	SD9430732471	Common lizard	Unknown	1 adult ,3 juvenile
28/08/2024	SD9427732478	Common lizard	Female	Adult
28/08/2024	SD9479133979	Common lizard	Unknown	Juvenile
28/08/2024	SD9898633287	Common toad	Unknown	Unknown
28/08/2024	SD9903333311	Common frog	Unknown	Unknown
28/08/2024	SD9883233178	Common lizard	Female	Adult
28/08/2024	SD9779732599	Common lizard	Unknown	Juvenile
28/08/2024	SD9673934815	Common lizard	Female	1 adult and 1 juvenile
28/08/2024	SD9675534791	Common lizard	Male and female	Adult
28/08/2024	SD9678034751	Common lizard	Male	Adult
03/09/2024	SD9650831863	Common lizard	Unknown	Juvenile
03/09/2024	SD9707133112	Common lizard	Unknown	1 adult and 1 juvenile
03/09/2024	SD9707133112	Common lizard	Male	2 adults
03/09/2024	SD9665034894	Smooth newt	Unknown	Juvenile
03/09/2024	SD9676034788	Common frog	Unknown	Juvenile
03/09/2024	SD9690733698	Common lizard	Female	Adult
04/09/2024	SD9790834700	Common lizard	Female	Adult
04/09/2024	SD9517134386	Common lizard	Male and female	Adult
09/09/2024	SD9517134386	Common toad	Unknown	Unknown
09/09/2024	SD9696933922	Common toad	Unknown	Unknown
09/09/2024	SD9708433125	Common lizard	Male	Adult
09/09/2024	SD9697133372	Common lizard	Unknown	Juvenile
09/09/2024	SD9693833376	Common lizard	Unknown	Adult
09/09/2024	SD9693833376	Common lizard	Unknown	Juvenile
09/09/2024	SD9691533380	Common lizard	Unknown	Juvenile

Survey date	Grid reference	Species	Sex	Life stage
09/09/2024	SD9691533380	Common lizard	Unknown	Juvenile
09/09/2024	SD9677034767	Common lizard	Unknown	Juvenile
09/09/2024	SD9677034767	Common lizard	Unknown	Juvenile
09/09/2024	SD9677034767	Common lizard	Female	Adult
09/09/2024	SD9677534758	Common toad	Unknown	Adult
09/09/2024	SD9664734889	Common lizard (slough remains)	Unknown	Unknown
09/09/2024	SD9973233457	Common lizard	Unknown	Unknown
09/09/2024	SD9562932158	Common lizard	Unknown	Unknown
09/09/2024	SD9562932158	Smooth newt	Unknown	Juvenile
10/09/2024	SD9233233437	Common lizard	Unknown	Juvenile
10/09/2024	SD9648331867	Common lizard	Male	Adult
10/09/2024	SD9647431867	Common lizard	Unknown	Juvenile
10/09/2024	SD9646131868	Common lizard	Unknown	Juvenile
10/09/2024	SD9651331869	Common lizard	Unknown	Unknown
16/09/2024	SD9461533521	Common lizard	Male	Adult
16/09/2024	SD9762834359	Amphibian species	Unknown	Unknown
16/09/2024	SD9687833682	Common lizard	Unknown	Juvenile
16/09/2024	SD9691633380	Common lizard	Unknown	Juvenile
24/09/2024	SD9693033376	Common lizard	Unknown	Adult
24/09/2024	SD9656733656	Palmate newt	Female	Adult
24/09/2024	SD9535032893	Common frog	Unknown	Unknown
24/09/2024	SD9479333986	Common frog	Unknown	Juvenile
24/09/2024	SD9461533521	Common lizard	Unknown	Unknown
24/09/2024	SD9562932158	Common lizard (melanistic individual)	Unknown	Juvenile

3.6 Fungi

3.6.1 A minimum of 45 CHEGD species were recorded in total across Transects 1-10 within the Turbine Area, of which 23 species were true waxcaps. According to the CHEGD assessment system this equates to an exceptionally rich site for waxcaps, indicating these are long established grasslands, potentially of international importance.

3.6.2 Fungi Transects 1-6 recorded the highest numbers of CHEGD fungi, with the highest number (25) recorded in Transect 5. Several rare and cryptic waxcap species were also recorded within Transects 4, 5, 6 and 7 including:

- Glistening waxcap *Gloioxanthomyces vitellinus* in Transect 7, which is endangered according to the IUCN Red List;
- Pink club species *Clavaria messapica*, in Transects 5 and 4, likely new to the UK; and
- Fanvault species *Hodopilus Sp.*, in Transect 6, a very rare fungi species.

A number of other cryptic species of *Entoloma sp.*, were also recorded across Fungi Transects 8, 6, 5 and 4. A summary of CHEGD fungi diversity within each transect area is provided in Table 3-6 below.

Table 3-6: No. of CHEGD fungi found within each transect

Transect	Location	CHEGD Fungi	Habitat Notes
Fungi Transect 1	SD 95734 32936 to SD 95409 32483	16	Short-sward grassland interspersed with Juncus.
Fungi Transect 2	SD 95208 32017 to SD 95418 31651	26	Short-sward grassland with some Juncus
Fungi Transect 3	SD 94801 32320 to SD 95454 32213	21	Short-sward grassland with some Juncus
Fungi Transect 4	SD 95026 32723 to SD 94819 33220	20	Short-sward grassland with plentiful Juncus
Fungi Transect 5	SD 94802 33353 to SD 94861 33975	25	Short-sward grassland becoming progressively wetter and interspersed with abundant Juncus pasture and mosses
Fungi Transect 6	SD 95213 33341 to SD 95869 33588	16	Short-sward grassland with Juncus
Fungi Transect 7	SD 96613 35221 to SD 97550 34736	11	Purple moor grass. Largely unsuitable for waxcaps
Fungi Transect 8	SE 00282 33552 to SD 99356 33822	11	Purple moor grass. Largely unsuitable for waxcaps
Fungi Transect 9	SD 99727 32202 - SE 00679 32331	n/a	Purple moor grass. Largely unsuitable for waxcaps
Fungi Transect 10	n/a	n/a	Juncus pasture and purple moor grass. Largely unsuitable for waxcaps

3.7 Incidental bird recordings

3.7.1 Incidental bird records for the following Schedule 1¹⁹ bird species were recorded during the terrestrial ecology surveys:

- Barn owl (seen foraging and roosting within on-site buildings)
- Red kite (seen foraging/commuting)

The locations of these records are shown on Figure A1-10.

¹⁹ Schedule 1 of the WCA 1981 affords additional protection to certain bird species during the breeding season and to their nest, eggs and young.

4 Further Survey Requirements

The following survey requirements listed in Table 4-1 are needed to fill in current gaps to survey and assessment in support of the Proposed Development.

Table 4-1: Further terrestrial ecology survey requirements in each area of the Proposed Development

Location/ Component of the Proposed Development	Survey Type/Data Collection Activity	Description	Planned Timing
<p>Remaining sections of the Western Access Route, Eastern Access Route and Bradford West Cable Corridor</p>	<p>Extended UK Habitat Classification Survey</p>	<p>An Extended UKHab Survey to be completed of all accessible sections of the Access Routes (except for the section of the Western Access Route that has been surveyed) and the Bradford West Cable Corridor.</p> <p>Surveys will identify habitats to UKHab Level 4 (where practicable). Where potentially sensitive habitats are identified, further habitat surveys may be required following NVC methodology. Condition assessments following Statutory Metric approaches will also be completed.</p> <p>The survey will be “extended” to include an assessment of habitat suitability to support protected/notable species taking into consideration direct observation, field signs and habitat features. This will include the completion of HSI for GCN of any waterbodies, identification of any badger setts and preliminary roost assessments of trees/buildings which may be impacted.</p>	<p>January – March 2026 with follow up surveys as required throughout March – August 2026</p>
<p>Turbine Area, Access Routes and Bradford West Cable Corridor</p>	<p>NVC Survey and Condition Assessment</p>	<p>Further NVC surveys and blanket bog condition assessment will be completed within the Turbine Area to ensure sampling in all areas of predicted impacts. This information will be used to ground-truth predicted habitats and to refine existing habitat mapping.</p>	<p>May – August 2026</p>

Location/ Component of the Proposed Development	Survey Type/Data Collection Activity	Description	Planned Timing
		Where the Access Routes and Bradford West Cable Corridor cross areas of the SAC and where sensitive habitats are identified, NVC surveys will be completed.	
Turbine Area	Bat activity surveys	<p>As the proposed turbine layout has changed since initial surveys between 2023-2025 were undertaken, requirements for repeat or refined bat activity surveys will be confirmed following consultation with Natural England.</p> <p>Monitoring during Spring 2026 will be prioritised following delay and limitation to deployment in 2025.</p>	June 2025 – October 2025
Turbine Area, Access Routes and Bradford West Cable Corridor	Bat emergence surveys	<p>As the proposed turbine layout has changed since initial surveys were undertaken between 2023 and 2025, requirements for repeat or refined bat emergence surveys will be confirmed following consultation with Natural England. These surveys will focus on potential roost features (buildings, built structures and trees) within 200m + rotor radius of proposed turbine locations.</p> <p>Following the Extended UKHab survey of the Access Routes and Bradford West Cable Corridor, the scope of any bat emergence or roost surveys will be identified and completed.</p>	May – October 2026
Turbine Area, Access Routes and Bradford West Cable Corridor	GCN – eDNA Surveys and Population Surveys	As the proposed turbine layout has changed since initial surveys in 2024, the requirement for repeat and additional GCN surveys has been identified. eDNA and potentially population estimate surveys will be required in permanent ponds within 250-	April – June 2026

Location/ Component of the Proposed Development	Survey Type/Data Collection Activity	Description	Planned Timing
		<p>500m of proposed construction activity within the Proposed Development.</p> <p>Following the Extended UKHab survey of the Access Routes and Bradford West Cable Corridor, the scope of eDNA and/or population surveys will be identified and completed.</p>	
Access Routes and Bradford West Cable Corridor	Badger survey	Following the Extended UKHab survey of the Access Routes and Bradford West Cable Corridor, the scope of any additional badger surveys will be identified and completed. Surveys will focus on any active or potential badger setts identified within 30m of survey areas to confirm requirements for potential licencing.	March 2026 onwards
Turbine Area, Access Routes and Bradford West Cable Corridor	Otter and water vole	<p>As the proposed turbine layout has changed since initial surveys in 2024, requirements for targeted surveys for otter and water vole will be undertaken within the Turbine Area. Surveys will focus on watercourses where crossing points are proposed or where construction is proposed within 50m of a watercourse.</p> <p>Following the Extended UKHab survey of the Access Routes and Bradford West Cable Corridor, the scope of any additional otter and water vole surveys will be identified and completed.</p>	March 2026 onwards
Turbine Area, Access Routes and Bradford West Cable Corridor	Fish and white-clawed crayfish	<p>Surveys to assess watercourse suitability to support white-clawed crayfish and/or assemblages of fish will be undertaken.</p> <p>Within the Turbine Area, surveys will focus on watercourses where crossing points are proposed</p>	March 2026 onwards

Location/ Component of the Proposed Development	Survey Type/Data Collection Activity	Description	Planned Timing
		<p>or where construction is proposed within 50m of a watercourse.</p> <p>Following the Extended UKHab survey of the Access Routes and Bradford West Cable Corridor, the scope of any additional surveys will be identified and completed.</p>	
Turbine Area, Access Routes and Bradford West Cable Corridor	Invertebrate Surveys	<p>Additional surveys were completed in August/September 2025 following provisional surveys in 2024. Data collected is currently being analysed alongside a review of desk study information.</p> <p>Requirements for any additional surveys in 2026 will be considered and completed as necessary.</p>	May – September 2026 (as required)

Appendix 1 - Figures

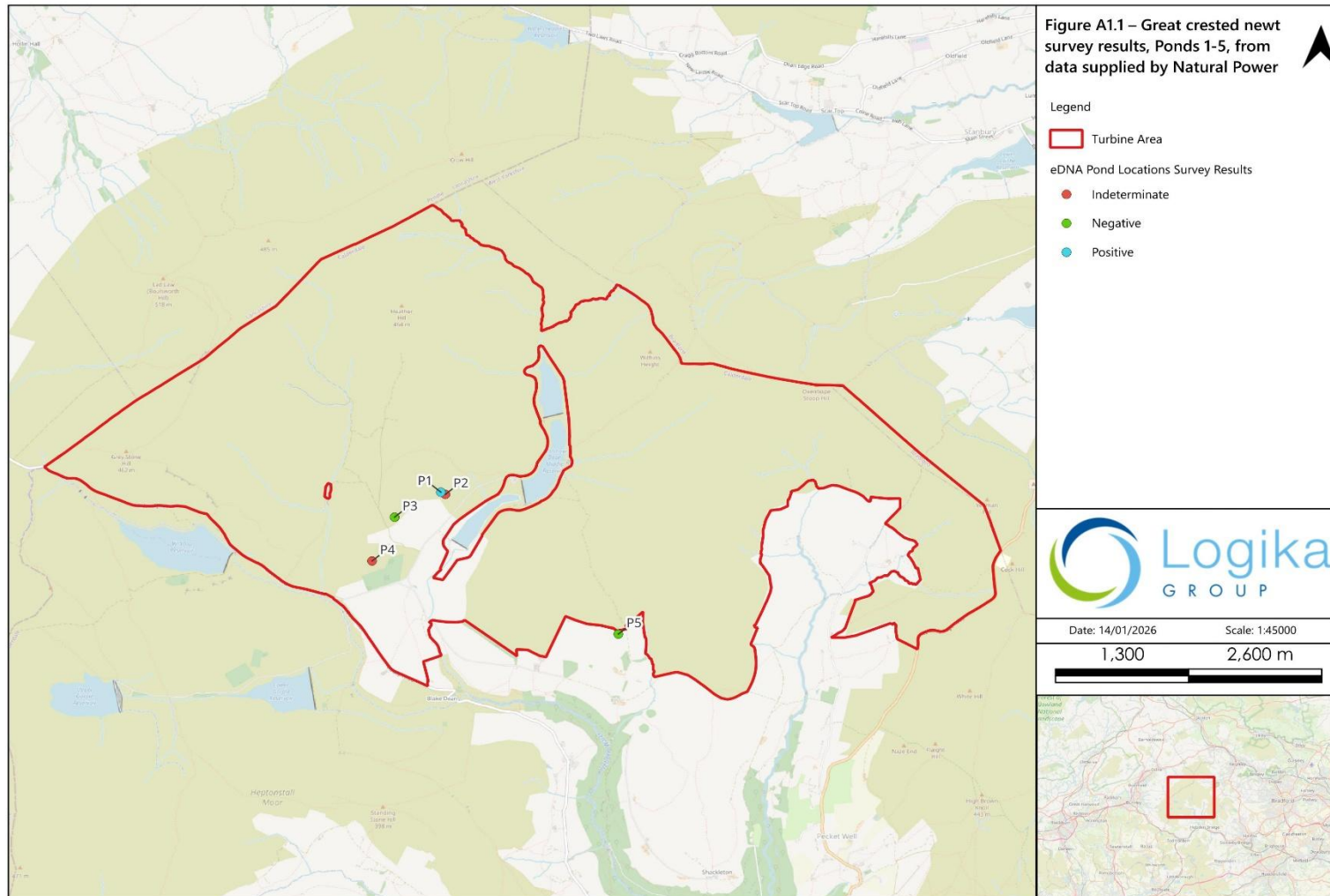


Figure A1-1: Great crested newt survey results, Ponds 1-5, from data supplied by Natural Power.

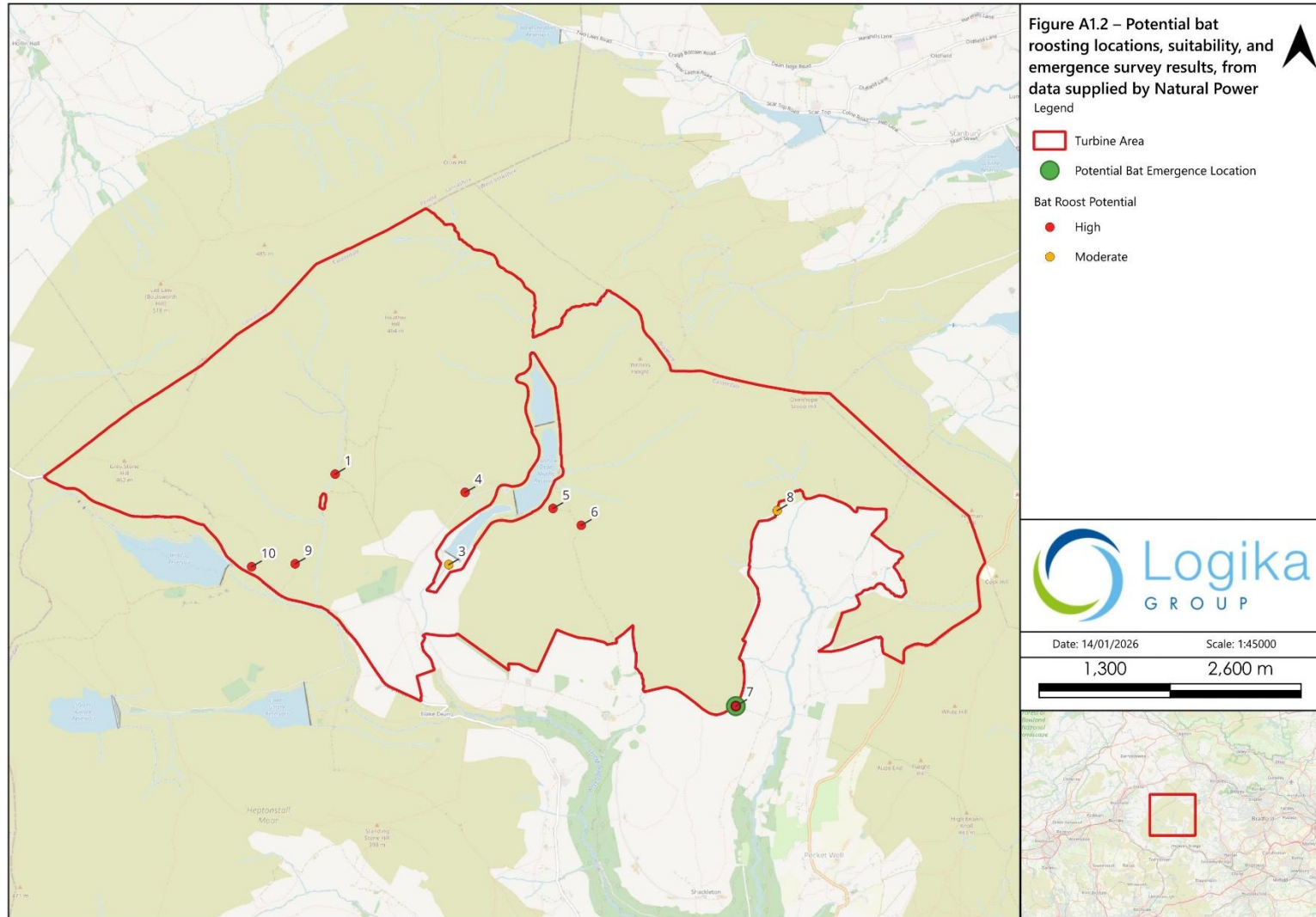


Figure A1-2: Potential bat roosting locations, suitability and emergence survey results, from data supplied by Natural Power.

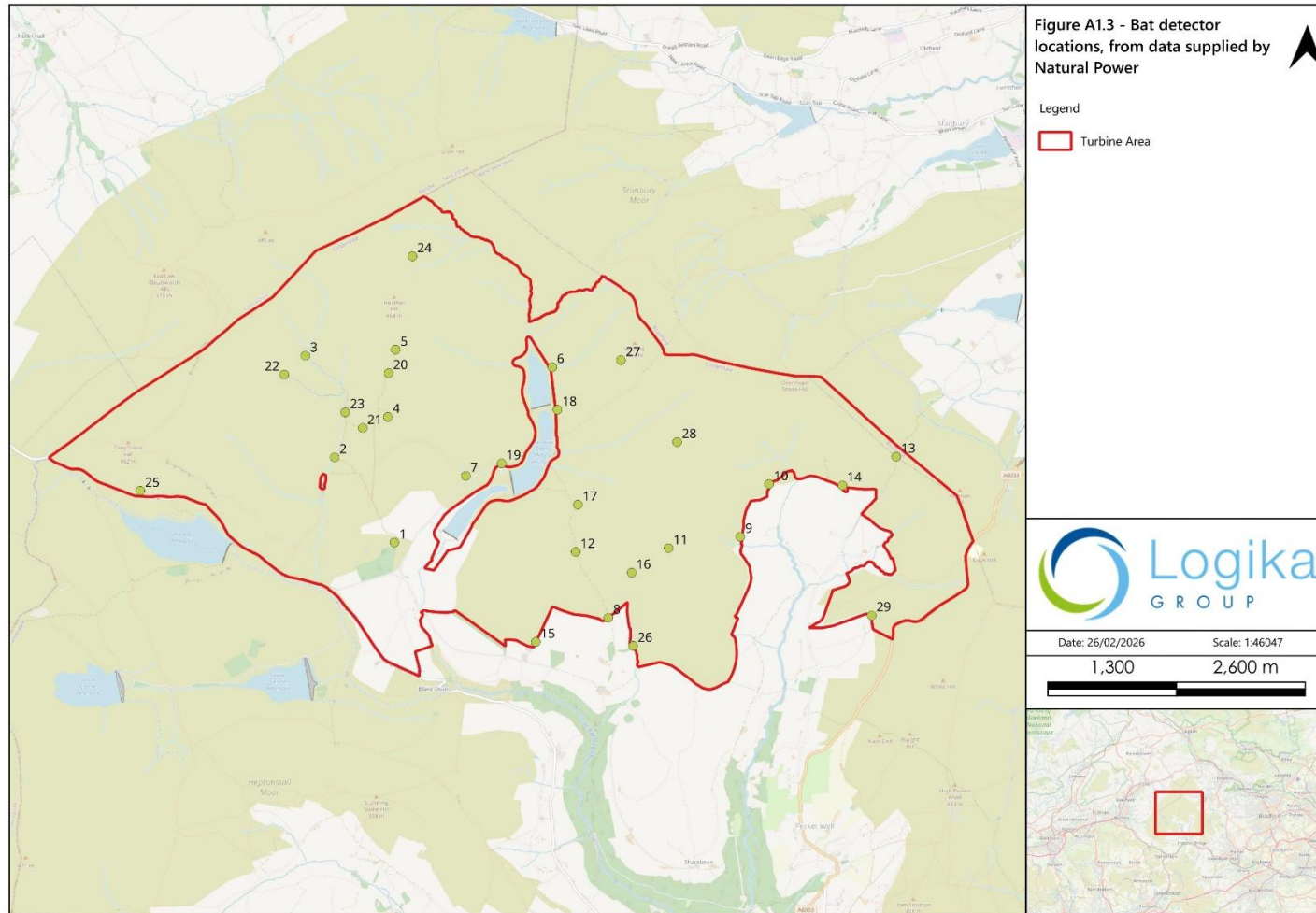


Figure A1-3: Bat detector locations, from data supplied by Natural Power

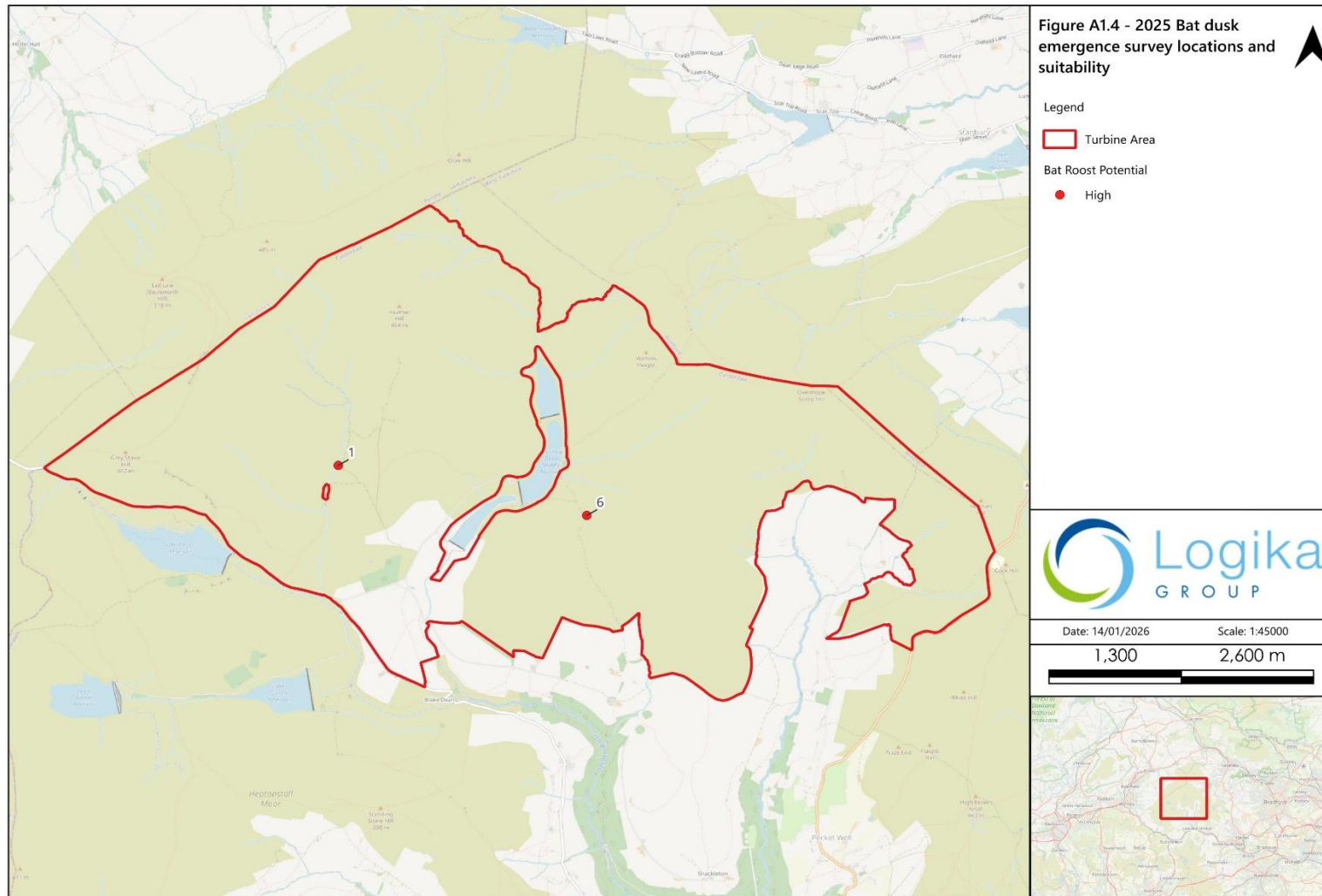


Figure A1-4: Bat dusk emergence survey locations and suitability

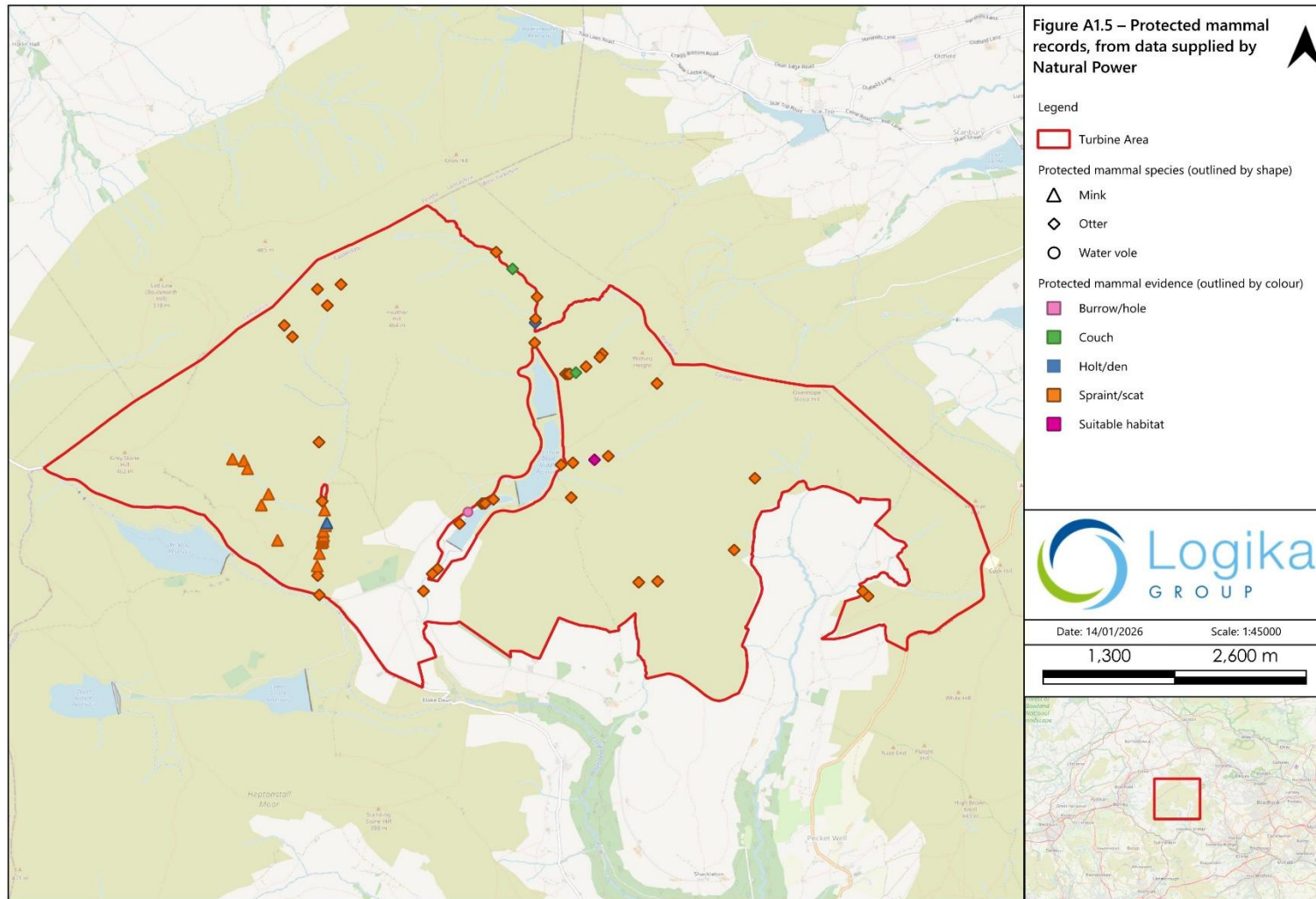


Figure A1-5: Protected mammal records, from data supplied by Natural Power

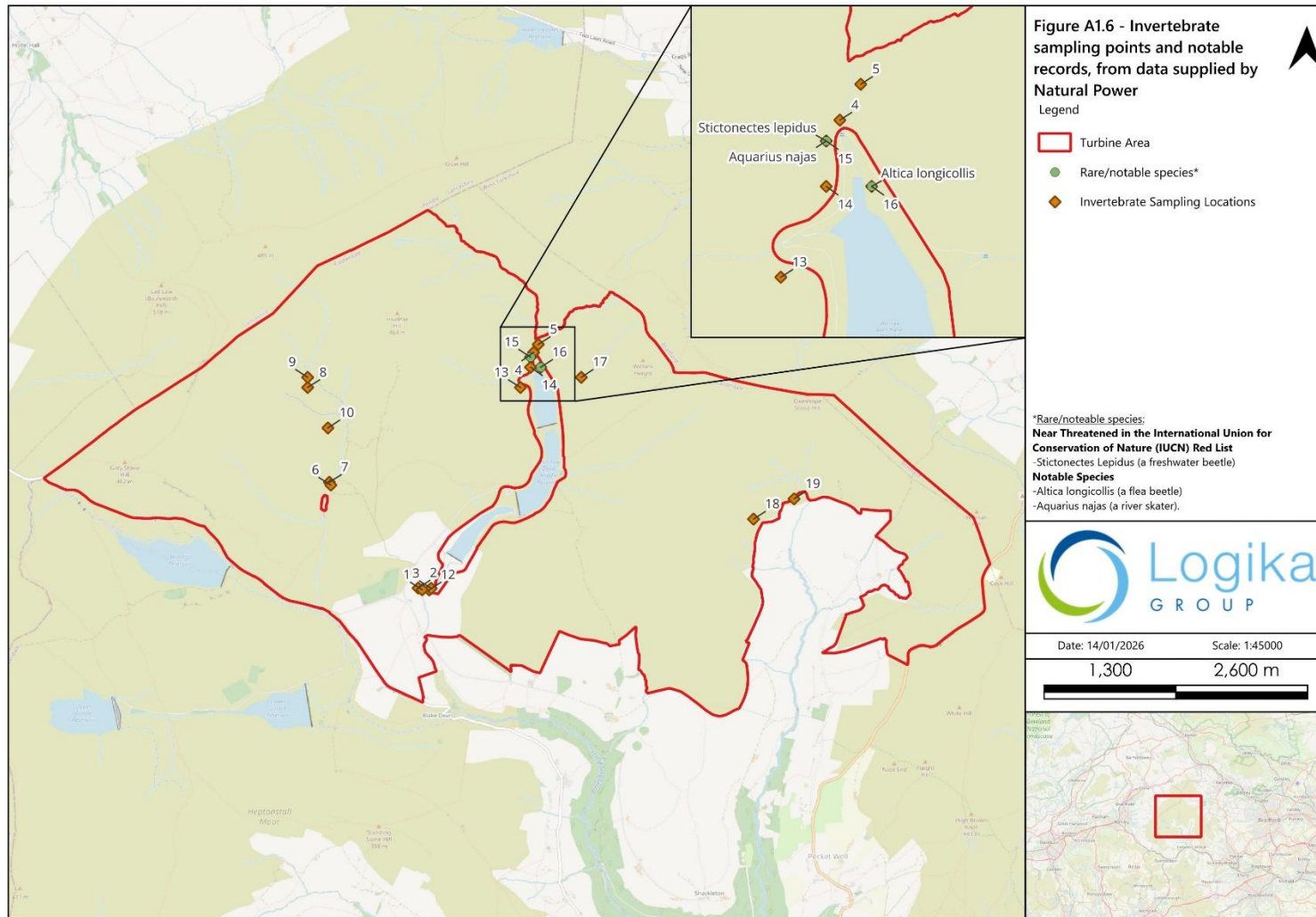


Figure A1-6: Invertebrate sampling points and notable records, from data supplied by Natural Power

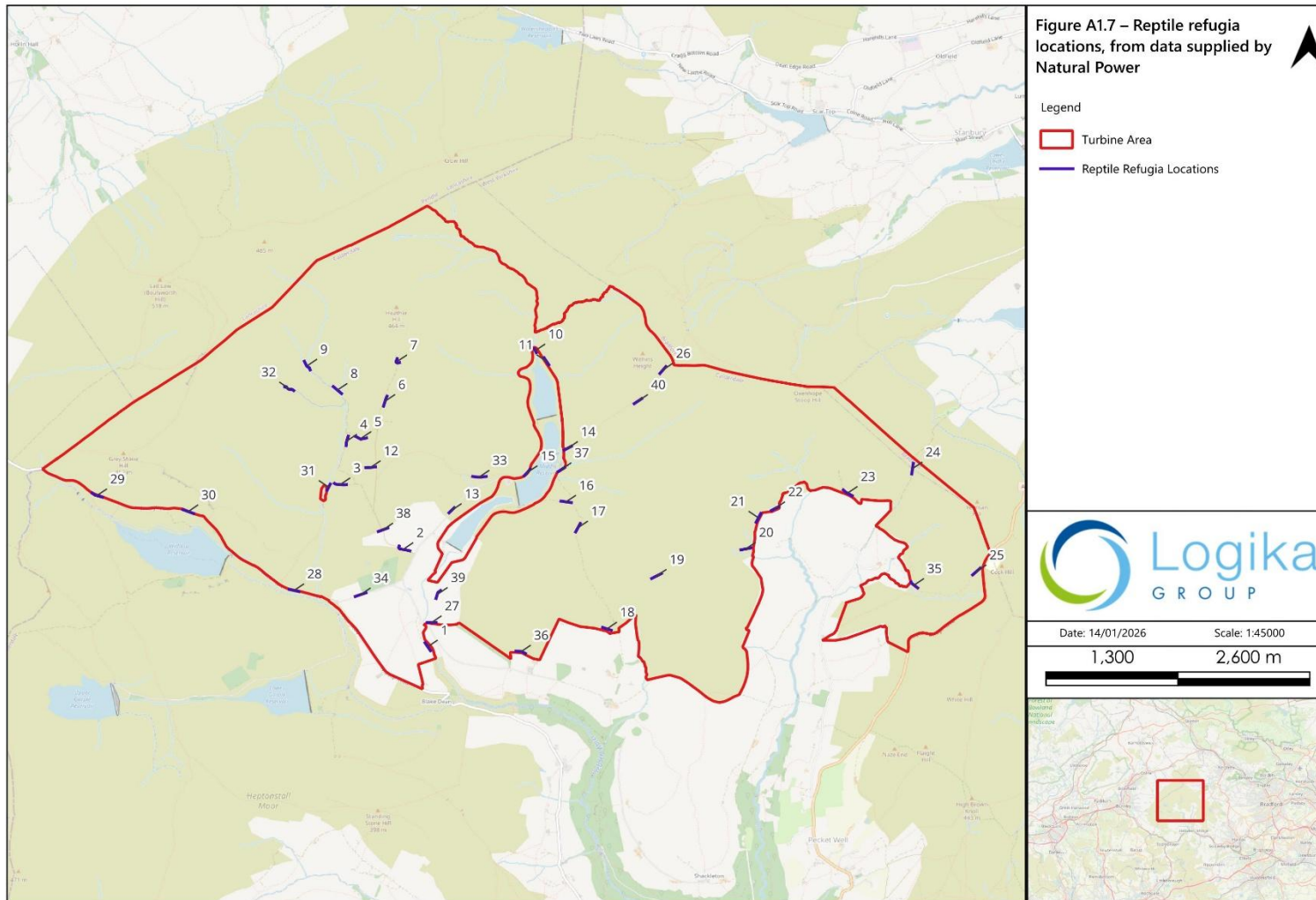


Figure A1-7: Reptile refugia locations, from data supplied by Natural Power

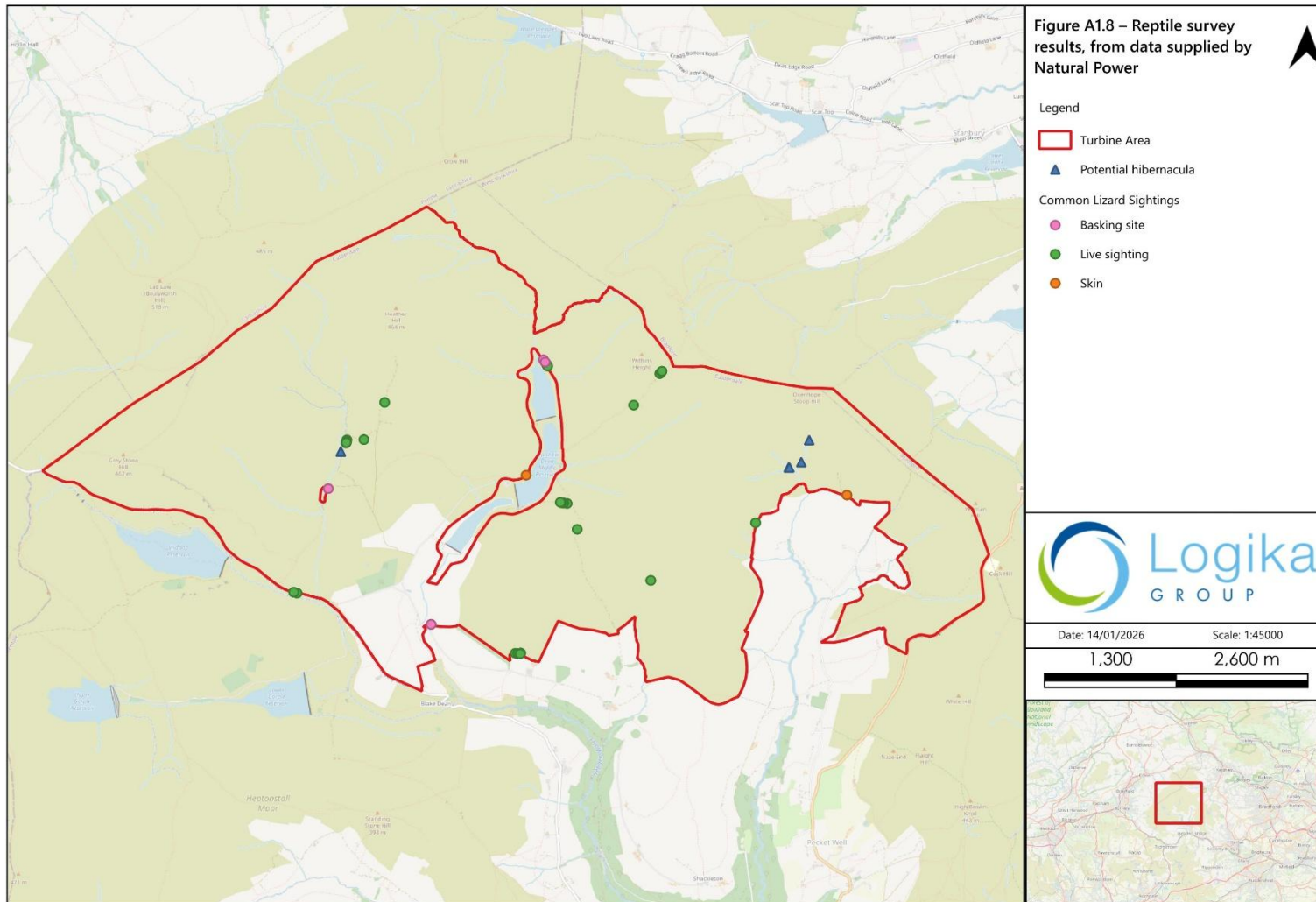


Figure A1-8: Reptile survey results, from data supplied by Natural Power

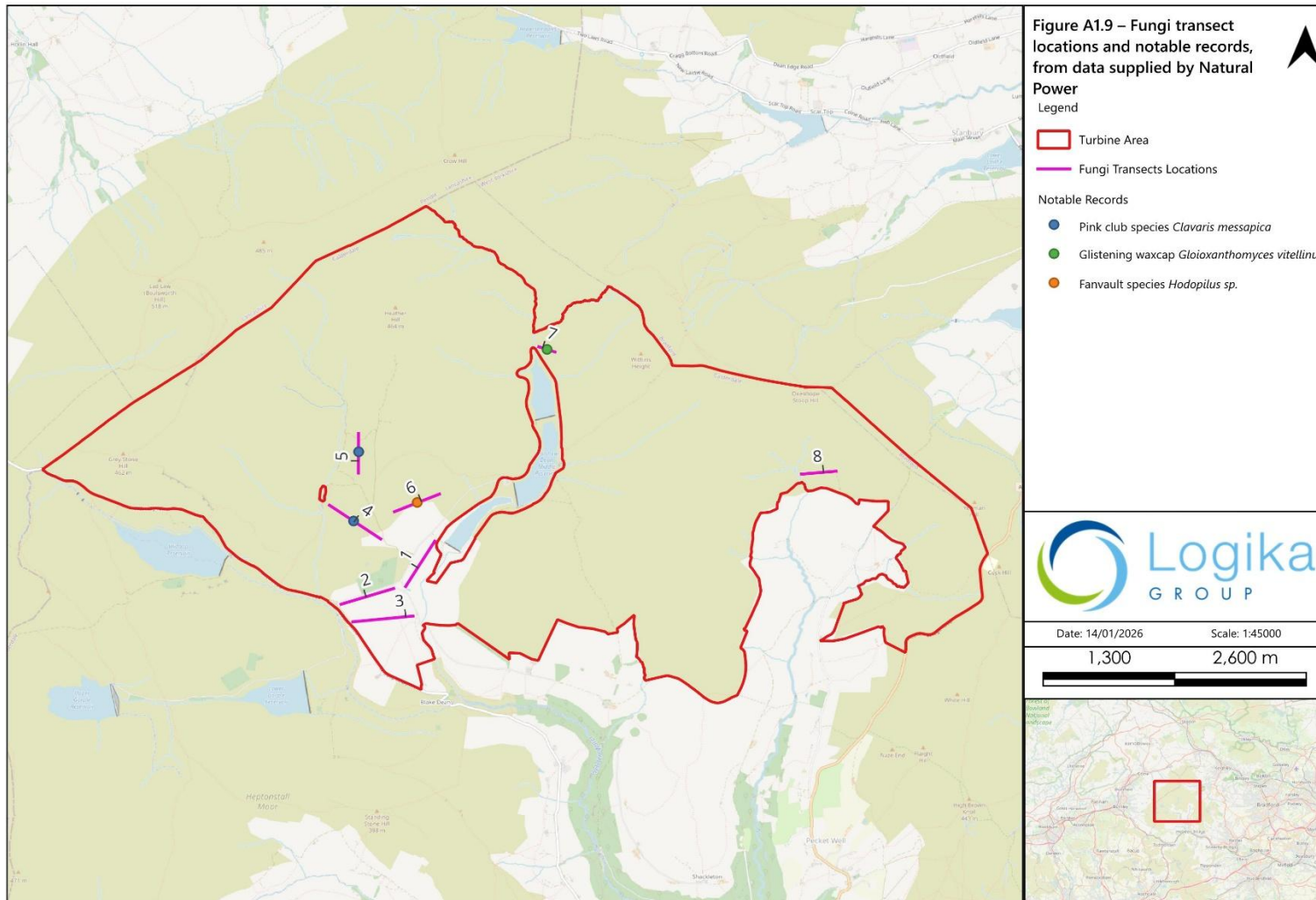


Figure A1-9: Fungi transect locations and notable records, from data supplied by Natural Power

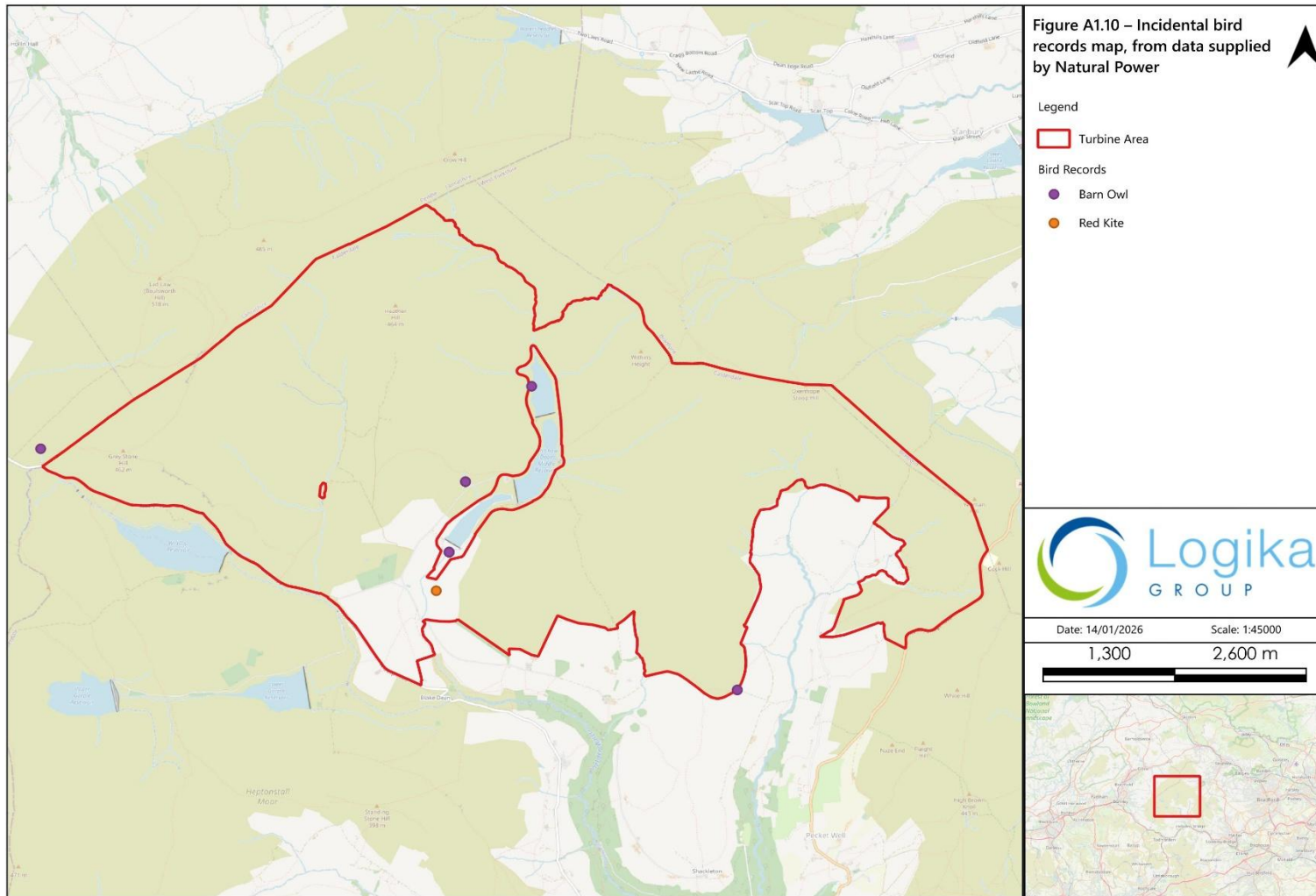


Figure A1-10: Incidental bird records map, from data supplied by Natural Power