

Appendix 8-8 (Version 5): Report to Inform HRA for Two European Sites:

- River Wye Special Area of Conservation (SAC)
- Elenydd-Mallaen Special Protection Area (SPA)

Executive Summary

Environment Systems Ltd was commissioned by EDF Renewables to provide information to inform a Habitats Regulations Assessment (HRA) in respect of the proposed Garn Fach wind farm in Powys

Two sites holding statutory designations are considered: the River Wye Special Area of Conservation (SAC), 1.9km to the east of the Site, and the Elenydd-Mallaen Special Protected Area (SPA) 6.7km to the south-west of the Site boundary and 8.6km away from the nearest proposed turbine location.

This report is provided to inform a Stage 1 (screening) (HRA) for both sites. The report first considers whether there are impact pathways from the Project, and if present, whether any Likely Significant Adverse Effects (LSE) will arise from the Project on the River Wye SAC, and Elenydd-Mallaen SPA. Where LSE cannot be ruled out, Stage 2 Appropriate Assessment (AA) has been carried out to assess whether potential adverse effects arising from the Project on the integrity of the relevant European Site, both alone and in combination with other developments can be mitigated.

River Wye SAC

The River Wye SAC is large and will experience varying conditions relative to its location. Various reaches of the watercourse have been designated as Sites of Special Scientific Interest (SSSI) which also correspond to Management Units within the SAC Core Management Plan. The corresponding Management Unit to the Site (7) considers Atlantic salmon, European otter and Water courses of plain to montane levels.

- No targeted survey effort for Atlantic salmon has been carried out at the proposed development site, as their presence is assumed due to functional linkage.
- Targeted otter survey has been conducted with otter known to be present on site, with signs of foraging and resting observed.
- No examples of the 'Water courses of plain to montane levels' has been observed on site.

LSE to the Atlantic salmon and Water courses of plain to montane levels qualifying features of the SAC (toxic contamination, nontoxic contamination, physical damage and biological disturbance) cannot be ruled out as a result of poor construction management and pollution prevention measures during the construction and decommissioning phases. Other LSE include direct mortality of otters, as well as loss of habitat and habitat fragmentation. Therefore, the screening assessment considers LSE cannot be ruled out and hence Stage 2 Appropriate Assessment is required.

Mitigation for these impacts include the preparation of a water quality monitoring programme, implementation of pollution prevention practices (which are well-known in the construction industry) and preparation of a surface water management plan which are detailed in Appendix 10-1: Outline Construction Environmental Management Plan (CEMP), and Appendix 10-7 Outline Drainage and Surface Water Management Plan. A final detailed CEMP will include all these measures and provide

further details where necessary. With respect to otter, mitigation measures include restriction of traffic speed across the Site, employment of a watching brief, installation of mammal ledges at each water course crossing point and implementation of the aforementioned water-quality measures.

following the implementation of mitigation, it is considered that there will be no adverse effect on the SAC features as a result of the Garn Fach wind project in-combination alone.

In combination effects on all qualifying features consider three operational wind farms within 5km of the SAC: Llandinam, Garreg Lwyd Hill and Bryn Titli. As these wind farms are already operational, limited impacts to SAC features, the AA integrity test has concluded that there will be no adverse effect on the integrity of the SAC as a result of the project either alone or in-combination with other plans or projects following the implementation of mitigation measures to be secured through relevant planning conditions.

Elenydd-Mallaen SPA

The Elenydd-Mallaen SPA occupies the southern section of the Cambrian Mountains in central Wales. The SPA is designated for breeding red kite, and breeding Merlin, and Peregrine. The three features have a favourable conservation status within the SPA.

The report has considered whether there is functional linkage (connectivity) between the Garn Fach site and the SPA, and whether the proposals would cause Likely Significant Adverse Effects (LSE) on the Elenydd-Mallaen SPA breeding population of the three species.

Each of the three SPA feature species were screened against the following connectivity tests:

Test 1: "Is there evidence to suggest that breeding adults of all three classified features from the Elenydd-Mallaen SPA forage within the proposed development area?"

Test 2: "Is the maintenance of conservation objectives for all classified features of the Elenydd-Mallaen SPA dependent on recruitment from within the proposed development area. If so, would this loss of immigration represent an adverse impact to the favourable condition of the qualifying feature of the Elenydd-Mallaen SPA?"

Test 3: "Are there temporal differences, between breeding and non-breeding periods, in the percentage values of flight time at collision risk height and the predicted number of collisions per year within the proposed development area? If so, would the predicted number of collisions per temporal period (breeding and non-breeding) represent a likely significant effect to the qualifying interests of the Elenydd-Mallaen SPA?"

The tests' appraisal assessment considered information from a suite of habitat and bird surveys carried out over two survey periods, desk studies on the bird feature ecology and distribution, advice from experienced ornithologists, Collision Risk Modelling (CRM), and Population Viability Analysis (PVA). In conclusion, following the three tests of connectivity the following Spatial magnitude of impact can be concluded for each of the three feature species

- Merlin adult breeding population Negligible, screened out in test 1 and 2, and therefore, will not be evaluated against test 3.
- Peregrine adult breeding population Negligible, screened out in test 1 and 2; and therefore, will not be evaluated against test 3

- Red kite adult breeding population: Negligible. Potential impact pathways/functional linkage with regards to dispersing juvenile birds from the Garn Fach site to the SPA was investigated.

The impact pathway screening exercise did not identify potential impact pathways from the Project on the merlin and peregrine SPA designated features. Therefore, no further screening assessment was carried out under Stage 1 Likely Significant Effect (LSE) test

For dispersing juvenile red kite, the assessment considered the size of the red kite population on Garn Fach site and in the hinterland areas of the SPA, and concluded that the small red kite population from the Garn Fach site and surrounding area will have a minimal contribution to the breeding birds of the SPA. While there is a small possibility that juvenile red kite may be part of the SPA population through immigration, the assessments carried have shown even with the small predicted collision fatality occurring, this is unlikely to significantly affect the SPA red kite population. Therefore, the assessment concluded no LSE on SPA red kite population.

The in-combination assessment considered available information on other plans and projects, and PVA evidence. The assessment has also taken into account the red kite unprecedented regional and national population growth trends, and information outlining the larger role other red kite populations (adjacent to the SPA) have in maintaining and increasing the SPA red kite population size, than the small and more distant population from the Site. The in-combination assessment has concluded that the project, in combination with other relevant projects and plans, is not likely to result in a significant [adverse] effect upon the SPA, and no further assessment is required.

The in-combination assessment has concluded that the project, in combination with other relevant projects and plans, is not likely to result in a significant adverse effect upon the species for which the SPA was classified, and no further assessment is required.

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1. Introduction

1.1. Background and Proposals

Environment Systems Ltd was commissioned by EDF Renewables to provide information to inform a Habitats Regulations Assessment (HRA) in respect of the proposed Garn Fach wind farm in Powys, hereafter known as ‘the Site/the Garn Fach site’. The centre of the Site is situated at National Grid Reference (NGR) SO 04417 80052. The existing Penrhyddian and Llidiartywaun (P&L) wind farm is situated a short distance to the north of the Site’s boundary; this wind farm will become the repowered Llandinam project.

The proposed development will consist of the siting of 17 wind turbines, each with a capacity of generating up circa 5 megawatts (MW). The turbine heights is up to 149.9m to blade tip. Other associated infrastructure is proposed to be installed, such as a control building and electricity substation; energy storage facility; access tracks; buried cabling; crane hardstandings and borrow pits. The study area and indicative locations of the turbines are shown in Figure 1.

1.2. Site Description and Context

The Site is located approximately 8km south-west of Newtown, Powys, and occupies a large area of upland ground, comprising Waun Ddubarthog, Garn Fach and Brondre-fawr Hill, as well as an area of lower-lying land at Ddullui Banc. The Site comprises three separate parcels: the northern, central and southern, and land ranges in height from approximately 380m Above Ordnance Datum (AOD) to 520m AOD covering approximately 830ha.

The proposed Development has been through a series of design iterations based on potential landscape and visual effects, and archaeological, ecological and hydrological constraints since its inception. Existing land use comprises grazed pastoral fields, tree lines and hedgerows, coniferous plantation, broadleaved woodland, acid dry heath, various types of grassland (improved; semi-improved acid; unimproved) and areas with a wetter substrate such as blanket bog, marshy grassland, acid flush and wet modified bog. Areas of both standing and running water are also present, comprising Custogion Brook and Blue Lins Brook, two small tributaries of the River Ithon and eventually the River Wye.

The River Wye Special Area of Conservation (SAC) commences 1.9km to the east of the Site. The SAC was designated in 2004, and is classified for a range of botanical and faunal features: allis shad *Alosa alosa*, twaite shad *Alosa fallax*, white-clawed crayfish *Austropotamobius pallipes*, bullhead *Cottus gobio*, river lamprey *Lampetra fluviatilis*, brook lamprey *Lampetra planeri*, otter *Lutra lutra*, sea lamprey *Petromyzon marinus*, Atlantic salmon *Salmo salar*, transitional mires and quaking bogs, and water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation. Brown trout *Salmo trutta* are also considered alongside these species, as it is listed on Section 7 of the Environment (Wales) Act 2016.

The Elenydd-Mallaen Special Protection Area (SPA) is located 6.7km to the south-west of the Site boundary and 8.7km away from the nearest proposed turbine location. The SPA was designated in 1996, and is classified for its breeding populations of Merlin *Falco columbarius*, Red Kite *Milvus milvus* and peregrine falcon *Falco peregrinus*.

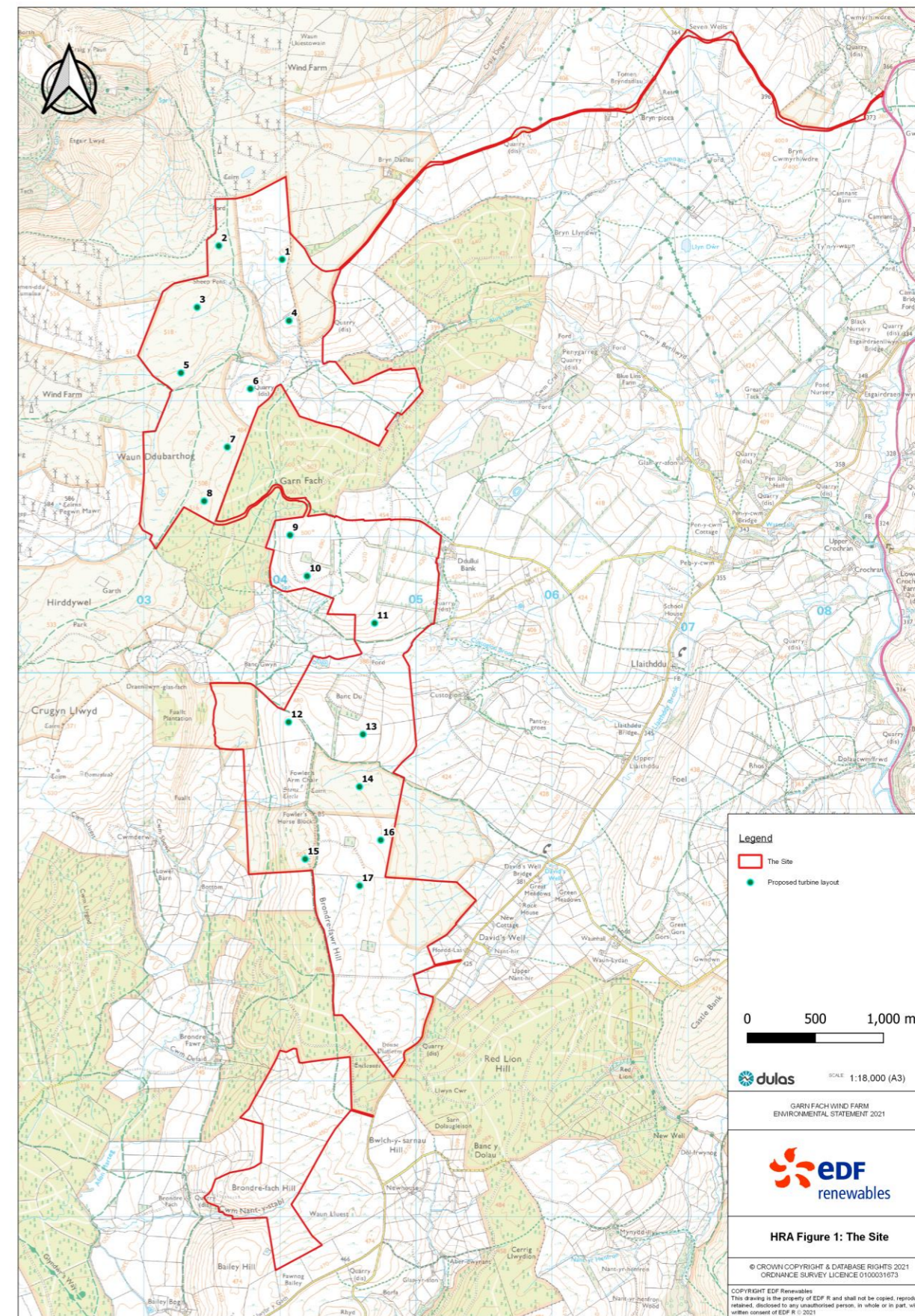


Figure 1: Site application boundary and proposed turbine layout

2. Legislative Context

The Conservation of Habitats and Species Regulations 2017 (as amended) are enacted into UK law following the implementation of Brexit.

The 2017 Regulations (as amended) make provision for implementing the EC Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora ('the Habitats Directive') into UK law. The Regulations also detail measures relating to the conservation of SACs and SPAs, often referred collectively as European Sites or National Site Network (previously referred to in the UK as Natura 2000 site).

The Welsh Government has a statutory duty under Regulation 63 of the 2017 Regulations, to assess the implications of a plan or project on a European site. Examination of Regulation 63 indicates that this is a two-stage process:

- Under Regulation 63(1)(a); the first stage is to ascertain whether or not the plan or project is likely to have a significant effect on a European site, either alone or in combination with other plans or projects. When conducting this initial 'screening' assessment, it is necessary to determine if the plan or project is directly connected with, or necessary to the management (conservation) of the site (Regulation 63(1)(b)).
- If it is determined that the plan or project is likely to have a significant effect on a European site, and that it is not directly connected with or necessary for the management of the site (for example, plans for development) the requirement for completing stage 2 is triggered. Stage 2 is set out at the end of Regulation 63(1), and states (where the above conditions have been met) that the competent authority 'must make an appropriate assessment of the implications of the plan or project for that site in view of that site's conservation objectives'.

Although it is the duty of the Welsh Government to undertake the first stage screening test, the relevant information needs to be provided to enable them, as the competent authority, to conduct their duties under the 2017 Regulations. This derives from Regulation 63(2) of the 2017 Regulations: '*A person applying for any such consent, permission or other authorisation must provide such information as the competent authority may reasonably require for the purposes of the assessment or to enable it to determine whether an appropriate assessment is required*'.

This report addresses Stage One (screening) and Stage Two (Appropriate Assessment) elements of the Habitats Regulations Assessment (HRA) process.

3. Methods

HRA of projects can be broken down into three discrete stages, each of which effectively culminates in a test. The stages are sequential, and it is only necessary to progress to the following stage if a test is failed. The stages are:

Stage 1 – Likely Significant Effect (LSE) Test, is essentially a risk assessment, typically utilising existing data, records and specialist knowledge. The purpose of the test is to decide whether 'full' Appropriate Assessment is required. The essential question is: "Is the project, either alone or in combination with other relevant projects and plans, likely to result in a significant [adverse] effect upon a European site?" If it can be demonstrated that significant effects are unlikely, no further assessment is required.

The LSE test will indicate the possible pathways through which the project may impact upon European sites. Briefly defined, pathways are routes by which a change in activity associated with a development can lead to an effect upon a European site

Stage 2 – Appropriate Assessment (AA); In this case as it cannot be satisfactorily demonstrated that significant effects are unlikely, an "Appropriate Assessment" should be carried out. This will be focused entirely upon the designated interest features of the European site in question. The essential question here is: "Will the project, either alone or in combination with other relevant projects and plans, actually result in an adverse effect upon the integrity of any European sites, without mitigation?"

If it is concluded that adverse effects will occur, measures will be required to either avoid the impact in the first place, or to mitigate the ecological effect to such an extent that it is no longer significant. Note that, unlike standard Ecological Impact Assessment, compensation for adverse effects (i.e. creation of alternative habitat) is not permitted at the Appropriate Assessment stage.

Stage 3 – Imperative Reasons of Overriding Public Interest (IROPI) Test: If a project will have a significant adverse effect upon a European site, and this effect cannot be either avoided or mitigated, the project cannot proceed unless it passes the IROPI test. In order to pass the test, it must be objectively concluded that no alternative solutions exist. The project must be referred to Secretary of State on the grounds that there are Imperative Reasons of Overriding Public Interest as to why the plan should nonetheless proceed.

The approach that has been taken has been to review the locations of the European sites and their qualifying features in relation to the Site and identify any apparent impact pathways. Consideration has then been given to the likely significance of effects identified on the SAC and SPA. This included:

1. Review the qualifying interest features and conservation objectives of the European sites.
2. Review the available existing ecological information regarding the qualifying interest features and their populations (that provide information on the current condition of the European sites).
3. Review the ecological/ornithological survey and assessment work undertaken at the Site as relevant to SAC and SPA qualifying interest features.
4. Consider the potential impact pathways/functional linkages that can lead to an effect upon a European site.
5. Where impact pathways are identified, consider whether the impacts of the development **alone** would be likely to give rise to a likely significant effect on the European sites.
6. Where relevant, consider whether the impacts of the development **in combination** with those from other sites would be likely to give rise to a likely significant effect on the European sites.
7. Carry out the LSE test.
8. If LSE cannot be concluded, carry out AA.
9. Present the findings of the HRA.

It is a requirement of the Conservation of Habitats and Species Regulations 2017 (as amended) that the impacts of any land use plan being assessed are not considered in isolation but in combination with other plans and projects that may also affect the European sites in question.

Given the relatively remote and upland location of The Site, development types that are most likely to act in combination with the proposed development are other wind farms. Wind farm projects could potentially generate collision risk for SPA qualifying features that could act in combination with that generated by the proposed Development. Aerial photography and maps have been studied to identify projects that are already in operation or under construction within the relative buffer zones. The Powys County Council website and the Planning Inspectorate's National Infrastructure Directorate have been

reviewed to determine whether there are further relevant projects that are likely to come forward (including wind farm proposals that have been subject to scoping, submitted to planning or consented but not yet built) that will need to be considered. Where publicly available, Environmental Statements for existing wind farms were consulted, along with other documents in the public domain.

Where LSE on a European site was concluded alone, AA was carried out. Where functional linkage was identified, but it was concluded no LSE from the Site alone, an in-combination assessment of LSE was carried out. Where no LSE alone or in-combination is concluded, no further assessment was carried out.

4. River Wye SAC

4.1. River Wye SAC, Qualifying Features and Conservation Objectives

In this section of the report, the European sites that may be affected by the Proposed Development and conservation objectives are detailed and considered.

The River Wye rises on Plynlimon in the Cambrian Mountains and flows in a generally south-easterly direction to enter the Severn Estuary at Chepstow. The run-off characteristics and nutrient status are significantly modified by land use in the catchment, which is predominately pastoral with some woodland and commercial forestry in the headwaters, and arable in the lower catchment and the Lugg.

The River Wye SAC is connected hydrologically with The Site by way of two minor watercourses that originate and flow through the Site: the Custogion Brook and Blue Lins Brook.

4.1.1. SAC Qualifying Features

The River Wye SAC is located approximately 1.9km to the east of the Site boundary, and 2.1km to the east of the nearest proposed turbine. As the River Wye SAC is large and will experience varying conditions relative to its location, various reaches have been designated as SSSIs, also corresponding to Management Units within the SAC Core Management Plan. At a distance of 1.9km from the Site, the SAC occupies the same boundary as the River Ithon SSSI, which corresponds to Management Unit 7. The Llaithddu brook on Site corresponds to management unit 7s.

Within each Management Unit, specific SAC features are identified as being 'Key' or 'Other'. Key species or habitats are the main drivers of management and the focus of monitoring effort. Other features are of importance in a unit, but are not the main drivers. They will benefit from management for the Key features, and may be classed as Sympathetic on association with the Key features.

It is noted that if features are Key Species or Key Habitats, they are **bolded** in the list below. The SAC features relevant to Management Unit 7 are:

- Feature 2: River lamprey (Other/Sympathetic);
- Feature 3: Brook lamprey (Other/Sympathetic);
- **Feature 6: Atlantic salmon (Key Species/KS);**
- Feature 7: Bullhead (Other/Sympathetic);
- **Feature 8: European otter (KS);**
- **Feature 9: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation (Key habitat/KH);** and

- Feature 10: White-clawed crayfish* (Other/Sympathetic).

*White-clawed crayfish has been recorded in Management Unit 7 in Howey Brook, however its restoration to this sub-catchment is not a current management objective and is therefore scoped out and not considered further.

Twaite shad, allis shad and sea lamprey are not known to occur within Management Unit 7, but habitats in the lower reaches may possibly be suitable.

Conservation objectives and performance indicators, where relevant, are provided below.

4.1.2. The Wye Watercourse

The ecological status of the watercourse is a major determinant of favourable conservation status for all features. The required conservation objectives for the watercourse are defined in Section 4.1 the Core Management Plan (NRW, 2017).

4.1.3. Atlantic salmon / Brown trout

The Core Management Plan covering the River Wye SAC (NRW, 2017) sets out the following conservation objectives for Atlantic salmon:

- The conservation objective for the Wye watercourse as defined must be met;
- The population of the feature is stable or increasing over the long term;
- The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is and will probably continue to be a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.

Performance indicators for Atlantic salmon were listed in the plan as follows:

- Adult run size to meet an agreed reference level, including a seasonal pattern of migration characteristic of the river and maintenance of the multi-sea-winter component. Adult run size to be calculated using rod catch data;
- Juvenile densities to not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality. Assessed using electrofishing data, and expected densities for each sample site to use HABSCORE;
- Water quality: biological GQA class A;
- Chemical quality: RE 1; and
- Flow: Targets set in relative to river/reach type, and equate to those agreed and used in Review of Consents.

4.1.4. European Otter

Conservation objectives for European otter are as follows:

- The population is stable or increasing over the long term and reflects the natural carrying capacity of the habitats within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour;
- The natural range is neither being reduced nor is likely to be reduced for the foreseeable future;

- The safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable riparian habitat, and underpasses, ledges, fencing etc at road bridges and other artificial barriers.

Performance indicators laid out in the plan for otter are as follows:

- Distribution: otter signs present at 82-90% of Otter Survey in Wales sites in sub-catchments (Lyles, 2006)
- Breeding activity: reports of cub/family sightings (no limits);
- Actual and potential breeding sites: No decline in number and quality of mapped breeding sites in sub-catchments. Lyles (2006) indicates number of breeding sites should increase from 19 within the Wye SAC to 23.

4.1.5. Water Courses of Plain to Montane Levels with the *Ranunculus Fluitantis* and *Callitriche-Batrachion* Vegetation

Conservation objectives for the habitat as laid out in the plan are as follows:

- The conservation objective for the Wye watercourse as defined must be met;
- The natural range of the plant communities represented should be stable or increasing;
- The area covered by the feature within its natural range should be stable or increasing;
- The conservation status of the feature's typical species should be favourable.

Performance indicators laid out in the plan for this habitat are as follows;

- Distribution within the catchment: *Ranunculus spp.* will be present with a cover of at least 10% in any three representative sample 100m stretches of suitable habitat;
- Species list: should conform to appropriate JNCC habitat type or other list for site unit as appropriate;
- Cover of indicators of eutrophication maintained below threshold over the medium to long term. Species include algal spp. *Enteromorpha spp.*, *Cladophora spp.* and *Vaucheria spp.* – these should not have a cover value of >10% in three consecutive years; and
- No impact on native biota from alien or introduced species using the SERCON scoring system.

4.2. Survey Baseline Information, Impact Pathways and Effects

This section considers the information gathered on the European sites and the associated qualifying features. It also considers the impact pathways which are routes by which a change in activity as a result of the proposed Development can lead to an effect upon the European sites.

Due to the scale and nature of the proposed Development it is considered that river Wye SAC and to Elenydd-Mallaen SPA could be affected by the proposed works being undertaken. This is due to the fact that the proposed Development is located within potential influencing distance of the Site and could therefore affect their qualifying features (either alone or in combination with other plans or projects) and is not directly connected with or necessary to the management of them.

4.3. River Wye SAC Survey Data

Habitat surveys and targeted species-specific surveys for otter were undertaken between 2017-2020.

4.3.1. Water Courses of Plain to Montane Levels with the *Ranunculus Fluitantis* and *Callitriche-Batrachion* Vegetation

The Annex 1 habitat 'Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation' was not recorded on Site during the habitat survey.

4.3.2. Atlantic Salmon (and Non SAC Feature Brown Trout)

No targeted survey was undertaken for the presence of Atlantic salmon / Brown trout within the water courses present on The Site.

4.3.3. European Otter

Records of otter within 2km were returned as part of the request for records provided from the Biodiversity Information Service for Powys and the Brecon Beacons National Park (BIS), the nearest being 880m from boundary.

Targeted survey for otter was undertaken in 2019, where the surveyor walked the length of water courses within The Site and 50m from the boundary, as well as the edge of all water bodies on The Site. Four potential otter resting sites (couches) were recorded: three noted in the Blue Lins Brook watershed and one along the Custogion Brook. Numerous spraints, both fresh and old were recorded along the Blue Lins Brook and its tributaries, with few identified along the Custogion Brook although potential sprainting sites were located (please refer to Technical Appendix 8.7 of the relevant Ecological Impact Assessment/EcIA). No holts were identified.

Incidental evidence of otter was recorded during the 2020 great crested newt population size class assessment, where multiple fresh spraints were observed on the banks of the Custogion Brook and around all three ponds within the Pond 3 cluster. Additionally, during the first two GCN surveys up to 50 dead common frogs *Rana temporaria* with their rear end missing were noted in Pond 3A, which is a known characteristic of otter predation (Slater, 2002).

4.4. Predicted Impacts and Likely Significant Effects Test

On account of the qualifying features 'Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation' and Atlantic salmon (and non SAC feature Brown trout) being intrinsically linked to water quality impact pathways and related negative effects (toxic contamination, nontoxic contamination, physical damage and biological disturbance), they are considered together.

4.4.1. Effects Upon the Qualifying Features

*Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation*

The habitat as a feature is an Annex I habitat (code: 3260) with several variants in the UK, depending on geology and river type. It is widespread in rivers in the UK, particularly on softer and more mineral-rich substrates. It has been adversely affected by nutrient enrichment, mainly from sewage inputs and agriculture, and where agriculture has caused serious siltation. It is also vulnerable to artificial reductions in river flows and to unsympathetic channel engineering works. Consequently, the habitat has been reduced or has disappeared in some areas.

In the River Wye SAC, there is an exceptional range of aquatic flora in the catchment including river jelly-lichen *Collema dichotum*. The river channel is largely unmodified and includes some excellent gorges, as well as significant areas of associated woodland.

Atlantic Salmon (and Non SAC Feature Brown Trout)

Atlantic salmon / Brown trout are known to be present within the River Ithon SSSI; the former is one of the primary reasons for designation of the River Wye SAC. They are both also species of principal importance as listed by the Environmental (Wales) Act 2016. No targeted survey effort has been undertaken for the presence or activity of either species within the water courses on the Site. Due to the proximity of the SAC where they are known to be present and the lack of evidence that suggests otherwise, presence on the Site is assumed. It is also known that the species uses the upper reaches of the SAC for spawning.

The following effects relate to the construction and decommissioning phases:

1. Toxic contamination (Introduction of synthetic compounds, introduction of non-synthetic compounds). Water quality could be adversely affected during construction through the following mechanisms:
 - Potentially contaminating construction materials (i.e., fuel, oils, concrete constituents, soils, etc) are mobilised, washing chemical pollutants into surface waters and affecting river habitats.
 - Construction activities cause the mobilisation of soils and silt, which are washed into the river.
2. Non-toxic contamination (Changes in nutrient loading, changes in thermal regime, changes in turbidity (light penetration)).
3. Physical damage (creation of new water crossing points/reinforcement/redesign of existing water course crossing points, changes in suspended sediment, changes in water flow rate, abrasion/physical disturbance of habitats).
 - Damage to small localised areas of stream beds for the culverting works would not have significant impacts on fish populations, and direct mortality is not likely. However works in important, sensitive good spawning area could have significant negative local impacts on fish populations.
 - Soil compaction can lead to the creation of preferential flow paths and drainage can increase run-off rates. This has the effect that flood peaks increase in energy/erosive power and occur more rapidly, resulting in increased river bank erosion and slumping, leading to river widening and increased sediment load and scour of river habitat.
 - Depleted water flows can result in exposure (emersion) of some life cycle stages of fish and their habitat, impede migration, and altering spawning/nursery substrate. It can also lead to increased sedimentation and increased macrophyte and macroalgal colonisation of river habitat.

The impact pathway from the pollution sources to the sensitive ecological receptors is surface water runoff and ground water contamination which can lead to effects 1-3 listed above.

Introduction of pathogens and Invasive Non-Native Species (INNS) can potentially take place through the use of contaminated machinery and equipment within and adjacent to water courses, or through the transport of pathogens and INNS through surface water runoff.

The possible effects may occur during construction and decommissioning phases of the development. During the operation phase, once constructed, the potential for an increase in runoff into the water courses is envisaged on account of the increased area of man-made surfaces on the Site. It is not expected that soil will remain exposed during operation, as borrow pits will be reinstated following completion of construction of the proposed Development. The nature of vehicular access to the Development is expected to largely return to the existing levels, where current farming practices will continue after completion of the Development.

4.4.2. Predicted Impacts on Water Courses of Plain to Montane Levels and Atlantic Salmon

Water courses of plain to montane levels and Atlantic salmon (and non-SAC feature brown trout)

The habitat and both fish species are known to be susceptible to deteriorating water quality as an effect of both point and non-point-source pollution arising from land-use practices or industrialisation (Hendry *et al.* 2003), which affects both adult salmon and trout, and their fry. Impacts from siltation or accidental/reckless discharge, or spillage of other polluting substances into the water courses on Site have the potential to impact the habitat and both fish species in the wider catchment of the SAC.

Construction

Such impacts may be realised via reinforcement/redesign of existing water course crossing points, excavations for borrow pits and auxiliary infrastructure, sedimentation, accidental petrochemical spillages, and changes to in-stream hydrochemistry as a result of ground disturbance. These types of potential effects are well understood in the civil engineering industry and numerous codes of best practice examples exist (such as bunding for re-fuelling and fuel storage; use of sediment traps and silt fencing; fencing off water courses to prevent tracking vehicles and close proximity working).

Impacts include lower survival rate of eggs and embryos (Acornley & Sear, 1999). Ottaway *et al.* (1981) indicates amounts as little as 10% of material present in the brown trout *Salmo trutta* spawning site/redd being <2mm in diameter was detrimental to spawning success. Morphological changes in the gills of fish, including Atlantic salmon are documented from a wide range of pollutants (Poleksić & Mitrović-Tutundžić, 1994; Strzyzewska, Szarek & Babinska, 2016). Oxygen levels in the water may also be affected, which can itself be impacted through changes to groundwater quality (Greig, Sear & Carling, 2007) and a decrease in visual ability in cases of high levels of pollution, reducing ability of individual adult fish to see one another and/or compete for prey or mating resources (Blaxter & ten Hallers-Tjabbes, 1992). Successful migration of the young salmon to the ocean in the parr/smolt stage may also be negatively impacted by pollution (Thorstad *et al.* 2012)

Significant adverse effects are considered likely to be contained to the water courses and floral/faunal species within them, but may persist in the water course for longer than the duration of construction due to chronic diffuse pollution and bio-accumulation.

Significant adverse effects such as mortality or injury to adult Atlantic salmon are considered unlikely, and are not considered further in this report.

Significant adverse effects through physical damage, loss and disturbance to other life cycle stages are considered likely place during the water courses crossing work. The effects can include removal of hatching substratum, and destruction of foraging and spawning grounds..

Significant adverse effects on Atlantic salmon (and/or Brown trout) and their spawning habitats are considered likely.

Operation

Once constructed, an increase in runoff into the water courses is envisaged on account of the increased area of made surfaces on the Site. It is not expected that soil will remain exposed during operation, as borrow pits will be reinstated following completion of construction of the proposed Development. The nature of vehicular access to the Development is expected to largely return to the existing levels, where current farming practices will continue after completion of The Development. A compliance assessment report from NRW (2021) against Phosphorus Targets indicated that all water courses on the Site are within their recommended levels of phosphorus concentrations.

Water courses will not be breached during the course of the operation of the turbines. Isolated or unlikely/rare events such as heavy rainfall and flash flooding, repair of water course crossing points and landslip into the water courses may cause siltation of/introduce other pollutants into the watercourse, which would previously not have occurred if the Development had not been permitted. Such events are unpredictable and are likely to be contained to discrete areas on Site.

4.4.3. Predicted Impacts on European otter

Construction

Habitat loss during construction will consist of removing limited amounts of relatively low-value habitat for otters. Otters were recorded on both the Custogion Brook and the Blue Lins Brook and their headwaters. All turbines are >200m from recorded evidence of otter, with a single turbine <100m from an unnamed stream known to be frequented by otters. Construction works when installing this turbine may create disturbance events that would deter otters from using this part of the water course during daytime working hours. However, there are no identified couches or holts in the vicinity of this turbine, meaning that the area is likely not in use by otter during daytime hours.

Construction of, and reinforcement / widening of existing water course crossing points where necessary will involve working in close proximity with the water courses themselves. The Blue Lins Brook is of particular concern, as a concentration of spraints was observed either side of the access track where it crosses the Brook as well as on the bridge itself. Impacts will include loss of available sites for sprainting and an increased risk of collision with vehicles.

Significant adverse effects on otters through habitat loss and deteriorating water quality cannot be ruled out.

Operation

On account of the predicted low frequency of traffic as described in Chapter 13: Transport of the Environmental Statement and the lowered risk of impacts on otters in this regard when employing standard avoidance measures, it is considered that there are no impact pathways from operation phase activities leading to LSE on otters, and no further assessment is required.

4.4.4. LSE Test Conclusion

This assessment considers the Project will result in likely significant effects to the Water courses of plain to montane levels, Atlantic salmon and Otter SAC features during construction and decommissioning phases. Considering the ruling in Court of Justice of European Union case c-323/17 'People over Wind', avoidance measures cannot be considered at the Screening stage of HRA. Further HRA "Appropriate Assessment" (Stage 2) will therefore be required to assess if the project, either alone or in combination with other relevant projects and plans, likely to result in a significant [adverse] effect upon a National site?" Appropriate Assessment (Alone)

4.4.5. Appropriate Assessment (Alone)

Where adverse effects cannot be ruled out, measures will be implemented to either avoid the impact in the first place, or to mitigate the ecological effect to such an extent that it is no longer significant as described in the following sections.

Water Courses of Plain to Montane Levels and Atlantic Salmon

The AA has considered the following proposed mitigation measures:

Mitigation for Toxic and Non-contamination, Physical Loss, Physical Damage

Mitigation measures have been outlined in Appendix 10-1: Outline Construction Environmental Management Plan (CEMP), and Appendix 10-7 Outline Drainage and Surface Water Management Plan. A water quality monitoring programme will also allow prompt detection and rectification of any pollution incidents during construction.

A final detailed **CEMP** will include all these measures and provide further details where necessary. New and upgraded culverts will be designed to retain the conditions that existed prior to that installation. This means that the cross-sectional area will not be restricted by the culvert, the slope should will not change, and the roughness coefficients will remain the same.

The streams where new and upgraded culverting for are proposed are small and shallow. Where practicable, any culverting works will be carried out between early May and late October and damage to or destabilisation of banks, will be avoided to avoid impacts on spawning fish or developing eggs and fry. If it is necessary to carry out culverting work during sensitive months (November to April) then fish habitat assessment surveys will be carried out to determine habitat suitability for key live stages of fish. Surveys will be carried out as described in fish habitat survey section below; If the habitat surveys conclude the crossing locations as important spawning areas, then further consultation with NRW will be undertaken as part of this process and prior to works commencing. Options to consider then would be restricting works to avoid the sensitive months, or reviewing locations of crossings and this can be secured through relevant planning or consenting conditions.

Mitigation for Biological Disturbance

Biosecurity risk assessment and compliance actions will be implemented as outlined in section 2.8 of Appendix 8-10 Great Crested Newt Conservation Plan. This is also relevant to fish species mitigation and will be incorporated into the final detailed CEMP.

A water quality monitoring programme will be developed following consultation with statutory consultees to allow any potential pollution incidents to be detected and rectified promptly.

There will be no likely adverse effect on the integrity of the SAC features as a result of the Garn Fach wind project alone following the implementation of mitigation measures to be secured through relevant planning conditions.

4.4.6. Mitigation for European Otter

The following mitigation measures are proposed to reduce/minimise the risk to the Otter SAC feature to non-significant levels:

- Measures to avoid direct collision between otters and vehicular traffic will include restricting traffic to particular speed limits on The Site between sunset and sunrise, and informative signage for vehicles around water course crossing points;
- Thorough checks of the water course crossing points will be made prior to commencement of works to redesign / reinforce them, as well at the start of works each day, to prevent direct mortality or injury to otters;
- Measures to prevent indirect effects on otters, such as silt and other pollution being introduced into the water courses will be identical to those described above;
- Installation of mammal ledges on each crossing point where water levels are >3cm. Ledges must be adequately supported and be at least 50cm in width.

Following the implementation of mitigation measures, there will be no likely adverse effect on the integrity of the Otter SAC feature as a result of the Garn Fach wind project alone.

4.4.7. Appropriate Assessment (In Combination)

Three operational wind farms are present within 5km of the SAC: Penrhyddlan-Llidiartywaun (P&L) – which will become the repowered Llandinam project; Garreg Lwyd Hill; and Bryn Titli.

- P&L comprises 102 turbines. An application for repowering (Llandinam) was consented in 2015, including erection of 34 larger and more-efficient turbines. A Section 36 planning application has been consented, and sought an extension of the implementation timescale for a further 5 years.
- Garreg Lwyd Hill comprises 17 turbines, and became operational in 2017.
- Bryn Titli, comprising 22 turbines and has been operational since 1994. Consent was granted by Powys County Council to extend the operational life of the development until 2027.

A single application for a proposed wind farm was located on the Powys County Council planning website: Bryngydfa, comprising 12 turbines and which was validated in 2009, although no further information is available. A precautionary approach was adopted and despite the age of the application the proposal is scoped into this assessment.

Llandinam is situated on ground that forms part of the watershed for the Site, where the Custogion Brook and Blue Lins Brook partially originate. Garreg Lwyd Hill and Bryngydfa are situated within the watershed for the Gwenlas and Llwymwynt Brooks, which are both tributaries for the two designated sites.

The River Wye SAC was fully considered and mitigated for within the Environmental Statement for Garreg Lwyd Hill access route; it is presumed similar precautionary provisions were made for Llandinam on account of the presence of the SAC. No information is available with regards to Bryngydfa.

Bryn Titli is not situated within a watershed that directly influences the specific reaches of the two designated sites, however, it is within the watershed for the Marcheini Fawr and the Afon Marteg, and thus the River Wye SAC. It is presumed that SAC was fully considered in the development proposals on account of their designations.

Garreg Lwyd Hill and Bryn Titli are established developments with limited scope for further water quality deterioration, habitat loss and damage that could contribute to the in-combination LSE.

No information is available with respect to Bryngydfa which has been operational since 1994.

Information submitted for Llandinam concluded no adverse effect on the SAC features as a result of the project in-combination with other plans or projects following the implementation of mitigation measures.

It's considered that the in-combination impacts will be limited to the construction and decommissioning phases of the established wind farms, which have been either mitigated for or presumed mitigated for in the development proposals due to the SAC designations.

Therefore will be no adverse effect on the SAC features as a result of the Garn Fach wind project in-combination with other plans or projects following the implementation of mitigation measures to be secured through relevant planning conditions.

4.4.8. Conclusion of the AA Integrity Test

There will be no adverse effect on the integrity of the SAC Water courses of plain to montane levels Atlantic salmon and Otter features as a result of the project either alone or in-combination with other plans or projects following the implementation of mitigation measures to be secured through relevant planning conditions.

5. Elenydd-Mallaen SPA

5.1. Elenydd-Mallaen SPA Qualifying Features and Conservation Objectives

The Elenydd-Mallaen SPA occupies the southern section of the Cambrian Mountains in central Wales, stretching from the upper Cothi and Tywi valleys north-west of Llandovery to the Ystwyth, Elan and Wye valleys in the north. The area supports a wide variety of uncommon plants and animals.

The Elenydd-Mallaen SPA was designated on the basis that it supports the following features:

- Feature 8: breeding red kite, where the site and the surrounding 2km support 9.3%, of the British red kite population – count as of 1997, or a lower limit of 15 pairs
- Feature 9: breeding Merlin, where the site supports 0.5% of the British population – 5-year mean between 1987-1991, or a lower limit of 7 pairs; and
- Feature 10; breeding Peregrine, where the site supports 0.5% of the British Population, or a lower limit of 15 pairs.
- The Core Management Plan lists all three features as having a Favourable Conservation Status within the SPA.
- The JNCC Natura 2000 Data Form¹ for the SPA does not currently include peregrine as a qualifying feature. It is understood that peregrine was initially a listed interest feature on the Data Form, but was removed in response to the conclusion of one of the periodic SPA Reviews that the number of individuals present did not meet the qualifying threshold. Peregrine has been nevertheless included in this assessment as it is has been made clear that NRW do not recognise the deletion of peregrine from the interest features of the Elenydd-Mallaen SPA Data Form. The latest JNCC Standard data form for Elenydd-Mallaen SPA (which has not been updated in the Core Management Plan) describes **34 red kite pairs, and 7 Merlin pairs** as the most recent SPA feature population estimate.

¹ JNCC. Standard Data Form for sites within the 'UK national site network of European sites'. Available at: <<https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9014111.pdf>>. Accessed 01.03.2023.

In general terms, the conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' when:

- population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis."

5.1.1. Red Kite

The Core Management Plan covering the Elenydd-Mallaen SPA (NRW, 2013) sets out the following specific conservation objectives for red kite. The conservation objectives include both the Vision for the feature and the performance indicators.

Vision for red kite:

- The SPA area continues to support at least 15 pairs of breeding red kites, or 0.5% of the British population.
- Traditional nest sites within the SPA continue to be used.
- The extent of suitable semi-natural feeding habitat within the SPA is maintained.
- Availability of carrion within the SPA is maintained.
- Roosting sites within the SPA are maintained.
- All factors affecting the achievement of these conditions are under control.

The performance indicators were listed as follows in the plan:

- At least 15 pairs of red kite nest regularly within the site SPA, or within 2km of the boundary;
- Kites continue to breed regularly in all the main areas used in 2007;
- At least 1 fledged young/nesting pair/year;
- The total extent of suitable semi-natural habitat within the SPA is the same as it was in 2006 and the habitat proportions are roughly the same;
- There should continue to be some grazing (resulting in carrion) on the main hill areas throughout the Site;
- No breeding attempt to be known to fail because of impact of human disturbance; and
- The woodland at Hafod (an important roosting area) to remain suitable for roosting red kite.

5.1.2. Merlin

The Core Management Plan sets out the following conservation objectives for Merlin which include feature Vision:

- The SPA area continues to support at least 7 pairs of breeding Merlin, or 0.5% of the British population;
- Traditional nest sites within the SPA continue to be used;
- The extent of suitable semi-natural feeding habitat within the SPA is maintained; and
- All factors affecting the achievement of these conditions are under control.

Performance indicators for Merlin were listed as follows in the plan:

- At least 7 pairs of Merlin regularly nest within the SPA, or close by, and 1 pair nest regularly within the central part of the Elenydd SSSI;
- The total extent of suitable semi-natural habitat within the SPA is the same as it was in 2006 and the habitat proportions are roughly the same; and
- No breeding attempts to be known to fail because of impact of human disturbance.

5.1.3. Peregrine

The Conservation objectives for Merlin as set out in the core management plan include feature vision:

- The SPA area continues to support at least 15 pairs of breeding peregrines, or 0.5% of the British population;
- Traditional nest sites within the SPA continue to be used;
- The extent of suitable semi-natural feeding habitat within the SPA is maintained; and
- All factors affecting the achievement of these conditions are under control.

Performance indicators for Peregrin were listed as follows in the plan:

- At least 15 pairs nest regularly within or adjacent to the SPA and are supported by the SPA;
- Peregrines continue to breed regularly in all the main areas used in 2002;
- The total extent of suitable semi-natural habitat within the SPA is the same as it was in 2006 (shown on aerial photographs) and the habitat proportions are roughly the same; and
- No breeding attempts to be known to fail because of impact of human disturbance.

5.2. Baseline Information; Elenydd-Mallaen SPA and Impact Pathways Screening; Connectivity/Functional Linkages Tests;

Bird survey work to inform the wind farm planning application comprised:

- Vantage Point surveys from four locations within or in close proximity to the Site over two years between April and September 2017 – 2019. Survey effort came to a total of 576 hours from all four locations in each of the breeding seasons and the winters of 2017/2018 and 2018/2019;
- Walk over breeding bird surveys covering the whole site up to 500m of the development boundary using open access land and public access routes surrounding the site between April and September of 2017/2018 and 2018/2019;
- Walk over wintering bird surveys between and including October and March in both 2017/18 and 2018/19.

All three SPA feature species were observed on site during Vantage Point (VP) surveys carried out. Three merlin, 11 peregrine and 853 kite observations were recorded over the survey period. The VP surveys during the breeding season recorded no instances of merlin, four instances of peregrine and 398 instances of kite.

breeding bird surveys found red kite to be breeding locally included. Merlin and peregrine were not recorded breeding locally.

The approach to addressing the connectivity test has considered the results of survey completed at the Site in combination with available information on the typical ranging distances of breeding and

wintering birds for which the SPA was classified. The quality of habitat on Site for these species has also been considered in drawing a conclusion on functional linkage / connectivity. This has been broken down into three discrete stages below:

5.2.1. Test 1: Is there evidence to suggest that breeding adults of all three classified features from the Elenydd-Mallaen SPA forage within the proposed development area?

To address test 1, this section reviews findings on the usage levels of the Site by the three feature species, their breeding range in relation to the Site and the SPA, available breeding and foraging habitat for each feature species within and around the Site.

Usage Levels of the Site by the Three SPA Feature Species

The survey results show very low levels of use of the Site by merlin and peregrine, with both species being encountered slightly more commonly outside of the breeding season. The results illustrate that red kite occurs commonly year-round, being slightly more regularly encountered outside of the breeding season. Field observations suggest there are several territories close to the Site (outside the SPA) that are likely to account for many of the observed field observations during the breeding season. Table 1 shows flight activity from all three SPA features over the Site and at Collision Risk Height (CRH).

Table 1: Flight activity from all three SPA features over the Site and at CRH

Species	Survey period	Number of flights observed	Time observed at collision risk height	Time observed in flight	Percentage of flight time at collision risk height (%)
Red kite	Total	853	31:22:10	36:33:10	85.82
	Breeding season	398	13:12:45	16:03:15	82.30
	Outside of breeding season	455	18:09:25	20:29:55	88.58
Peregrine	Total	11	0:25:00	0:27:00	92.59
	Breeding season	4	0:02:45	0:03:45	73.33
	Outside of breeding season	7	0:22:15	0:23:15	95.70

Does the Site lie within the typical breeding range for each of the feature species from the SPA

The review of published data shows that the Site does not represent an area of normal breeding range extent for foraging merlin and peregrine. This is supported by the survey results based on the low number of occurrences and low number of flight minutes recorded during VP surveys. When the recommended home range zone of influence (ZOI) distance was considered for red kite (including the

2km breeding buffer zone referenced in the Core Management Plan (CCW, 2008)², the Site boundary and nearest turbine lie outside the maximum ranging distance of breeding red kites within the SPA.

The distance between the Elenydd-Mallaen SPA and the Site, and published ranging distances of all three SPA feature species are outlined within Table 2 below.

The data shows that the proposed wind farm lies outside the maximum ranging distance of all feature SPA birds.

Table 2: Home range distances of different feature species (SNH, 2016³)

	Merlin ZOI	Peregrine ZOI	Kite ZOI	Minimum distance between Elenydd-Mallaen SPA boundary and the site	Minimum distance between Elenydd-Mallaen SPA boundary and the nearest turbine
Distance (Km)	Within 5km (Likely wider ranging in the winter)	2km	Core range of 4km, with maximum range of up to 6km	6.7 km	8.6km

Evaluation of habitat quality; available breeding and foraging habitat for each feature species within and around the Site.

Part of the Site support typical peregrine prey species including flocks of starling *Sturnus vulgaris* with a mean flock size of 23 (breeding season) and 87 birds (outside the breeding season), and golden plover *Pluvialis apricaria* with a mean flock size of 98 birds. No peregrine were observed hunting these species during any survey. Observed flight activity over the period did not suggest peregrine regularly use the Site as a hunting resource.

Peregrine falcons require a well-protected and relatively flat ledge on a steep cliff for nesting. Some buildings and quarry faces can provide a suitable ledge in the absence of a natural site. A desk study was undertaken to estimate the habitat suitability in the surrounding area using online aerial photography and available Phase 1 data from Welsh Government data dating 1979-1991 . Survey findings have recorded 107.16 km² suitable foraging habitat and 0.019 km² potentially suitable breeding habitat for peregrine. Peregrine falcons require a well-protected and relatively flat ledge on a steep cliff for a nesting site, (alternatively some buildings and quarries can also provide a suitable ledges), which are habitat features not recorded on Site.

For merlin the habitat extent estimates within the Site were 1.97 km² of suitable breeding habitat.

² Countryside Council for Wales, 2008, Elenydd Mallaen Core Management Plan

³ Ibid.

and 1.47km² of **optimal** foraging habitat, and 107.16 km² **suitable** foraging habitat. This translates to 29.4% suitable habitat for merlin, which is considerably less than the 59% minimum suitable foraging habitat within 5km of the territories (nest sites) that is required for this species.

This finding is consistent with the low number of merlin recorded by the surveys, suggesting the habitats are not regularly used for foraging.

The data review and bird survey results show that the habitats within the SPA and the surrounding area of the Site are of higher quality for merlin than those within the Site boundary.

Red kite is a generalist feeder. The Site represents typical but an unexceptional resource to kites with a mosaic of extensive open habitat consisting of upland habitats such as upland acid grassland and upland dry heath, open agricultural pasture with adjacent wooded gullies and valleys. Compared to the SPA and the surrounding area, the Site provides fewer quality habitats than those found in the SPA and surrounding land.

5.2.2. Test 2: Is the Elenydd-Mallaen SPA population dependent on recruitment from within the proposed development area.

Recruitment of juveniles of the three feature species, into the Elenydd-Mallaen SPA breeding populations has the potential to contribute to maintaining the favourable conservation status of the Elenydd-Mallaen SPA breeding populations, by replacing breeding adults lost by natural mortality, or by directly increasing the breeding population. In this section we address the need to understand whether the species breed on or close to the Site, and whether this is likely to make a significant contribution to maintaining populations within the SPA.

Assessing Whether Each of the Three Feature Species Breeds Within the Site.

Neither peregrine nor merlin have been recorded breeding on or close to the Site. It is therefore considered that the Elenydd-Mallaen SPA merlin and peregrine population is not dependent on recruitment from within the Site.

For red kites, three nests were recorded on and within 2km of the Site within the two survey seasons. However, one of the nests was either unsuccessful or unused in both breeding seasons, however the species often reuses the same nesting sites and so this should be considered as a potential active nest in future breeding seasons. Assuming typical productivity of the nests which is 0.9 chicks per nesting pair (Smith, 2020), indicating that the birds within the Site will produce 2.7 young per year, these three sites make a limited contribution to the population of red kites which is exponentially growing at a regional level.

Monitoring work undertaken in mid-Wales and in nearby areas of England by the Welsh Kite Trust has recorded 39 red kite pairs and 35 nests within approximately 360km² in East Powys in 2019, 37 nests in a Shropshire study area in 2019 (study area size not reported), and 113 occupied sites in part of Brecknockshire in 2015. The Brecknock and East Powys study areas, are within the referenced dispersal range of juvenile red kite to the SPA.

Based on the data gathered, it is not considered likely that the SPA red kite breeding population is reliant on the contribution of juveniles from the Site and immediate surrounding land to achieve the 34 breeding pairs outlined in the (JNCC standard data form) conservation objectives listed in the Core Management Plan⁸. However, there is a small possibility that the young from birds on Site could

subsequently breed within the Elenydd-Mallaen SPA, population. Considering data for the site and the land surrounding the SPA it is considered that this is unlikely to have an impact on recruitment and maintaining the favourable conservation status of the red kite population at the SPA at 15 pairs.

Assessing the Dispersal of red kites.

The data review has shown that juvenile red kites will be able to disperse between the Site and the Elenydd-Mallaen SPA. Cross (2005)⁴ has recorded that within Wales, maximum dispersal distances between place of hatching and first breeding, is 11km for males and 13.7km for females. The Site is 6.7km at its closest point from the SPA, with the nearest turbine 8.7km from the SPA. Juvenile kites fledged on Site could therefore form part of the breeding population of the SPA in future years.

Assessing if the Predicted Juvenile Mortality Due to the Wind Farm will Have a LSE on the SPA Population Impact on Achieving a Stable Population within the SPA

Collision Risk Modelling was undertaken to work out any additional mortality from the turbines which could affect recruitment into the SPA population. A worst-case scenario was established, where it was assumed that all the birds represented in the collision risk analysis were from the red kite population from the Site and all the birds affected were juveniles. Even in this worst case scenario, one bird would be available from the site every six years to interact with the population from the PSA, leading to a slight positive increase of birds in the SPA.

Within the SPA the population of red kite is known to have increased. Annual survival in the breeding population is high, with only a 5% annual mortality rate in adult birds (Newton *et al.* 2000). When considering the red kite productivity of 0.9 chicks per nesting pair (Smith, 2020), annual productivity of the 34 pairs recorded within the Elenydd-Mallaen SPA can be expected to be around 30.4 young which makes the SPA population very robust. The juvenile population from Garn Fach are not necessary to maintain this population.

Modelling using the Population Viability Analysis (PVA) tool has indicated that if all juvenile birds from the Site's population contributed to Elenydd-Mallaen SPA breeding population, the impact would be around a 22% potential population increase over the lifetime of the wind farm project. The spatial potential positive magnitude would be **Highly positive** if the results are considered in isolation.

Evidence from the Welsh Kite Trusts area report, and advice from Tony Cross (personal communication), the potentially large local population adjacent to the SPA population is likely to have a larger role in maintaining / increasing the red kite population size in the SPA, than the small and more distant population from the Site. For these reasons, the spatial magnitude of impact for the birds on the Site is **Low**, and the impact of the Site's population on the internationally important population of red kite in the Elenydd-Mallaen SPA is likely to be **negligible**.

Overall, given the size of the red kite population in the hinterland areas of the SPA, that the small population from the Garn Fach site and surrounding area will have a minimal contribution to the breeding birds of the SPA.

CRM with a worst-case scenario for the Site, demonstrated the population growth in the SPA would not be significantly reduced by the turbines.

⁴ Cross. T. et. al, 2005, The Red Kites of Wales, page: 41, Subbuteo.

5.2.3. Test 3: Are there temporal differences in collision risk and would any difference represent a likely significant effect to the feature species. Consideration was given to collision risk inside and outside the breeding season

To address test 3, this section considers the findings on how the three feature species use the Site's air space, and how does the observed difference in kite activity outside the breeding season affect the predicted collision risk rate during that time.

Assessing how each of the three feature species are using the Site's air space.

Merlin has not been recorded at collision risk height and is not considered further here.

Peregrine use of the airspace was irregular. It was not possible to reach statistically robust conclusions on total usage and usage in and out of breeding season with the small data set of 14 observations over a total of 576 hours of survey.

When considering red kites, the likely large population of red kite adjacent to the Site, and the distance between the Site and the SPA boundaries results in it being unlikely that the SPA population will be impacted differently within or outside of the breeding season. Red kites showed a slightly higher level (14.32%) of use of the Site's air space outside of the breeding season than within. This level does not represent a large difference in Site use by this species.

How does the observed difference in kite activity outside the breeding season affect the predicted collision risk rate during that time

The increase in kite activity on Site observed outside of the breeding season was translated by the Collision Risk Model (CRM), to an expected annual collision rate of 1.26 individuals per year during the breeding season, and 1.82 birds outside of the breeding season. It is considered that the increase of activity was not likely due to the winter movement of breeding kites from other locations. The Site is at a similar altitude to the SPA with comparable upland conditions. If red kites are to move during winter, the movement will favour lower ground habitats destinations. Therefore, the increase in activity could be due to the increase in fledged juvenile birds from within or outside of the Site or more likely due to an increase in the use of the Site's airspace by the same birds on Site as opposed to an increased number of birds.

Therefore, risk to the relevant protected feature of adult breeding kite remains **low**.

5.2.4. Impact Pathway Screening and the Results of the Three Tests

In conclusion, following the three tests of connectivity the following spatial magnitude of impact can be concluded for each of the three feature species.

- Merlin adult breeding population: **Negligible**;
- Peregrine adult breeding population: **Negligible**; and
- Red kite adult breeding population: **Negligible**. A 'potential' impact pathways/functional linkage with regards to dispersing juvenile birds from the Garn Fach site to the SPA was investigated, and the assessment concluded no LSE. Given the size of the red kite population in the hinterland areas of the SPA, that the small population from the Garn Fach

site and surrounding area will have a minimal contribution to the breeding birds of the SPA. While there is a small possibility that Juvenile red kite may be part of the SPA population through immigration, the assessments carried have shown even with the small predicted collision fatality occurring, this is unlikely to significantly affect the SPA red kite population.

The impact pathway screening exercise considered three questions demonstrating whether there is functional linkage (connectivity) between the wind farm site and the SPA. The screening did not identify potential impact pathways from the Project on the merlin and peregrine SPA designated features.

A 'potential' impact pathways/functional linkage with regards to dispersing juvenile birds from the Garn Fach site to the SPA was investigated, and the assessment concluded no LSE. Given the size of the red kite population in the hinterland areas of the SPA, that the small population from the Garn Fach site and surrounding area will have a minimal contribution to the breeding birds of the SPA. While there is a small possibility that juvenile red kite may be part of the SPA population through immigration, the assessments carried have shown even with the small predicted collision fatality occurring, this is unlikely to significantly affect the SPA red kite population.

The in-combination assessment considered available information on other plans and projects, and PVA evidence. The assessment has also taken into account the red kite unprecedented regional and national population growth trends, and information outlining the larger role other red kite populations (adjacent to the SPA) have in maintaining and increasing the SPA red kite population size, than the small and more distant population from the Site. The in-combination assessment has concluded that the project, in combination with other relevant projects and plans, is not likely to result in a significant [adverse] effect upon the SPA, and no further assessment is required.

5.2.5. Likely Significant Effect Test Test (In combination)

There are no windfarms within 6km of the Site with published data except for the immediately adjacent (to the north) Llandinam project with a published CRM estimate of 1.24 red kite per year. This is because many windfarms have been in place for a significant amount of time, with many starting without prior CRM studies.

The Llandinam wind farm includes 102 turbines installed in 1992, and the Llandinam Repowering Proposal has been consented. This will see the removal of the existing Llandinam turbines being replaced with 34 turbines. It is therefore expected that this reduction in turbine numbers will lead to a reduction in predicted collision related fatalities.

However as previously discussed, breeding red kite have small ZOI's, and juvenile kites relatively small dispersal distances. The population of red kites in Wales is exponentially increasing, with the Welsh Kite Trust study plots demonstrating how many kites could be present in the valleys woodland and farmland surrounding the SPA. These birds from the surrounding land are likely to contribute far more to the SPA, than birds from sites like Garn Fach, which are more remote.

Looking at the worst case scenario considering both sites together a combined CRM estimated 3.77 bird collisions per year across the two sites,

A PVA analysis showed that the effect of the Garn Fach windfarm may very slightly reduce the kite population within the Garn Fach site and the Llandinam site when considered alone however, there is

no indication this will impact the SPA, In addition, because the data available to input in to the PVA model is limited by data access issues, due to sensitivities, a further search for evidence was undertaken. This evidence was evaluated to take account of the realities of the kite's pollution in the area to help with the interpretation.

The results of the Welsh Kite Trust area reports (one survey area of which lies within the hinterland of the SPA and the range of the Site's kite population) describes a very large number of previously unrecorded kites (Smith, 2020)⁵. It is also likely that dispersing juveniles from this large unrecorded population will disperse into both the site and the SPA population.

The results of Durr (2020)⁶ suggest that instances of recorded red kite collisions are rare, with five recorded cases in the UK. However, it is important to consider there is little effective monitoring effort in the UK, and while no clear issue has emerged (and the kite population continues to grow), the true rates of fatality may be higher. Even taking this into account, the data suggests that there is no problem to the birds on site because of the high likelihood that the offsite increasing populations, including juveniles from elsewhere, will be making contributions to the breeding population on site.

When considered together with all available data, including the Potential Biological Removal (PBR) results submitted within the ES, the spatial magnitude of impacts is judged **low**. Therefore the project, in combination with other relevant projects and plans, is not likely to result in a significant [adverse] effect upon the SPA, and no further assessment is required.

Table 5: Wind farm projects within 6km radius of the Elenydd-Mallaen SPA

Project	Predicted mortality data available
Bryn Blaen	2.9
Cefn Croes	No
Bryn Titli	No
Rheidol wind farm	No

⁵ Smith, L. 2020, Red Kites in East Powys 2019, The Red Kite Trust

⁶ Tobias Dürr, 2022, Dokumentation aus der zentralen Datenbank der Staatlichen Vogelschutzwarte, Bird fatalities at wind farms in Europe.

6. Conclusion

River Wye SAC

The Proposed Development is not necessary to the management (conservation) of the River Wye SAC. Some effects on SAC qualifying features are predicted. The assessment process has therefore considered the potential effects on the integrity of the SAC during the Proposed Development.

Predicted impacts on qualifying features ('Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation' and Atlantic salmon (Brown trout) were a deterioration in water quality, physical damage and biological disturbance on account of the construction, operation and decommissioning phases of the Proposed Development. Impacts from siltation or accidental/reckless discharge, or spillage of other polluting substances into the water courses have the potential to impact the habitat and both fish species in the wider SAC catchment. Direct impacts to otters were also predicted via reinforcement of water course crossing points.

The screening stage 1 HRA assessment considered the Project will result in likely significant effects to the Water courses of plain to montane levels, Atlantic salmon and Otter SAC features during construction and decommissioning phases.

Proposed mitigation measures include the development of a water quality monitoring programme following consultation with statutory consultees, to allow any potential pollution incidents to be detected and promptly rectified. Pollution prevention measures will be adhered to during reinforcement of water course crossing points, and an Outline 'Surface Water Management Plan' has been produced to detail best practice procedures to prevent contaminated runoff from construction and operational phases for both surface and ground water receptors. There will be no adverse effect on the integrity of the SAC Water courses of plain to montane levels Atlantic salmon as a result of the project either alone or in-combination with other plans or projects following the implementation of mitigation measures to be secured through relevant planning conditions.

With respect to otters, mitigation measures proposed include traffic speed restrictions between sunset and sunrise, along with information signage around water course crossing points; thorough checks of the crossing points before commencement of reinforcement works, as well as at the start of works each day; and installation of mammal ledges to reduce risk of vehicle mortality. With the implementation of these measures, there will be no adverse effect on the integrity of the Otter SAC feature.

It was considered that the in-combination impacts will be limited to the construction and decommissioning phases of the established wind farms, which have been either mitigated for or presumed mitigated for in the development proposals due to the SAC designations.

Further HRA "Appropriate Assessment" (Stage 2) was carried out which concluded there will be no adverse effect on the integrity of the SAC as a result of the project either alone or in-combination with other plans or projects following the implementation of mitigation measures to be secured through relevant planning conditions.

Elenydd-Mallaen SPA

The proposed Development is not necessary to the management (conservation) of the Elenydd-Mallaen SPA.

The impact pathway screening exercise considered three questions demonstrating whether there is functional linkage (connectivity) between the wind farm site and the SPA. The screening did not identify potential impact pathways from the Project on the merlin and peregrine SPA designated features.

For dispersing juvenile red kite, the assessment considered the size of the red kite population on Garn Fach site and in the hinterland areas of the SPA, and concluded that the small red kite population from the Garn Fach site and surrounding area will have a minimal contribution to the breeding birds of the SPA. While there is a small possibility that juvenile red kite may be part of the SPA population through immigration, the assessments carried have shown even with the small predicted collision fatality occurring, this is unlikely to significantly affect the SPA red kite population. Therefore, the assessment concluded no LSE on SPA red kite population.

For red kite, the in-combination assessment considered available information on other plans and projects, and PVA evidence. The assessment has also taken into account the red kite unprecedented regional and national population growth trends, and information outlining the larger role other red kite populations (adjacent to the SPA) have in maintaining and increasing the SPA red kite population size, than the small and more distant population from the Site. The in-combination assessment has concluded that the project, in combination with other relevant projects and plans, is not likely to result in a significant [adverse] effect upon the SPA, and no further assessment is required.

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