

National Grid Electricity Distribution

Celtic Lakes Cable Connection

Ecological Impact Assessment (EcIA)

Reference: 298483 - NGED CLCC - PD ECOL1 EcIA

P01 | 21 July 2025



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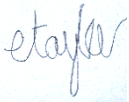
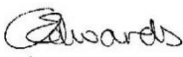
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1. Introduction

Ove Arup and Partners Limited (Arup) has been appointed by National Grid Electricity Distribution (NGED) to undertake a suite of ecological surveys and assessments. This commission includes the provision of an Ecological Impact Assessment (EcIA) to support the installation of approximately 2km of 132kV underground electricity cables to connect the NGED substation currently under construction¹ at Celtic Lakes, Newport (hereafter referred to as the ‘Celtic Lakes Substation Development’) to the existing distribution network. These works are to be undertaken using NGED’s permitted development rights and are the primary focus of this report.

The proposed cable route and associated works (hereafter referred to as the ‘Project’) extends from a location adjacent to the substation site at Ordnance Survey Grid Reference (OSGR) ST 28414 83970 in the northern extent of the site, to a southern mid-point at OSGR ST 29409 82733. The cable route and adjacent areas needed to facilitate construction are hereby collectively referred to as “the Site”. The Site location is illustrated in Figure 1.

1.1 Background

Newport County Council (hereafter referred to as ‘NCC’) received planning permission (ref: 23/0878) for the proposed construction of an electricity substation compound (132/33/11Kv) and associated infrastructure, located at Celtic Lakes, southeast of the existing Imperial business Park. Following consultation, the application was granted with conditions on February 7, 2024.

NGED are required to connect the approved Celtic Lakes NGED substation¹ to the existing distribution network. Primary works required to deliver this connection include:

- Replacement of two existing 132kV towers with two new terminal towers (Section 37)
- Installation of four 132kV underground cable circuits, approximately 2km in length between the new terminal towers and the BSP Celtic Lakes substation (Permitted Development)

Works associated with the installation of the two new terminal towers are planned to commence in January 2026. Consents for the construction of overhead lines are regulated by the Department of Energy Security and Net Zero (DESNZ) under the provision of Section 37 (S37) of the Electricity Act 1989. The removal and construction of the two new terminal towers will therefore be subject to a S37 application in which separate ecological assessments will be undertaken to assess any potential impacts.

Works for the installation of the 132kV underground cable circuits are planned to commence in September 2025. These works will be undertaken using NGED’s permitted development rights.

The Project is located approximately 1.9km west of the River Usk Special Area of Conservation (SAC) and 1.2km north of the Severn Estuary European Marine Site (EMS) which includes the Severn Estuary SAC, Special Protection Area (SPA) and Ramsar site. In addition, much of the land required for the Project is located within the Gwent Levels – St Brides Site of Special Scientific Interest (SSSI), an area designated for its network of reens and ditches, aquatic flora and invertebrates including shrill carder bee (*Bombus sylvarum*).

1.2 Project description

Proposed works under the Project comprise the installation of 2km of underground cabling/ducting. The installation will be undertaken using Horizontal Directional Drilling (HDD) techniques for the vast majority of the cabling, with small sections of open cut required; one at the northern end through existing tarmac and two at the southern end to facilitate connection to the new towers (when in place, tower installation is not part of this Project). Launch and reception pits will be required at each end of HDD sections and will be

¹ Newport City Council planning reference: 23/0878, consented 7 February 2024.

located within fields. Cable joint bays will be required which comprise underground structures where sections of cable are connected or spliced together.

Approximately 3.25 hectares of predominantly agricultural grassland (poor semi-improved / improved) habitat will be temporarily impacted to facilitate the Project (this includes working areas, access, storage and cable duct laydown areas). No permanent habitat loss would be required, with all habitats to be reinstated upon completion of the works. Locations of the working areas and associated HDD pits are situated within arable, cultivated and semi-improved grassland habitats within the Gwent Levels, with all working areas to be located at least 7m away from field ditches and 12.5m from reens. There are a total of five access routes to the respective working areas for this scheme. Access to the northern extent of the site will be achieved via Dyffryn Lane, which adjoins Celtic Way, Imperial Park. Access to a working area located within a cultivated field situated south of Percoed Lane and north of the South Wales mainline will be achieved via the Road To Nowhere, with access into the field via an existing bridge over Percoed Reen. Access to the fields south of the railway line will be achieved via Pont Estyll Lane via existing agricultural field access points.

A total of 157m² of mixed scrub and reed/ruderal vegetation within hedgerows and along the watercourses will require removal to allow access for plant/equipment. Two temporary bailey bridges will be constructed prior to the cabling works to facilitate plant movement onto the site towards the southern extent (See Figure 1; Appendix A.1). No working in water will be required for the construction of the temporary bridges or any other works.

The depth and path of the HDD bore have been chosen to minimise impact on buried heritage and utilities/services as well as on trees. If drilling is unsuccessful, the borehole will be safely filled with a mud slurry to prevent ground instability.

Figure 1 provides a visual representation of the Project including associated working areas, HDD launch pits, cable joint bays, and soil storage areas required to facilitate the cable installation. A general arrangement drawing which provides greater technical detail of the Project is included in Appendix C.1. The following paragraphs provide further detail on the activities. There are not anticipated to be any operational works, other than minimal maintenance. Any decommissioning works would be covered by a separate assessment.

The overall programme for the HDD cable ducting installation and the cable installation is September 2025 to September 2026 inclusive.

1.2.1 Enabling works – access requirements

Enabling works will include site mobilisation including preparation of access roads and compound areas and the preparation of launch and reception pits in addition to demobilisation once the activities are complete.

Site mobilisation

Site mobilisation will be undertaken over a period of up to seven weeks commencing in September 2025. It would include preparation of access routes (as shown in Figure 1) with the installation of temporary track matting. Access and egress points for vehicles, plant and persons would be integrated into the traffic management plan. Compound and temporary working areas are shown in Figure 1 and will comprise six working areas, covering approximately 1.41 hectares. The drilling rig required for the HDD would be tracked into position and hoses laid from a mixing plant to the rig. Table 1 below details the locations of vegetation clearance required to facilitate works, all of which are temporary losses that would be reinstated / allowed to regenerate naturally following completion of works.

Table 1: Temporary vegetation clearance locations and rationale for site mobilisation

Location	Grid Reference	Rationale	Area	Drawing reference
1	ST 29499 82830	Installation of a bailey bridge to facilitate access across Sunny Sealand-Sunnybank Link reen (6m wide bridge). Additional cable laydown area (3m wide laydown) required to the south of the bridge installation.	27m ² of common reed (<i>Phragmites australis</i>) to be cleared comprising 18m ² to facilitate the installation of the bailey bridge and 9m ² for the cable laydown.	Appendix A.3(1)

Location	Grid Reference	Rationale	Area	Drawing reference
2	ST 29386 82774	Cable laydown area (6m wide laydown)	40m ² reed/ruderal vegetation.	Appendix A.3(2)
3	ST 29343 82867	Cable laydown area (6m wide laydown)	40m ² reed/ruderal vegetation.	Appendix A.3(3)
4	ST 29267 83106	Widening of the existing access gateway, including the installation of a bailey bridge (6m wide bridge).	10m ² of mixed blackthorn (<i>Prunus spinosa</i>) and bramble (<i>Rubus fruticosus</i> agg.) scrub. 20m ² common reed and hairy willowherb (<i>Epilobium hirsutum</i>).	Appendix A.3(4)
5	ST 29257 83171	Widen existing access gateway, (4m wide access road required)	20m ² mixed scrub comprising willow (<i>Salix</i> sp.), bramble and rose (<i>Rosa</i> sp.).	Appendix A.3(5)
Site-wide		Launch/receptor pits, laydown areas, compound access and storage	0.39ha semi-improved neutral grassland, 0.36ha improved grassland, 1.1ha cultivated arable field and 1.4ha poor semi-improved grassland.	Appendix A.1

As discussed in Section 1.2, existing hardstanding is being used wherever possible to access the relevant areas to carry out the works (See Appendix A.1), however track matting will be required across the arable and grassland fields present due to the wet ground conditions present across much of the Site. No permanent habitat loss is anticipated as a result of the Project.

Launch and reception pits

A total of seven HDD launch and/or receptor pits are required to carry out the works, each 2.0 metres wide x 12.0 metres long with a depth of 1.0 metres. Working areas of approximately 50m x 40m would be maintained at the launch and reception points for the parking of vehicles, trailers and associated plant (See Appendix A.1). All excavations will be carried out within the designated working areas as shown in Figure 1 and will be fenced off with suitable edge protection and Heras Fencing or similar.

The depth and path of the HDD bore have been chosen to minimise impact on buried heritage and utilities/services as well as on trees. All existing underground ducts and services within the vicinity of the drill path, site compound and launch/reception pits will need to be located, marked out and their position detailed to the drilling team.

Where the position of any buried services is unknown or unsure then trial holes will need to be excavated to reveal their actual positions. Where it is not reasonably practicable to dig trial holes, then alternative means of identifying depth and location shall be used (i.e., ground probing radar).

A summary of the pits and their required working areas are summarised below, this should be read in conjunction with the detailed drawings in Appendix A.1:

- HDD1 launch pit: 1800m²
- HDD1 reception / HDD2 reception pit: 1428m²
- HDD2 launch / HDD3 reception pit: 2075m²
- HDD3 / HDD4 launch pit: 3037m²
- HDD4 / HDD5 reception pit: 1280m²
- HDD5 launch / HDD6 reception pit: 2450m²

- HDD6 launch pit: 2112m²

Demobilisation

Site demobilisation will be undertaken over a period of up to four weeks in October 2026. It will include the removal of all plant and machinery and removal of the temporary track matting. Access and egress points for vehicles, plant and persons will be adhered to throughout demobilisation.

1.2.2 Cable installation

Drilling operation

A pilot hole would be drilled by the drilling rig using a 150mm drill bit. The process would use bentonite, a natural clay-based drilling fluid, to support the borehole and minimise environmental disturbance. Bentonite is commonly used due to its low toxicity and ability to stabilise the ground. After the pilot hole is completed in 2.5m sections, the bore would be gradually enlarged to the required diameter. The drilling fluid would continue to be used throughout to support the ground and carry away material. Once the bore is ready, a High Density Polyethylene (HDPE) pipe would be pulled through the hole. The pipe sections would be welded together before installation to create a continuous length.

The installation will be drilled at minimum nominal depth of 8.0m metres and it will be below the reens as per the following design profiles, which can be viewed in Appendix A.2. Cables will be buried 5.91m beneath the bed of Percoed Reen, 6.46m for Wheel Lane and 6.6m for Sunny Sealand Link Reen.

Cable installation & joint bays

The Project would comprise the installation of 4No. underground circuits, each comprising three cables arranged in a trefoil formation, making a total of 12 cables. The cables would be laid in plastic ducts and installed using the HDD technique. There would be a distance of 5m between the centres of the middle circuits (circuit centre to centre) and 2.5 meters between the outer circuits.

Cable joint bays are needed at intervals of approximately 500m to 1,000m when constructing underground cables, to allow for individual sections of cable to be joined together. In areas where a cable joint bay is needed, a wider cable corridor may be required. These bays are typically made of concrete and are strategically placed along the cable route to facilitate the joining of cable segments. Three underground joint bays are proposed for the Project, located between the HDD2 launch / HDD3 reception pit (108m²), HDD3 / HDD4 launch pit (179m²) and HDD5 launch / HDD6 reception pit (120m²), with locations shown in Figure 1 and Appendix A.1. Existing habitat will be re-instated above joint bays upon completion.

Soil handling and management

Topsoils are an important and valuable asset to this, and any site. Damaging, mixing and contaminating soils would likely lead to additional capital costs through disposal off site and the importation of new replacement soils. On this site, the soils are a key factor in the site's value for agricultural productivity, with several of the fields used as silage and grazed by livestock. The seedbank within the topsoil is important in reinstating a robust, productive and valuable grassland sward after the works are complete.

Topsoil and subsoil will be stripped, handled and stored with care for future use in the landscape and habitat creation scheme. Soil management will be undertaken in accordance with Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites².

Proper handling and storage of topsoil onsite will enable the soil's structure, seedbank and living ecosystem to remain undamaged for successful reuse in the landscape and habitat re-instatement.

As set out in Section 5.4 of the Defra guidance² the height to which topsoil can be stored depends on a number of factors including; project programme, weather, storage duration and proposed re-use, among

² Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf [Accessed July 2025].

others. Unless topsoils are handled when dry and non-plastic, and can be kept that way, the height of storage mounds should be kept to a max of 2 m high,

Adequate space has been allowed for the storage of topsoil on site in bunds no taller than 2m, these are shown on the accompanying parameter plan (Appendix A.1).

During the drilling of the holes, cuttings³ would be produced. The cuttings would be carried back along the drilled path by the drilling fluids to a mud pit. The mud pit would be excavated within the working area close to the HDD entry point, with the sidewalls of the mud pit built up to form a bund. Stockpiles and associated mud pits would be kept a minimum of 10m from watercourses as shown in Appendix A.1. Launch and reception pits are to be of sufficient size to hold excess amount of water/drilling fluid to prevent run off. Recycling plant will be used to minimise material usage with the use of a vacuum anker and tractor to transport fluids from the reception to the launch area.

The level of drilling fluid in the mud pit would be constantly monitored at all times during the drilling operations by the drilling rig hands. Fluids and sediments would be pumped from the mud pit using centrifugal pumps into fluid separation units. The cuttings would then be separated from the drilling fluid in the drilling fluid recycling system, and the recycled drilling fluid used again for drilling. The cuttings fall from shaker screens as a relatively dry product with a small percentage of drilling mud. Supasorb (a universal liquid spillage absorbent) would be used to absorb the water and solidify the remaining sludge, allowing it to then be excavated and removed by conventional grab wagon for disposal off-site.

1.2.3 Cable operation

Once operational, the 4No. underground circuits will emit a very low-level electromagnetic field (EMFs). An EMF assessment has been undertaken as part of the Project, and is reported herein in Section 7.

1.3 Aim of this assessment

The objectives of the EcIA are as follows:

- To report the ecological baseline relevant to the Site, including designated sites, notable habitats and notable/protected species;
- To determine the importance of ecological features that could be affected by the proposed project, with reference to the geographical context in which they are considered important,
- To identify any impacts from the Project to the important ecological features in absence of mitigation, and to categorise any resulting significant effects at a geographic scale;
- To set out any avoidance and mitigation measures necessary for compliance with wildlife legislation, Future Wales and Planning Policy Wales 12 (the Stepwise Approach)⁴, to avoid, minimise or mitigate likely significant effects, and identify residual effects.
- To identify compensation measures that are required to address residual effects;
- To clearly set out any additional measures that are required for compliance with wildlife legislation, national planning policy.

The scope of this assessment has been determined with consideration for best-practice guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM)⁴⁹ and the Biodiversity: Code of practice for planning and development published by the British Standards Institute (BS 42020:2013)⁵.

³Cuttings refer to the fragments of soil, rock, or other materials that are produced during the drilling process. These cuttings are generated as the drill bit penetrates and breaks up the ground material to create the borehole.

⁴ Welsh Government, February 2024, Planning Policy Wales. Website: <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf> [Accessed May 2025]

⁵ BSI Standards Publication (2013). Biodiversity — Code of practice for planning and development (BS42020:2013).

1.4 Stakeholder Consultation

The Preliminary Ecological Appraisal Report (PEA), included in Appendix C.1, was submitted to Natural Resources Wales (NRW) on 11 February 2025 as part of their Discretionary Planning Advice Service (DPAS) to obtain their opinion on the Project and surveys planned to be undertaken. Table 1 includes a summary of the responses received and how the surveys completed, design development and this EcIA has been undertaken with consideration to those comments.

Table 2: Stakeholder consultation with NRW

Receptor	NRW DPAS comment on the PEA	Response
Bats	Agreement on the approach of recommended bat surveys including: • Ground-based inspections to map and categorise trees. • Aerial Potential Roost Feature (PRF) inspection of trees found to contain potential roost features, with further surveys if a roost feature is categorised PRF-M. • Where bat foraging and commuting habitat (e.g. hedgerows and woodland) are to be impacted, bat activity surveys consisting of one night-time bat walkover per season (spring, summer and autumn), plus static monitoring.	Ground-level tree assessment (GLTA) surveys were completed on all trees located within the anticipated footprint of the Project to assess their suitability to provide bat roosting opportunities. Further assessments were completed within an additional 50m buffer to allow for design changes and micro-siting as the construction methodology was still under development. Trees immediately adjacent to Green Lane and Pont Estyll Lanes were also assessed in case modification (e.g. branch trimming) was likely to be required to facilitate access to the Site. Updated tree roost assessments were undertaken on trees with identified PRFs categorised as PRM-M, following the results of the GLTA, where safe to do so. As part of this update assessment, trees were surveyed from the ground and aerially to assess the suitability of individual PRFs to provide bat roosting opportunities. All features categorised as PRF-M, with the exception of four trees (T8, T12, T18, T19), were evaluated through three aerial inspections. The four additional trees were assessed using either a combination of aerial PRF inspection and emergence surveys or solely through emergence surveys, due to health and safety considerations. No nighttime walkover and/or statics have been carried out as part of this scheme, however with the embedded design of the works avoiding severance and fragmentation of corridors of linear habitats, impacts to foraging and commuting habitat is considered to be negligible. Refer to C.5 for the bat survey report.
Dormice	We note that presence of dormice in the area of works is assumed on the basis of previous records in the vicinity. Whilst we are content with this approach, we note that the PEA recognises our advice to deliver habitat creation to habitat loss on a 2:1 basis. We recommend that a dormouse conservation strategy is prepared, which includes full proposals for dormouse habitat loss avoidance and habitat	The DAS response was delayed and prior to its receipt it was decided to proceed with a reduced survey effort as a precaution, to provide updated data from 2024 focusing on the distribution of dormice within the study area and temporal usage of the Site. The reduced survey effort proposed monthly survey checks in May and June 2024, and in September and/or October 2024. The Project has been designed to avoid and minimise impacts to dormouse habitats. As a result, loss of self-seeded scrub on Site is restricted to approximately 30m² on a temporary basis only to facilitate construction access in two locations. A further 127m² of common reed and ruderal vegetation will be lost on a temporary basis to facilitate access and cable laydown areas. Due to the small-scale and temporary nature of vegetation loss, it is proposed that this vegetation is allowed to regenerate naturally following completion of the works,

Receptor	NRW DPAS comment on the PEA	Response
	compensation in suitable functionally linked areas.	and as such no additional planting is proposed. A dormouse licence has been prepared on this basis. Refer to Appendix C.10 for the dormouse survey report and dormouse licence method statement ⁶ respectively.
Otters	We advise that all affected habitats potentially used by otters for breeding, resting, foraging, such as reens, streams, and ponds, or for commuting, should be subject to survey following best practice guidelines. We advise that camera trapping is undertaken at any location where there is uncertainty whether a breeding site or a resting site is present. In addition, we advise that likely otter commuting routes within the site are surveyed using camera traps. Should otter use of the site be confirmed, we advise that a conservation plan for the species will be required	All waterbodies which are to be crossed by the cable, as well as within 50m of the cable route were assessed for riparian suitability and field signs. In addition, directly adjacent and interconnected waterbodies further to the west of the proposed cable route were also captured to allow the possibility of micro-siting. There are approximately 20 field ditches and 3 reens present within the study area. Water vole signs were found within the study area; however works have been designed to avoid impacts on suitable water vole habitat wherever possible, with no burrows found within the study area (i.e. within 50m of the Project). As such, a water vole conservation plan has not prepared, however pre-construction surveys are proposed to ensure water vole have not moved into to the working area prior to mobilisation. Several signs of otter were recorded including spraints, slides and potential pathways primarily confined to Percoed Reen which indicates regular foraging and commuting. No otter breeding/resting sites were not confirmed on site, however, there are suitable habitats such as dense scrub lining the watercourses. With the design of the Project avoiding impacts to watercourses and associated marginal habitat and the lack of otter resting places identified during the survey, no camera traps have deployed as part of this scheme.
Water voles	We support the proposals for water vole surveys as outlined within the PEA report, consisting of two survey visits to confirm the presence/ likely absence of water voles within the site and adjacent habitats. We advise that surveys should not be conducted during times of flooding or heavy rain. If water voles are confirmed as being present on site, a conservation plan for the species should be prepared.	Refer to Appendix C.9 for the riparian mammal survey report and refer to Section 7 for details of mitigation proposed.
Great Crested Newts (GCN)	We note the recommendation for four presence/ absence surveys using traditional survey methods. Please note that we would be content for eDNA surveys to be used to establish presence/ likely absence within the site and any other affected areas (such as new transport	The DAS response was delayed and prior to its receipt it was decided to proceed with traditional GCN survey methods given the uncertainty of acceptance of eDNA sampling during survey design. Between April and June 2024 four GCN surveys to determine presence or likely absence were carried out on 13 waterbodies using three of the following survey methods: egg search, torching, bottle trapping and terrestrial search. Refer to Appendix C.11 for the GCN survey report.

⁶ Arup (2025). Celtic Lakes Cable Connection – Dormouse License Method Statement. Ref: 298483 - NGED CLCC - PD ECOL4 DM Licence

Receptor		NRW DPAS comment on the PEA	Response
		routes for machinery or materials).	
Gwent Levels (SSSI)	Terrestrial habitats	Further surveys are proposed to be undertaken, including an NVC survey during spring/summer to determine the condition of the habitats onsite and suitability to support important species such as the shrill carder bee. A number of section 7 habitats have been identified on site, where possible impact to these habitats should be avoided. We welcome that a management plan will be produced.	A combined phase 1 habitat and National Vegetation Classification survey was carried out by Peter Sturgess in early June 2024 which covered the study area footprint of the Project, with an additional 100m buffer to allow for design changes and micro siting as the construction methodology was still under development. The grassland vegetation was divided into approximately homogeneous stands for mapping purposes, and these were plotted by eye onto an aerial photograph base plan. These mostly coincide with the broad habitats and therefore the mapping has attempted to use similar colouring to standard JNCC habitat survey methodology (JNCC, 2010). The grassland plant communities were described by using quadrat sampling and target notes, aiming to classify them in terms of the published NVC communities (Rodwell, 1991, etc.). A total of 27 quadrat samples were recorded. These involved recording every species within 2x2m sample areas. The quadrats were generally selected as being representative of the stand in which they occurred. The ditches were described in target-note format, with recommendations being made to return later in the summer to carry out more thorough checks of any that were considered of potentially high value for their aquatic or marginal flora, and when more precise information might be available on where the proposed re-en crossings might be located. A further four watercourses were assessed in September 2024 and April 2025 using Palmer <i>et al</i> (2013) guidance for ditch flora survey. This involved close examinations of 20m length in reens and ditches, see Appendix C.3 and Appendix C.4 for aquatic flora survey reports. Refer to Appendix C.2 for the NVC survey report. Refer to Section 7 for details of mitigation taken to avoid impact to Section 7 habitats. Terrestrial invertebrate surveys specifically focusing on shrill carder bee and habitat suitability are detailed below.
	Shrill carder bee	The further NVC surveys should be followed by shrill carder bee surveys where suitable habitat is identified. We welcome the proposal to enhance grassland on site for shrill carder bee. Should any seeding be proposed within the SSSI, a local seed mix will be used. Further details should be included in a management plan.	Fieldwork was carried out over four days, with bumblebee surveys undertaken on the Site between May and August 2024. Aquatic invertebrate surveys were undertaken in May 2025. Survey areas included the footprint of the Project, within an additional 100m buffer to allow for design changes and micro-siting as the construction methodology was still under development. The cable corridor footprint is largely located within species-poor semi-improved agricultural grassland fields which are used as silage and grazing. No grassland enhancements are proposed within these agricultural fields given the temporary impact of works and potential of conflicting land use priorities (NGED are not the landowners) and reduced productivity / income. Neutral semi-improved grassland habitat to be temporarily disturbed towards the northern extent of the

Receptor		NRW DPAS comment on the PEA	Response
			site (See location of HDD6, Appendix A.1) will be re-sown using the existing planting schedules consented for the substation development⁷. Refer to Appendix C.8 for the invertebrate survey report. Refer to Section 7 for details of mitigation.
	Tree planting	For any tree planting within the Gwent Levels SSSIs, our preference is that any planting is species from our Gwent Levels tree list. We can provide this list.	The Project has been designed to avoid and minimise impacts to habitats, including trees wherever possible. As a result, tree loss is restricted to the temporary loss of self-seeded scrub at the Site. It is proposed that this is allowed to regenerate naturally following completion of the works and as such no planting is proposed.
	Grips	Damage to the grips can affect the hydrological connectivity of the interconnected drainage system and therefore could significantly affect the quantity and flow rate of water entering the SSSI reed and ditch network. In turn, this has the potential to affect the ability of the SSSI flora and fauna to survive in the watercourses. We recommend that further surveys should identify any grip features within the site and look at implementing mitigation or restoration of grips if necessary.	Field grips have been recorded within the majority of the fields within the study area from Lidar data although many have been degraded due to current management practices. During the NVC survey, vegetation within the grips were almost indistinguishable from the adjacent grassland, indicating current degradation of the historical field drains. Field grips have been assessed as part of the designated site valuation as part of the assessment. Due to nature and location of the works, temporary impacts to agricultural grips cannot be avoided. Agricultural grips will be reinstated upon completion of the works.
	Pollution prevention	We welcome that a Construction Environment Management Plan (CEMP) will be produced and will set out how pollution prevention measures will be implemented to ensure impacts are avoided or minimised. Mitigation includes use of track pads for any plant access within the vicinity of watercourses.	An outline CEMP⁸ has been produced, and a full CEMP will in place as part of the works to ensure pollution prevention measures will be adhered and implemented to avoid impacts to ecological features and habitats. SignaRoad track matting to be installed within fields prior to the works commencing to mitigate impacts to tree and grassland habitat. Refer to Section 7 for details of general site wide mitigation.
European Designated Sites		We welcome that further bird surveys are planned due to the potential for overwintering birds, a feature of the Severn Estuary Ramsar/SPA, to be	A suite of breeding (Appendix C.6) and wintering bird surveys (Appendix C.7) were undertaken at the site. An HRA has been produced alongside the EcIA which assesses the impacts of the Project on the qualifying

⁷ Arup (2023). Celtic Lakes: Planting Schedule. Available from: https://documents.newport.gov.uk/PublicAccess_Live/Document/ViewDocument?id=4EF7253D645E4A1CB8C07EDE2ABF1CDA [Accessed June 2025]

⁸ Arup (2025). Celtic Lakes Cable Connection - Outline Construction Environmental Management Plan. Reference: 298483 – NGED CLCC – PD ENV1 CEMP

Receptor	NRW DPAS comment on the PEA	Response
	affected by the proposed project. We note that an HRA is proposed to be produced to determine the potential impact of the Project on the features of the River Usk SAC and Severn Estuary SAC/SPA/Ramsar.	habitats and features of the Severn Estuary European Marine Site (EMS) and River Usk SAC.

2. Legislation, Planning Policy and Guidance

2.1 Legislative context

A list of relevant legislation, and brief overview of the key pieces of legislation only, that has been taken into account in undertaking this EcIA is detailed below. Further details of relevant legislation are provided in Appendix B.

- The Conservation of Habitats and Species Regulations 2017 (as amended);
- Wildlife and Countryside Act 1981 (as amended) (WCA);
- The Environment (Wales) Act 2016 (EWA);
- Well-being of Future Generations (Wales) Act 2015;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;
- National Park and Access to the Countryside Act 1949 (as amended);
- Countryside and Rights of Way Act 2000 (CRoW);
- The Hedgerows Regulations 1997;
- Protection of Badgers Act 1992;
- Wild Mammals (Protection) Act 1996;
- The Salmon and Freshwater Fisheries Act 1975 (as amended);
- The Eels (England and Wales) Regulations 2009;
- The Invasive Alien Species (Enforcement and Permitting) Order 2019; and
- Well-being of Future Generations (Wales) Act 2015.

2.1.1 The Conservation of Habitats and Species Regulations 2017 (as amended)

The Conservation of Habitats and Species Regulations (Habitats Regulations) 2017 (as amended) sets out protection for habitats and species listed within its annexes. This includes legislation covering European Protected Species (EPS) and the National Site Network (NSN).

2.1.2 Wildlife and countryside Act 1981 (as amended)

The Wildlife and Countryside Act (WCA) 1981 (as amended) protects a range of wildlife, the most relevant to this report including: the protection of wild birds and their eggs whilst nests are in use, making it an offence to injure or kill a number of species listed on Schedule 5, protecting wild plants listed under Schedule 8, and making it unlawful to plant or otherwise cause to spread in the wild any plant which is listed under Part II of Schedule 9.

2.1.3 The Environment (Wales) Act 2016

At the national level the Environment (Wales) Act (EWA) 2016 requires public authorities to seek to maintain and enhance biodiversity to promote the resilience of ecosystems when undertaking their functions. This includes consideration of species and habitat listed under Section 7 of this act as those of ‘principal importance’ to conserving and enhancement biodiversity in Wales (hereafter referred to as Section 7/Priority habitats and species⁹). Further consideration to the Sustainable Management of Natural Resources (SMNR)

⁹ This section replaces the duty in section 42 of the NERC Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales. The Welsh Ministers must also take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section and encourage others to take such steps.

as required under the Environment (Wales) Act has been detailed under the Natural Resources Policy¹⁰ (Welsh Government, 2017). This includes:

- Using resources sustainably to support move towards a more circular economy and accelerating green growth through increasing renewable energy and resource efficiency;
- Improving ecosystem health and resilience to tackle climate change and the decline in biological diversity through the delivery of nature-based solutions for mitigation and adaption; and
- Taking a place-based approach to deliver better results at a local level by enabling collaboration at the right scale (e.g. site, regional catchment, landscape or ecosystem) and at the right locations to tackle issues and maximise benefits.

2.1.4 Well-being of Future Generations (Wales) Act 2015

Places a duty on public bodies in Wales to carry out sustainable development. In this Act “sustainable development” means the process of improving the economic, social, environmental, and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals.

2.1.5 The Salmon and Freshwater Fisheries Act 1975 (as amended)

The Salmon and Freshwater Fisheries Act 1975 (SAFFA) is legislation that aims to protect freshwater fish, with a particularly strong focus on Atlantic salmon and trout. The legislation covers a broad range of topics, but of particular relevance to development are those sections covering water pollution, habitat disturbance and fish migration routes.

Under Section 2 (4) it is an offence to wilfully disturb spawn, spawning fish or spawning areas and under Section 4 (1) it is an offence to knowingly permit the flow of poisonous matter and polluting effluents into river courses that are poisonous or injurious to fish or the spawning grounds, spawn or food of fish.

Sections 9 to 15 are concerned with fish passage and migration routes. It is the duty of the waterway owner that when constructing dams, screens or sluices to provide and maintain a facilitating fish pass for migrating Atlantic salmon or trout. Section 9 allows the regulator to serve notice on the owner or occupier of a dam or obstruction, to install a fish pass where necessary. This section applies to dams which are either new or have been altered to create an increased obstacle to the passage of migratory salmonids. It is also applicable where dams in a state of disrepair are rebuilt over at least one half of their length.

2.1.6 The Eels (England and Wales) Regulations 2009

The Eels (England and Wales) Regulations 2009 (hereafter referred to as the Eels Regulations) implement Council Regulation (EC) No 1100/2007 of the Council of the European Union, establishing measures for the recovery of the stock of European eel. The Regulations are focused on the management of commercial eel fisheries (licences, catch returns and restocking) and the passage/migration of eels. The regulations afford powers to the regulators (the Environment Agency (EA) and Natural Resources Wales) to implement recovery measures in all freshwater and estuarine waters in England and Wales.

Part 4 of the regulations is concerned with the passage of eels and makes it a legal requirement to notify the regulator of the construction, alteration or maintenance of any structure likely to affect the passage of eels. This includes water intakes and outfalls, dams and weirs, sluices or any other in-river obstruction lies may be required to construct and operate an eel pass to allow the free passage of eels. Compliant eel screening facilities are also required for abstractions, and temporary pumps, capable of abstracting over 20 cubic metres in a 24-hour period, unless specifically exempted from the requirement by the EA.

¹⁰Natural Resources Policy. August 2017. Available at: <https://www.gov.wales/natural-resources-policy> [Accessed May 2025]

2.2 National Policy

2.2.1 Planning Policy Wales (PPW)¹¹

Planning Policy Wales 12 (PPW 12) sets the national policies in relation to development control through the Town and Country Planning Act 1990. This is supported by a series of Technical Advice Notes (TAN), including Technical Advice Note 5 which sets out the consideration of nature conservation in the determination of planning applications. Chapter 6 of PPW 12 has been updated with immediate effect as of 18 October 2023. The changes apply to all planning applications regardless of size and scale.

PPW 12 sets out that “planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or populations of species (not including non-native invasive species), locally or nationally and must work alongside nature and it must provide a net benefit for biodiversity (NBB) and improve, or enable the improvement, of the resilience of ecosystems.”

All schemes applying for planning permission must demonstrate they have achieved a NBB and enhanced ecosystem resilience through applying a Stepwise Approach. The stepwise approach is defined as any adverse environmental effects are firstly avoided, then minimised, mitigated, and as a last resort compensated for, delivering enhancements at each stage. A Green Infrastructure Statement will be required with all planning applications to demonstrate the stepwise approach and compliance with NBB and ecosystem resilience.

There is an emphasis on avoidance of development within statutory designated sites, or those not within but likely to damage, as a matter of principle. Development in a Site of Special Scientific Interest (SSSI) which is not necessary for the management of the site must be avoided. This has been conveyed to ensure that these sites can continue to fulfil their role at the heart of resilient ecological networks. In relation to non-statutory designated sites (such as Sites of Interest for Nature Conservation (SINCs)) there is additional need for a written opinion from the authority Ecologist. However, development is not presumed unacceptable in SINCs, only that ‘Where harm is unavoidable it must be minimised by mitigation measures and offset as far as possible by compensation measures designed to ensure there is no reduction in the overall conservation value of the area or feature, and a net benefit for biodiversity secured.’

The policy places emphasis on the retention of trees and hedgerows, both urban and rural, with a minimum ratio of at least three trees of a similar type and compensatory size planted for every one tree lost. The policy also places importance of the identification of managed wetland and riparian buffer zones to improve water quality as a key output of green infrastructure assessments as they will have a positive benefit in both reducing diffuse pollution and as part of securing a NBB and improving the attributes of ecosystem resilience.

2.2.2 DECCA Framework

The Environment (Wales) Act, the Well-Being of Future Generations Act and the Chief Planner’s letter frames biodiversity with respect to its contribution to achieving ecosystem resilience¹².

Natural Resources Wales (NRW) has developed a framework for evaluating ecosystem resilience based on five attributes and properties specified in the Environment (Wales) Act. This is referred to as DECCA: Diversity, Extent, Condition, Connectivity and Aspects of ecosystem resilience. The attributes provide a framework for considering the state of ecosystem resilience in Wales and can be applied across different habitats and land uses and for a range of different scales.

When assessing planning applications, PPW instructs planning authorities to take account of and promote the resilience of ecosystems. The DECCA attributes are explained further in NRW’s Terrestrial and freshwater

¹¹ Welsh Government Planning Policy Wales Edition 12. February 2024. Planning policy Wales [Accessed May 2025].

¹² [Net-Benefits-briefing.pdf \(cieem.net\)](#) (cieem.net) [Accessed May 2025]

Resilient Ecological Networks: a guide for practitioners in Wales¹³, but as a broad summary, the definitions are as follows:

- **Diversity:** maintaining and enhancing diversity at every scale, including genetic, structural, habitat and between-habitat levels.
- **Extent:** incorporating measures which maintain and increase the area of semi-natural habitat/features and linkages between habitats.
- **Condition:** The condition of an ecosystem affected by both direct and wider impacts should be considered, for example avoiding or mitigating pressures such as climate change, pollution, invasive species, land management neglect etc.
- **Connectivity:** Developments should take opportunities to develop functional habitat and ecological networks within and between ecosystems, building on existing connectivity.
- **Aspects of ecosystem resilience (adaptability, recovery, and resistance):** Adaptability, recovery and resistance to/from a disturbance are defining features of ecosystem resilience.

2.2.3 Future Wales: The National Plan 2040¹⁴

Future Wales provides the National Development Framework for Wales, setting out the direction for development in Wales until 2040. It addresses national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate resilience, developing strong ecosystems and improving the health and well-being of communities in Wales. It is a spatial plan and therefore sets out a direction of where development and infrastructure should be located for the good of the communities in Wales. The principles of the Well-being of Future Generations Act are embedded within the plan, to facilitate sustainable development. Importantly, it sets out how biodiversity needs to be safeguarded, and how actions should secure the maintenance and enhancement of biodiversity (net benefit for biodiversity), ecosystem resilience and green infrastructure, and part of development proposals.

2.2.4 South East Wales Area Statement

Area statements have been produced by NRW detailing the key challenges that are faced in different localities across Wales. The South East Wales Area Statement¹⁵ area covers the Local Authorities of Blaenau Gwent, Caerphilly, Monmouthshire, Newport and Torfaen; these areas are also referred to within this statement as ‘Gwent’. The four key strategic themes in South East Wales were identified from the key objective of improving ecosystem resilience using a landscape scale approach. The key risks to the health of Gwent’s ecosystems have been identified as climate change, habitat loss and degradation, excessive nutrient load and other forms of pollution, Invasive Non-Native Species (INNS), over exploitation and unsustainable use.

As part of the area statement opportunities for biodiversity relating to the challenges identified within Gwent have included:

- Developing effective collaborative, preventative interventions to reduce the impact of factors threatening the resilience of our key habitats and species including climate change, habitat loss and degradation, excessive nutrient load and other forms of pollution, INNS and over exploitation and unsustainable use by identifying the root cause of issues and taking collaborative, preventative approaches towards reducing their impact on species, habitats and people. This includes using Nature Based Solutions effectively and efficiently to reduce the pressure on assets and services (e.g. grey infrastructure such as sewerage network, flood risk assets and emergency services).

¹³ <https://naturalresources.wales/about-us/area-statements/south-west-wales-area-statement/?lang=en> [Accessed May 2025].

¹⁴ Welsh Government (2019). Future Wales The National Plan 2040.

¹⁵ Natural Resources Wales (NRW) (2023) South East Wales Area Statement. Available at: <https://naturalresources.wales/about-us/what-we-do/strategies-plans-and-policies/area-statements/south-east-wales-area-statement/> [Accessed 20/06/25]

- Improve the permeability of the urban environment through effective allocation of green infrastructure including use of Sustainable Urban Drainage Systems (SUDS) and urban tree planting.
- Developing a methodology or criteria (which accounts for a high emissions climate prediction scenario) for identifying where non-main rivers could implement natural flood risk management opportunities to greatest effect.
- Making efficient use of natural resources to optimise wellbeing including allowing the natural to provide employment which sustains communities across Gwent. This includes ensuring employment in the farming, forestry, fisheries, tourism and recreation industries is thriving and sustainable.
- Maintaining, enhancing and restoring floodplains and hydrogeological systems to reduce flood risk and improve water quality and quantity.
- Explore the implementation of ‘cut and collect’ schemes regionally to exploit economies of scale by joining up equipment, collection and disposal resources. This could provide further opportunities to increase the distribution of wildflowers and improve biodiversity.
- Increasing tree canopy cover and hedgerows where appropriate to do so (key spatial opportunities: various, but include the Wye valley, Central Monmouthshire and the urban environment).
- Working with land-owners and managers to identify where land could be managed differently to sequester carbon and build resilience and maximise the ability of ecosystems to protect, prevent and reduce climate impact across Gwent.
- Encouraging, supporting and delivering initiatives that improve the quality of local environments. This includes increasing the number of publicly accessible local green spaces achieving Green Flag and Community Green Flag status.

2.2.5 Wales Action Plan for Pollinators (2013)

The Action Plan for Pollinators in Wales recognises that: “Pollinators are an essential component of our environment. Honeybees and wild pollinators including bumblebees, solitary bees, parasitic wasps, hoverflies, butterflies and moths and some beetles are important pollinators in Wales, for crops such as fruit and oil seed rape, clovers and other nitrogen fixing plants that are important to improving the productivity of pasture systems for livestock grazing, and wildflowers.”

The Welsh Government has worked with industry and stakeholders to look in more detail at the evidence and issues around pollinators and their conservation in Wales. Following consultation, an 'Action Plan for Pollinators in Wales' was launched setting the strategic vision, outcomes and areas for action to halt and reverse pollinator decline in Wales. This plan aims to reduce and reverse the decline in wild and managed pollinator populations, which includes bees, some wasps, butterflies, moths and hoverflies, some beetles and flies. A pollinator task force comprising of key stakeholders is now active and a draft implementation plan is in place.

2.3 Local Policy

2.3.1 Newport Local Development Plan

The Planning and Compulsory Purchase Act 2004, or as amended, requires Newport City Council to prepare a Local Development Plan. The Plan will guide development within Newport up to 2026. The vision of the Plan is:

“As a gateway to Wales, Newport will be a centre of regeneration that celebrates its culture and heritage, while being a focus for varied economic growth that will strengthen its contribution to the region. It will be a place that people recognise as a lively, dynamic, growing City, with communities living in harmony in a unique natural environment”.

Objectives relating to the natural environment are as follows:

Objective 6 – Conservation of the Natural Environment To protect and enhance the quality of the natural environment, including landscape, protected habitats and species of principal importance for biodiversity in Wales (regardless of greenfield or brownfield status) and the protection of controlled waters.

The Newport City Council (NCC) Wildlife and Development Supplementary Planning Guidance (SPG)¹⁶ provides specific guidance on how biodiversity should be conserved and enhanced throughout the development control process, and states that ‘biodiversity must be actively considered by all development proposals.’

The Newport SPG¹⁶ has been prepared to provide guidance on how biodiversity in Newport will be conserved and enhanced throughout the planning and development process. The SPG states that in order to compensate for habitat loss, a greater quantity of the replacement will be required. A replacement ratio for ‘like for like’ compensation is set at 1:1.5 or 50% above the area to be replaced – and is the minimum that would be accepted. Where the habitat replacement is not ‘like for like’ the replacement ratio will likely need to be higher. All options for on-site compensation should be investigated and given preference over off-site compensation options.

2.3.2 Newport Local Biodiversity Action Plan

The Local Biodiversity Action Plan (LBAP) for Newport¹⁷ further outlines habitats and species of conservation importance to be considered during the planning process. This includes action plans for shrill carder bee and hazel dormouse (*Muscardinus avellanarius*).

¹⁶ Newport City Council Supplementary Planning Guidance: Wildlife and Development (2015). Available at: <https://www.newport.gov.uk/documents/Planning-Documents/Supplementary-Planning-Guidance/Wildlife-and-Development-SPG---August-Adoption-Version.pdf> [Accessed May 2025].

¹⁷ The Newport Local Biodiversity Action Plan. Available at: <https://www.newport.gov.uk/documents/Leisure-and-Tourism/Countryside/Newport-Local-Biodiversity-Action-Plan.pdf> [Accessed 07/01/2024]

3. Methodology

The following sections set out the methodology used to establish baseline conditions and to assess potentially significant effects of construction and operation of the Project.

3.1 Ecological Zone of Influence

The current guidance on ecological assessments (Chartered Institute of Ecology and Environmental Management (CIEEM), 2024)⁴⁹ recommends that all ecological features that occur within a ‘Zone of Influence’ (ZoI) for a proposed work are investigated.

The ZoI includes:

- Areas directly within the land take for the proposed project and access;
- Areas which will be temporarily affected during construction;
- Areas likely to be impacted by hydrological disruption; and
- Areas where there is a risk of wider disbenefits including, but not limited to, any increase in air, water, or noise pollution; or visual or vibrational disturbance during construction and/or operation.

The ZoI is variable depending on the nature of the construction and operational activities, and the ecological features affected. To inform this EcIA, the following zones have been defined in Table 3.

Table 3: Zone of influence used for this assessment.

Ecological Features	Zone of Influence
Statutory designated sites	10km buffer around the Site boundary for internationally designated sites. 2km buffer around the Site boundary for nationally designated sites
Non-statutory designated sites such as SINC's and Ancient woodland sites	1km buffer around the Site boundary.
Relevant species and habitat records (including protected and Invasive Non-Native Species (INNS) species)	2km from Site boundary for species records and 500m for standing waterbodies which could support great crested newt ¹⁸ .
Appraisal of protected species and habitats and potential for protected species	Varies from 50 to 100m from the Site boundary as described in Section 3.2.2 and Table 4.

3.2 Establishing the ecological baseline

3.2.1 Desk study

As part of the PEA, a desk study was undertaken to determine the presence of designated sites and protected or notable species records within the ZoI of the site, as determined in Section 3.1. Species records obtained from the various sources were curtailed to the last ten years to increase relevance, with the exception of fish records, where historical records were included due to the lack of recent data and the fact that older records can be valuable in characterising the likely current fish assemblage and river typology. The following sources were consulted as part of the desk study:

¹⁸ Included a search standing waterbodies within 500m of the site as per Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001), Great Crested Newt Conservation Handbook, Froglife, Halesworth.

- Department for Environment, Food and Rural Affairs (Defra's) Multi-Agency Geographic Information for the Countryside (MAGIC) website¹⁹;
- Species records obtained from South East Wales Biodiversity Records Centre (SEWBRcC)²⁰ on 14 December 2023.
- Joint Nature Conservation Committee (JNCC)²¹;
- Natural Resources Wales²²;
- OS Open Maps²³; and
- DataMapWales²⁴

The full results of the desk study can be found within the PEA (Appendix C.1). These records, along with the results of the extended Phase 1 Habitat Survey were used to inform the requirements for further surveys at the Site and are therefore not fully replicated within this report.

3.2.2 Field Surveys

A suite of ecological surveys were undertaken between October 2023 and June 2025 to inform the design of the Project. In the absence of a fixed Site boundary during the early stages of design for this Project, an indicative cable route was used to inform the surveys, with buffers of up to 100m applied to factor in the potential for changes to the proposed design, including micro-siting to avoid ecological and other sensitive features.

Whilst all ecological surveys carried out as part of this project encompassed the proposed cable route (as shown in Figure 1), survey areas were adapted in relation to design of the Project and/or the targeted ecological feature (i.e, hazel dormouse, otter, bat) and potential impacts associated with the Project.

The northern extent of the site was generally not included in the surveys undertaken between October 2023 and June 2025 as this area was subject to construction works for the new substation under development hereafter referred to as the 'Celtic Lakes Substation Development'¹. A suite of ecological surveys were undertaken between 2021 and 2023 to inform this planning application, with the surveys summarised in this report for completeness given the overlap in works' boundaries and to provide a baseline valuation of the Site. Surveys undertaken for the Celtic Lakes Substation Development further encompassed both Celtic Lakes Plot 1²⁵ and Plot 2²⁶ which had previously been considered for development, providing a comprehensive level of background knowledge of the area for the basis of this report. A high-level summary of the Celtic Lakes Substation Development survey results is described in Table 4 for the relevant ecological feature. For further information, all baseline reports relating to this Site are included in the Appendices. The Site boundary in relation to the Celtic Lakes Substation Development survey area, including applicant boundaries and substation can be viewed in Figure 2.

¹⁹ <https://magic.defra.gov.uk/MagicMap.aspx>

²⁰ [Welcome to the South East Wales Biodiversity Records Centre | SEWBRcC](#)

²¹ <https://jncc.gov.uk/>

²² <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity>

²³ <https://www.openstreetmap.org>

²⁴ <https://datamap.gov.wales/>

²⁵ Plot 1 is centred at National Grid Reference (NGR) ST 28565 84052 and covers approximately 9.9 hectares (ha). The Plot is bordered by industrial units and residential areas along South Lake Drive to the east and north. Agricultural fields are located to the south of Plot 1.

²⁶ Plot 2 is centred at NGR ST 28093 83828 and covers approximately 24ha. This Plot is bordered by industrial units to the north, Plot 1 to the east, and a mix of woodland, farmland and ponds/field ditches to the west and south.

3.3 Supplementary technical assessments

The following technical assessments have been used to underpin the ecological assessments in this EcIA: National Grid (2025) Celtic Lake: Magnetic field assessment of 132 kV underground Cables crossing the Reens (EEN/646/NOTE2025)²⁷. This assessment quantifies the magnetic fields associated with the operation of 132kV underground cables where they cross the reens. It is based on the site-specific design/cable specification and associated desktop analysis, undertaken in line with UK Government Policy.

²⁷ National Grid (2025) Celtic Lakes - Magnetic field assessment of 132 kV underground cables crossing the Reens. Document Reference: EEN/646/NOTE2025 (v0.1 10/06/2025)

Table 4: Summary of surveys undertaken at the site (those in grey undertaken for the Celtic Lakes Substation Development)

Survey	Date	Summary of method	Survey boundary	Baseline report title, author and Appendix reference
Phase 1 Habitat survey	May 2021	Extended Phase 1 Habitat Survey using standard JNCC Phase 1 Habitat survey methodology, including Habitat Suitability Index (HSI) assessments ²⁸ for great crested newts.	Celtic Lakes Substation Development Plot 1 and Plot 2 (and adjacent areas)	Celtic Lakes, Newport - Preliminary Ecological Appraisal. Arup (2021)
	16/10/2023	Following JNCCs Extended Phase 1 Habitat Survey ²⁹ . methodology which included an assessment of habitats on site, and an appraisal of the habitats' suitability to support protected/notable species and Invasive Non-Native Species (INNS).	Cable route and 100m buffer	Celtic Lakes NGED Substation Cable Connection - Preliminary Ecological Appraisal Arup (2023) Appendix C.1
National Vegetation Classification (NVC)	September 2021	Survey of flora north of Percoed Reen using standard NVC methodology ³⁰ to map and describe vegetation communities. Primary and Contributory species listed under the relevant habitats within the Guidelines for the Selection of Wildlife Sites in South Wales ³¹ were noted where present.	Celtic Lakes Substation Development Plot 1 and Plot 2	Celtic Lakes, Newport Vegetation surveys Sturgess Ecology (October 2021)
	June and August 2023	Survey of flora north of Percoed Reen using standard NVC methodology to map and describe vegetation communities. Primary and Contributory species listed under the relevant habitats within the Guidelines for the Selection of Wildlife Sites in South Wales ³¹ were noted where present.	Celtic Lakes Substation Development Plot 1 and land immediately to the south (owned by Newport Council)	Celtic Lakes National Vegetation Classification Survey Report Ecus Ltd (September 2023)
	03/06/2024 to 05/06/2024	Survey of flora south of Percoed Reen using standard NVC methodology ³⁰ to map and describe vegetation communities A total of 27 quadrat samples were recorded. These involved recording every species within 2x2m sample areas.	Cable route and 100m buffer	Celtic Lakes Cable Route – Flora survey Sturgess Ecology (2024) Appendix C.2

²⁸ Odiham *et al.* (2000). in ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index.

²⁹ JNCC, (2010), Handbook for Phase 1 habitat survey – a technique for environmental audit, JNCC, Peterborough, ISBN 0 86139 636.

³⁰ Rodwell, (2006) National Vegetation Classification Users Handbook, JNCC

³¹ The South Wales Wildlife Sites Partnership (2004) Guidelines for the Selection of Wildlife Sites in South Wales. <https://www.blaenau-gwent.gov.uk/media/0utnyff5/sd112.pdf> [Accessed 08/07/25]

Survey	Date	Summary of method	Survey boundary	Baseline report title, author and Appendix reference
	12/09/2025	Survey of four ditches within the study area, based on Palmer et al (2013) guidance for ditch flora survey which involves close examination of 20m lengths of the reens. During the flora and reen survey, the Guidelines for the Selection of Wildlife Sites in South Wales³² was used to record the presence of Primary or Contributory species which contributes to SINC site selection.	Four ditches at some of the main crossing points along the proposed route which had suitability to support SSSI populations.	Celtic Lakes Cable Route – Reen Flora survey (2024) Celtic Lakes Cable Route – Reen Flora survey Sturgess Ecology (2025) Appendix C.3 & C.4
Amphibians – Great crested newt (GCN)	April to June 2023	Habitat Suitability Index (HSI) assessments on were completed on the two ponds within the northern extent of the site Extended Phase 1 Habitat Survey in May 2021 recorded found that both these ponds scored below average in the HSI category. Great crested newt eDNA and presence/absence surveys were undertaken within 250m of the Celtic Lakes Substation Development comprising surveys of two ponds and two ditches. Presence/ likely absence surveys were undertaken by Ecus. Techniques included egg search, torching, bottle trapping and terrestrial search within 5m of the waterbody.	Celtic Lakes Substation Development Plot 1 and waterbodies within 250m.	Celtic Lakes – Great Crested Newt Survey Report Ecus Ltd (2023)
	Four surveys between April and June 2024	Habitat Suitability Index (HSI) assessments²⁸ were carried out by Arup during the Extended Phase 1 survey undertaken in October 2023 for 26 waterbodies located on site, 13 were found to be poor and therefore not requiring further survey effort. Therefore, only waterbodies considered “below average” or higher suitability for GCN were surveyed, totalling 13 waterbodies. There were 13 waterbodies suitable for great crested newt present which were likely to be crossed by the proposed route. These were all interconnecting to the wider landscape. Presence/ likely absence surveys were undertaken by BSG for the 13 waterbodies. Techniques included egg search, torching, bottle trapping and terrestrial search within 5m of the waterbody.	13 waterbodies within the survey area and 5m terrestrial habitats	Celtic Lakes NGED – Great Crested Newt Survey Report BSG Ecology (2024) Appendix C.11

³² Gwent Wildlife Trust and The South Wales Wildlife Sites Partnership (2004) Guidelines for the Selection of Wildlife Sites in South Wales. Available at: <https://www.blaenau-gwent.gov.uk/media/0utnyff5/sd112.pdf>. [Accessed June 2025].

Survey	Date	Summary of method	Survey boundary	Baseline report title, author and Appendix reference
Reptiles	March to June 2023	Eight surveys in accordance with the Froglife survey guidance ³³ .	Celtic Lakes Substation Development Plot 1 and land immediately to the south (owned by Newport Council)	Celtic Lakes - Reptile Survey Report. Prepared for the Welsh Government. Ecus Ltd (2023)
Bats	August to October 2021	Transect survey and static deployment and analysis	Celtic Lakes Substation Development Plot 1 and Plot 2 (and adjacent areas)	Celtic Lakes, Newport - Bat Survey Report. Prepared for the Welsh Government Arup (2023)
PRA, transect and static				
Ground Level Tree Assessments (GLTA)	March 2023	Preliminary roost assessment including detailed external inspection of all structures and/or trees that bats could use for entry/ exit and roosting	Celtic Lakes Substation Development Plot 1	Celtic Lakes, Newport - Bat Survey Report. Prepared for the Welsh Government Arup (2023)
Aerial inspection	25/04/2025	The GLTA survey has been completed following the latest bat survey guidelines ³⁴ . Trees were assessed for potential bat roosting features (PRF) from the ground by a licensed ecologist	GLTA surveys assessed all trees within the Project's anticipated footprint to determine their suitability for bat roosting. Additional assessments were conducted within a 50m buffer to accommodate design changes and micro siting, as construction methods were still being developed. Trees next to Green Lane and Pont Estyll Lanes were also evaluated in case modifications, such as branch trimming, were necessary for site access.	Celtic Lakes NGED Substation Cable Connection – Interim Bat Report Arup (2025) Appendix C.5
Emergence surveys				
	21/08/2024 - 29/05/2025	Update tree roost assessments were undertaken on trees with PRFs categorised as PRM-M, where safe to do so. Two PRF-M trees, T2 and T14 were scoped out of aerial	T3, T5, T7, T9, T15, T16, T18	

³³ Froglife. (1999). Froglife Advice Sheet 10.

³⁴ Collins, J. (2023). Bat surveys: Bat surveys for Professional Ecologists: Good Practice Guidelines (4th edn.). The Bat Conservation Trust, London.

Survey	Date	Summary of method	Survey boundary	Baseline report title, author and Appendix reference
		PRF inspections due to being located outside of the 50m buffer from the preferred cable footprint corridor.	(See Figure 4 & 5 in Bat Report)	
	21/08/2024 - ongoing ³⁵	Emergence surveys were conducted under favourable weather conditions, following best practice survey guidance, in August and September 2024, and May and June 2025. Further emergence surveys are planned for June/July 2025 to fulfil the requirement of three surveys on all PRFs.	T8, T12, T18, T19 (See Figure 4 & 5 in Bat Report)	
Birds – breeding	April to June 2023	Six breeding bird surveys in accordance with the Bird Survey Guidelines ³⁶	Celtic Lakes Substation Development Plot 1 and land immediately to the south (owned by Newport Council)	Celtic Lakes – Breeding Bird Survey Report. Prepared for the Welsh Government. Ecus Ltd (2023)
	Six visits. 22/03/2024 (dawn) 08/04/2024 (dawn) 22/04/2024 (dawn) 16/05/2024 (dawn) 24/05/2024 (dusk) 04/06/2024 (dawn)	Breeding birds: The breeding bird survey consisted of walking pre-determined transect routes in all accessible habitat types and frequent stops were made to listen and scan for singing and calling birds. All habitat features within the survey area were approached to within approximately 50 m, apart from the National Grid substation, the margins of which were walked. Barn owl survey: A barn owl survey of the survey area and adjacent suitable habitat was undertaken in April 2024 to confirm presence / likely absence of the species.	Pre-determined transect route with 100m buffer to include all areas likely to be impacted by the works.	Celtic Lakes – Confidential Breeding Bird Survey Report BSG Ecology (2024) Appendix C.6

³⁵ This document provides an interim report detailing the bat surveys and assessments undertaken to date. This report will be updated following the completion of the remaining bat surveys which are scheduled in June/ July 2025.

³⁶ Bird Survey & Assessment Steering Group. (2023). Bird Survey Guidelines for assessing ecological impacts, v.1.1.0. Available at: <https://birdsurveyguidelines.org>.

Survey	Date	Summary of method	Survey boundary	Baseline report title, author and Appendix reference
Birds – wintering	November 2021 to January 2022	Wintering bird survey using survey methods derived from best practise bird census techniques ³⁷ and bird monitoring methods ³⁸ .	Celtic Lakes Substation Development Plot 1 and Plot 2, and arable fields to the south	Celtic Lakes, Newport - Wintering Bird Survey Report 2021/2022. Prepared for the Welsh Government. Arup (2023)
	Five surveys between November and February	Wintering bird walkover surveys were completed approximately monthly between early November 2023 and March 2024 (inclusive). The surveys were completed in line with the methods detailed within the Bird Survey Guidelines ³⁹ to determine the assemblage, numbers and distribution of wintering birds within the survey area.	Cable route and 100m buffer, any notable species or aggregations were noted on adjacent land where observed.	Celtic Lakes NGED Substation Cable Connection – Wintering Bird Survey Arup (2024) Appendix C.7
Hazel dormouse	July to November 2021	Dormouse nest rube and next box surveys using the methodology described in the Dormouse Conservation Handbook ⁴⁰ .	Celtic Lakes Substation Development Plot 1 and Plot 2 (and adjacent connecting habitats)	Celtic Lakes, Newport - Dormouse Survey Report. Prepared for the Welsh Government. Arup (2023)
	Between May 2024 and May 2025.	A habitat assessment for dormice was undertaken as part of a preliminary ecological assessment in. Based on the results of the habitat assessment, presence/ likely absence surveys were conducted between May 2024 to May 2025 using dormouse nests and boxes. The tubes were installed in April 2024 and checked during May, June and September 2024, and May 2025.	Cable route and 50m buffer	Celtic Lakes NGED Substation Cable Connection – Dormice Survey Report Arup (2025) Appendix C.10
Terrestrial Invertebrates	July and August 2021	Bumblebee survey using standardised methodology timed to coincide with peak flight period for shrill carder and brown-banded carder (<i>B. humilis</i>) bumblebee workers.	Celtic Lakes Substation Development Plot and Plot 2, and adjacent connecting habitats	Celtic Lakes, Wentlooge Level, Newport – Summary of Invertebrate Survey Results. David Boyce (2021)
	July and September 2023	Aquatic and terrestrial invertebrate surveys were undertaken over three distinct areas within Plot 1 and Plot 2 as far as possible in accordance with the guidelines	Celtic Lakes Substation Development Plot and part of Plot 2	Celtic Lakes – Invertebrate Survey Report. Prepared for the Welsh Government. Ecus Ltd (2023)

³⁷ Bibby, B.B., 2000. Bird Census Techniques. London: Academic Press

³⁸ Gilbert, G.G., Gibbons, D.W. and Evans, J.,1998. Bird Monitoring Methods: A manual of techniques. Bedfordshire, RSPB.

³⁹ Bird Survey & Assessment Steering Group (2023) Bird Survey Guidelines for assessing ecological impacts, v.1.1.1. <https://birdsurguidelines.org>

⁴⁰ Bright, P, Morris P, Mitchell-Jones, T (2006). The dormouse conservation handbook (2nd edition)

Survey	Date	Summary of method	Survey boundary	Baseline report title, author and Appendix reference
		provided by Drake et al (2007) ⁴¹ and also took into account the specific guidance provided in respect of the Gwent Levels SSSIs (CCW 1996 ⁴² ; 2004 ⁴³). Terrestrial invertebrates were sampled primarily by means of sweep-netting.		
	August 2024 – May 2025	Bumblebee surveys were undertaken on the 16 th and 17 th August 2024. The main focus of the August 2024 visits to the site was to record the distribution and abundance of shrill carder bumblebee. The population of the brown-banded carder bumblebee at Celtic Lakes was also assessed during the 2024 survey. Presence/absence of all other <i>Bombus</i> species	Cable route and 100m buffer	Celtic Lakes, NR. Newport – Invertebrate Survey David Boyce (2025) Appendix C.8
Aquatic Invertebrates	July and September 2023	Aquatic and terrestrial invertebrate surveys over three distinct areas within Plot 1 and Plot 2 Were completed as far as possible in accordance with the guidelines provided by Drake et al (2007) and also took into account the specific guidance provided in respect of the Gwent Levels SSSIs (CCW 1996; 2004). Aquatic invertebrates were sampled by means of pond-dipping’ from the bank.	Celtic Lakes Substation Development Plot and part of Plot 2	
	Samples were collected on 06 May 2025	11 eDNA samples were processed by Nature Metrics to identify freshwater invertebrate species present in 5 watercourses. Samples were collected following consultation with Nature Metrics to ensure methodology and sampling effort was representative for the Project.	Watercourses within the survey area: D1/Percoed Reen Branch West, Field Ditch 9, Percoed Reen, Sealand-Sunnybank Link and Wheel Lane Reen	Aquatic Invertebrates: eDNA Results Nature Metrics (2025) Appendix C.12
	May 2025	Five aquatic invertebrate sample stations were identified for monitoring in May 2025. At each station, samples were collected at three points with the three sub-samples pooled in the final results.	AQP01, AQP02, AQPR01M, AQ09, AQSSL02	Celtic Lakes, NR. Newport Invertebrate Survey David Boyce (2025)

⁴¹ Drake, C M, Lott, D A, Alexander, K N A & Webb, J (2007) Surveying terrestrial and freshwater invertebrates for conservation evaluation. Natural England Research Report No. BERR005. Natural England, Sheffield.

⁴² Countryside Council for Wales (CCW 1996) General guidance: Monitoring of Physical Developments within the Gwent Levels Site of Special Scientific Interest (SSSI). Interim Guidance Note 1.

⁴³ Countryside Council for Wales (CCW 2004) Invertebrate Monitoring on the Gwent Levels Sites of Special Scientific Interest. Interim Guidance Note 3, Updated June 2004.

Survey	Date	Summary of method	Survey boundary	Baseline report title, author and Appendix reference
				Appendix C.8
Riparian mammals - otter and water vole	September 2021	Survey of all waterbodies present within the study area for otter and water vole in accordance with standard survey guidelines.	Celtic Lakes Substation Development Plot 1 and Plot 2, and adjacent connecting habitats	Celtic Lakes – Otter and Water Vole Survey Report. Prepared for the Welsh Government. Ecus Ltd (2023)
	May and June 2023	Survey of all waterbodies present within the study area for otter and water vole in accordance with standard survey guidelines.	Celtic Lakes Substation Development Plot 1 and land immediately to the south (owned by Newport Council)	Celtic Lakes – Otter and Water Vole Survey Report. Prepared for the Welsh Government. Ecus Ltd (2023)
	Two surveys of each suitable waterbody along the route were undertaken (surveys were undertaken across three separate dates due to access constraints during the second survey) 14/06/2024 17/10/2024 28/04/2025	Otter and water vole surveys were carried out at each suitable watercourse or waterbody (pond, lake, reen, ditch) in line with guidance for each species ^{44, 45, 46} .	Cable route Watercourses and waterbodies within the survey area.	Celtic Lakes NGED Substation Cable Connection – Riparian Mammals Survey Report Arup (2025) Appendix C.9
Badger	March 2023	Badger survey to identify evidence of badger activity in accordance with the standard methodology ⁴⁷	Celtic Lakes Substation Development Plot 1	Celtic Lakes, Newport - Badger Survey Report. Prepared for the Welsh Government. Arup (2023).
Fish	September 2023	Four aquatic eDNA samples were collected across two ponds at the Celtic Lakes Substation site. Samples were sent to NatureMetrics for analysis and reporting.	Celtic Lakes Substation Development Plot 1 western and eastern pond	eDNA results report reference 'NM-EFN513.SO02635. Fish.Results' from samples received by Nature Metrics on

⁴⁴ Chanin, P. (2003). Ecology of the European Otter. Conserving Nature 2000 Rivers, Ecology Series No 10. EN, CCW, EA, SEPA, SNH & SNIFFER

⁴⁵ Strachan, R., Moorhouse, T., and Gelling, M., (2011). Water Vole Conservation Handbook. Wildlife Conservation Research Unit.

⁴⁶ Dean, M., (2021) Water vole Field Signs and Habitat Assessment – A Practical Guide to Water Vole Surveys.

⁴⁷ Harris, S. Cresswell, P and Jefferies, D. (1989) Surveying Badgers. The Mammal Society Publication No. 9. Mammal Society.

Survey	Date	Summary of method	Survey boundary	Baseline report title, author and Appendix reference
				12/09/2023. Results can be found in Table 8 of this report.
	October and November 2024	The western pond was partially drawn down during construction works and a fish translocation carried out in late October/early November 2024. During the works 115 eel, 6 pike and 1 stickleback were translocated to the closely adjacent Percoed reen west ⁴⁸ .	Celtic Lakes Substation Development Plot 1 western pond	Confirmed via email from Walters site agent to Arup ecologist on 6 Nov 2024 following the fish rescue.
	Samples were collected on 06 May 2025	11 eDNA samples were processed by Nature Metrics to identify freshwater fish species present in watercourses. Samples were collected following consultation with Nature Metrics to ensure methodology and sampling effort was representative for the Project.	Watercourses within the survey area (same as aquatic invertebrate survey sample locations)	Freshwater Fish eDNA Results Nature Metrics (2025) Appendix C.13

⁴⁸Confirmed via email from Walters site agent to Arup ecologist on 6 Nov 2024 following the fish rescue.

3.4 Limitations

The findings presented in this report represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys can be limited by factors affecting the presence of plants and animals, such as the time of year, migration patterns and behaviour.

It should be noted that the ‘Road to Nowhere’ and the southern extent of ‘Pont Estyll Lane’ have since been included into the Site boundary during the latter stages of design for access routes. Whilst trees immediately adjacent to Green Lane and Pont Estyll Lanes were also assessed in the event that modifications (e.g. branch trimming) was likely to be required for access, several of the habitat and specie surveys have not incorporated these access routes into the survey boundary. However, this is not considered to be a significant constraint to the impact assessment given that these access routes are comprised of hardstanding surfaces which will be subject to limited occasional plant/site traffic passing through. Where any trimming requirements are likely, this will be restricted to overhanging branches which have been subject to a Ground Level Tree Assessment as a minimum

Biological records obtained from third parties and presented in the desk study do not represent a full and complete species list for the area. Often there are areas of data deficiency as these records are mostly provided on an ad-hoc basis. For this reason, a particular species should not be disregarded if records were not returned within the biological data search as it may be a result of lack of survey effort opposed to an indication of the species’ absence.

The absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

Limitation specific to each species or further habitat surveys are detailed in each separate baseline report included in the Appendix C.

3.5 Assessment Methodology

The assessment of impacts from construction and operation has followed the methodology which is set out in the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland⁴⁹.

In line with this guidance, the following definitions are used for impacts and effects:

- **Impact** – Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow.
- **Effect** – Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow.

3.5.1 Valuing ecological features

The CIEEM guidelines recommend⁴⁹ that the value of ecological features or features is determined based on a geographic frame of reference. For this assessment, the following geographic frame of reference is used:

- International;
- National (i.e. UK);
- Regional (i.e. Southwest Wales);
- County (i.e. Newport); and
- Local (i.e. within circa 5km).

⁴⁹ CIEEM (updated September 2024). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.3. Chartered Institute of Ecology and Environmental Management, Winchester.

3.5.2 Predicting and Characterising Ecological Impacts

In accordance with CIEEM guidelines⁴⁹, when describing impacts, reference is made to the following:

- Positive or negative – an impact that either increases or reduces quality of the environment or factor being assessed;
- Magnitude – the size of an impact in quantitative terms where possible;
- Extent – the area over which an impact occurs;
- Duration – the time for which an impact is expected to last;
- Reversibility – a permanent impact is one that is irreversible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A temporary impact is one from which a spontaneous recovery is possible; and
- Timing and frequency – whether impacts occur during critical life stages or seasons and how often impacts occur.

Both direct and indirect impacts were considered: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through impacts on an intermediary ecosystem, process or feature, e.g. a pollution event reducing the food source for a species such as otter or water vole.

3.5.3 Significance Criteria

In accordance with the CIEEM guidelines⁴⁹, significant ecological effects in broad terms *‘encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)’*. Furthermore, a significant effect *‘is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general.’*

The assessment relies on professional judgement and guidance as provided within CIEEM Guidelines⁴⁹.

Any significant effects remaining after mitigation (the residual effects), together with an assessment of the likelihood of success of the mitigation, are the factors to be considered against legislation, policy and development management in determining the application.

3.5.4 Mitigation, Compensation and Enhancement

It is important as part of any environmental impact assessment, wherever possible, to clearly differentiate between mitigation, compensation and enhancement. These terms are used in this assessment as follows:

- **Mitigation** is used to refer to measures to avoid, reduce or remedy a specific negative impact in situ;
- **Compensation** is where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures;
- **Enhancement** is used to refer to measures that seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

4. Ecological Baseline

4.1 Designated sites

The data search highlighted four statutory designated sites of international importance within 10km of the Site comprising one Ramsar site, one Special Protection Area (SPA) and two Special Areas of Conservation (SACs). There are three statutory sites of national importance (Sites of Special Scientific Interest (SSSIs)) within 2km.

Details of these sites can be found in Table 4 below and their locations are shown in, Figure 3, Figure 4 and Figure 5.

Table 5: Internationally and Nationally designated sites within the ZOI

Designated site	Site features	Distance and direction from the Site	Scoped into assessment?
Internationally designated sites			
Severn Estuary Marine Site (including Severn Estuary SAC, SPA and Ramsar site)	The SAC⁵⁰ is designated for the presence of Annex I habitats: estuaries, mudflats and sandflats not covered by seawater at low tide, and Atlantic salt meadows and reef habitats are also qualifying features of the SAC, but not a primary reason for the designation. Sea lamprey (<i>Petromyzon marinus</i>), river lamprey (<i>Lampetra fluviatilis</i>) and twaite shad (<i>Alosa fallax</i>) are also a primary reason for the sites designation. In addition, migratory fish (Atlantic salmon (<i>Salmo salar</i>), European eel (<i>Anguilla anguilla</i>), sea trout (<i>Salmo trutta</i>) and allis shad (<i>Alosa alosa</i>) form part of the notable species sub-feature of 'estuaries' feature. The Seven Estuary SPA⁵⁰ is designated due to supporting internationally important populations of regularly occurring Annex I, migratory, assemblages of wildfowl bird species. The SPA supports 0.3-3.9% of the wintering populations of numerous species including Bewick's swan (<i>Cygnus columbianus bewickii</i>) (3.9%), gadwall (<i>Mareca strepera</i>) (0.9%), white-fronted goose (<i>Anser albifrons</i>) (0.4%), dunlin (<i>Calidris alpina</i>) (3.3%), redshank (1.3%) and shelduck (1.1%). Seven Estuary Ramsar Site⁵¹ is designated due to many of the SAC/SPA features but in particular: the presence of the estuary habitat, internationally important migratory fish assemblages and internationally important waterfowl populations largely during winter, and on passage and summer. The Ramsar site supports 1-35.8% of the wintering populations of numerous species including Bewick's swan (2.8%), gadwall (1.4%), white-fronted goose (35.8%), dunlin (1.8%), redshank (1%) and shelduck (1%).	1.2km southeast	The land required for the Project (and adjacent land) is hydrologically connected to the Severn Estuary EMS via the vast interconnected network of ditch/reen watercourses. As a result, migratory fish cited within the EMS may also be present within site boundary. Given the distance between the site and Severn Estuary EMS, there is the potential for overwintering birds cited within the SPA / Ramsar to utilise agricultural fields as feeding / roosting sites. As a result of potential impact pathways, the Severn Estuary EMS will be further considered within this assessment.

⁵⁰Severn Estuary SPA & SAC Information Sheet: <https://sac.jncc.gov.uk/site/UK0013030> [Accessed 07/01/24]

⁵¹ Severn Estuary Ramsar Information Sheet: <https://jncc.gov.uk/jncc-assets/RIS/UK11081.pdf> [Accessed 07/01/24]

Designated site	Site features	Distance and direction from the Site	Scoped into assessment?
River Usk / Afon Wysg SAC	The River Usk SAC⁵² comprises a large linear ecosystem which acts an important wildlife corridor, an essential migration route and key breeding area for a number of nationally and internationally important species. The site is primarily designated for its Annex II species including sea lamprey, brook lamprey (<i>Lampetra planeri</i>), river lamprey (<i>Lampetra fluviatilis</i>), twaite shad (<i>Alosa fallax</i>), Atlantic salmon (<i>Salmo salar</i>), bullhead (<i>Cottus gobio</i>) and otter (<i>Lutra lutra</i>), with allis shad (<i>Alosa alosa</i>) also present as a qualifying species, though not a primary reason for selection of the site. Habitat comprising water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation are also noted to be a qualifying feature of the site, though not a primary reason for its selection.	1.9km east	The land required for the Project (and adjacent land) is hydrologically connected to the River Usk SAC via the vast interconnected network of ditch/reen watercourses. As a result, migratory fish and otter cited within the SAC may also be present within site boundary. As a result of potential impact pathways, the River Usk SAC will be further considered within this assessment.
Nationally designated sites			
Gwent Levels St Brides SSSI	The SSSI ⁵³ is primarily designated for its reën and field ditch network and the plant and invertebrate species for which this network supports. The sites population of the rare shrill carder bee, which relies on flower rich grasslands and the banks of the reën and ditch network, is another reason for designation.	Within Site.	The site is largely within the Gwent Levels St Brides SSSI and may be impacted by the works. Therefore, the Gwent Levels St Brides SSSI will be further considered within this assessment.
Severn Estuary SSSI	The Severn Estuary SSSI ⁵⁴ is designated for its intertidal zone of mudflats, sand banks, rocky platforms and saltmarsh; it is one of the largest and most important in Britain. The estuarine fauna includes: internationally important populations of waterfowl; invertebrate populations of considerable interest; and large populations of migratory fish, including the nationally rare and endangered allis shad. The SSSI forms the major part of a larger area of estuarine habitat, which includes the Upper Severn Estuary, the Taf/Ely Estuary and Bridgwater Bay.	1.2km southeast	The Severn Estuary SSSI underpins the Severn Estuary EMS will therefore be further considered within this assessment.
River Usk (Lower Usk) SSSI	The River Usk (Lower Usk) ⁵⁵ is a rare example of a large mesotrophic lowland river which has not been subject to significant modification by man. Of particular significance to the river's morphology and biology are the extensive deposits of fluvio-glacial and alluvial material in the Usk valley between Abergavenny and Newport. The Lower Usk has developed a wide floodplain with a complex and active system of meanders, cut-off and back channels which contribute to the biological interest and diversity of the site.	1.8km east	The River Usk SSSI underpins the River Usk SAC will therefore be further considered within this assessment.

⁵² River Usk SAC Information Sheet: <https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0013007.pdf> [Accessed 03/07/2025]

⁵³ Gwent Levels – St. Brides SSSI Citation: https://naturalresources.wales/media/640899/SSSI_0341_Citation_EN0014d9a.pdf [Accessed 03/07/25]

⁵⁴ Severn Estuary SSSI. Citation: https://cdn.cyfoethnaturiol.cymru/643756/SSSI_0461_Citation_EN001f09c.pdf [Accessed 03/07/25]

⁵⁵ River Usk SSSI. Citation: https://cdn.cyfoethnaturiol.cymru/663716/SSSI_1425_Citation_EN0016492.pdf [Accessed 03/07/25]

A total of four non-statutory designated sites (SINCs) were identified within 1km of the site, as detailed in Table 6. These are shown in Figure 5.

Table 6: Sites of Importance for Nature Conservation (SINCs) within 1km of the site.

Site of Importance for Nature Conservation	Site description	Orientation from site	Potential Pathway for Effect
LG Duffryn Site 2 ⁵⁶	Neutral grassland	Within site.	LG Duffryn Site 2 is within the site and may be impacted by the works. Therefore, this site will be further considered within this assessment.
LG Duffryn Site 1 (South Lake Drive) ⁵⁷	Pond/reed bed; Cetti's warbler (<i>Cettia cetti</i>)	0.1 km northeast of site.	This area is subject to ongoing works from the Celtic Lakes NGED Substation Development (with the two projects to run concurrently) and as such, no additional potential pathway for effect is present. This site is therefore not considered further in this assessment.
Duffryn Pond ⁵⁸	Pond with emergent swamp vegetation, which supports a range of important invertebrates, plant, reptile, amphibian and mammal species	0.7 km north east of site.	No potential pathway for effect, therefore not considered further in this assessment.
Celtic Springs ⁵⁹	Post-industrial mosaic habitat. Neutral grassland. Calcareous grassland.	0.8 km north of site.	No potential pathway for effect, therefore not considered further in this assessment.

4.2 Habitats

4.2.1 Desk study

No ancient woodlands were identified within 1km of the site. Within 300m from the site boundary, there is a horse chestnut (*Aesculus hippocastanum*) which is a veteran tree, in an open access park. There may be additional trees (i.e., notable tree, veteran tree and ancient tree as listed within the Ancient Tree Inventory⁶⁰) present within 500m of the site, although they have not been recorded.

These features are all located across several main roads beyond several parcels of urban habitats with no hydrological connection to the site. Given the lack of impact pathways between the site and these features, ancient woodland and ancient / veteran trees are considered unlikely to be affected by the Project .

⁵⁶ LG Duffryn Site 2 (SINC) – Citation: <http://citations.lercwales.org.uk/sinc/new/MF7.pdf> [Accessed 07/01/24]

⁵⁷ LG Duffryn Site 1 (SINC) – Citation: <http://citations.lercwales.org.uk/sinc/new/MF6.pdf> [Accessed 07/01/24]

⁵⁸ Duffryn Pond (SINC) – Citation: <http://citations.lercwales.org.uk/sinc/new/TP1.pdf> [Accessed 07/01/24]

⁵⁹ Celtic Springs (SINC) – Citation: <http://citations.lercwales.org.uk/sinc/new/MF9.pdf> [Accessed 07/01/24]

⁶⁰ Woodland Trust (2025) Ancient Tree Inventory. Available from: <https://ati.woodlandtrust.org.uk/> [Accessed June 2025]

Figure 5 displays priority habitats which are derived from Phase 1 terrestrial habitat and species surveys conducted across Wales. Priority habitats recorded within the site comprise coastal and floodplain grazing marsh.

4.2.2 Phase 1 Habitat Survey

Habitats within the survey area were dominated by arable fields, improved grassland, poor semi-improved grassland and grazed fields comprising marshy grassland. Within the north of the site, dominating habitats comprised dense scrub, semi-improved grassland. Throughout the Site, there are a network of field ditches, reens and hedgerows, demarcating fields. Hardstanding and structures are present within the site, including a railway line which bisects the site and NG infrastructure such as terminal towers. A summarised description of the habitats recorded as part of the PEA are included in Table 6. Phase 1 habitat mapping is presented in Figures 3 in the PEA, see Appendix C.1.

Table 7 Phase 1 habitat descriptions recorded within the survey area (2023).

Phase 1 Habitat Type	Description
A1.1.1 Broadleaved woodland semi-natural	A small parcel of semi-natural broadleaved woodland is situated north and south of the railway bridge, with canopy cover dominated by semi-mature pedunculate oak (<i>Quercus robur</i>) and willow (<i>Salix sp.</i>). Understory vegetation was dominated by ivy (<i>Hedera sp.</i>) with the occasional scattering of bramble (<i>Rubus sp.</i>), cleavers (<i>Galium aparine</i>), harts-tongue fern (<i>Asplenium scolopendrium</i>) and male fern (<i>Blechnum spicant</i>).
A2.1 Scrub – Dense	Multiple dense scrub parcels were identified in northern extent of the site boundary. These were dominated by bramble with willow, gorse (<i>Ulex europaeus</i>), rowan (<i>Sorbus aucuparia</i>), hawthorn (<i>Crataegus monogyna</i>), alder (<i>Alnus glutinosa</i>), blackthorn (<i>Prunus spinosa</i>), cherry (<i>Prunus avium</i>), buddleia (<i>Buddleja davidii</i>) and dog rose (<i>Rosa canina</i>). A strip of dense mixed scrub is also situated south of the railway line, surrounding Ditch 4 along the northern boundary of Field 5 consisting of oak (<i>Quercus sp.</i>), willow, buddleia, traveller's joy (<i>Clematis vitalba</i>), dog rose and nettle (<i>Urtica dioica</i>).
A3.1 – Broad-leaved parkland/scattered trees	There are several mature and semi-mature oak trees scattered within the arable field described in section J1.1.
B2.2– Semi-improved neutral grassland	Parcels of semi-improved neutral grassland were identified north of the Percoed reen as part of the surveys undertaken in the summers of 2021 ⁶¹ and 2023 ⁶² . The dominant grass species comprised smooth meadow grass (<i>Poa pratensis</i>), Yorkshire fog (<i>Holcus lanatus</i>) and common bent (<i>Agrostis capillaris</i>) with some creeping bent (<i>Agrostis stolonifera</i>), false brome (<i>Brachypodium sylvaticum</i>), timothy grass (<i>Phleum pratense</i>), meadow foxtail (<i>Alopecurus pratensis</i>) adjacent to the reens and occasional quaking grass (<i>Briza media</i>). Other species present included common sedge (<i>Carex nigra</i>), spiked sedge (<i>Carex spicata</i>), meadow buttercup (<i>Ranunculus acris</i>), creeping buttercup (<i>Ranunculus repens</i>), common knapweed (<i>Centaurea nigra</i>), common birds-foot trefoil (<i>Lotus corniculatus</i>), field woodrush (<i>Luzula campestris</i>), common sorrel (<i>Rumex acetosa</i>), teasel (<i>Dipsacus fullonum</i>), thistle (<i>Cirsium sp.</i>), docks (<i>Rumex sp.</i>), perforate St John's-wort (<i>Hypericum perforatum</i>), yarrow (<i>Achillea millefolium</i>), red clover (<i>Trifolium pratense</i>), cranesbills (<i>Geranium sp.</i>), and self-heal (<i>Prunella vulgaris</i>). Where these habitats transitioned into marginal vegetation present on the site an increase in the presence of meadowsweet (<i>Filipendula ulmaria</i>), horsetail (<i>Equisetum sp.</i>) and hemlock water-dropwort (<i>Oenanthe crocata</i>) was noted.
B4 – Improved Grassland	Several fields to the southern extent of the boundary were identified as improved grassland habitat, dominated by species such as perennial ryegrass (<i>Lolium perenne</i>), and Yorkshire fog. Occasional species included red clover, dock, creeping buttercup, hard rush (<i>Juncus inflexus</i>) and chickweed (<i>Stellaria media</i>).

⁶¹ Sturgess Ecology (2021). Celtic Lakes, Newport - National Vegetation Classification Survey Report. Prepared for Ove Arup and Partners.

⁶² Ecus (2023). Celtic Lakes – National Vegetation Classification Report. Prepared for the Welsh Government.

Phase 1 Habitat Type	Description
B5 – Marshy grassland	Four parcels of poor semi-improved grassland (F5, F14, F18 and F21; Figures 2 and 3) are situated south of the railway line and one north (F3 Figure 2 and 3), all being dominated by perennial rye grass, dock and meadow buttercup. Occasional species included red clover, dandelion, creeping buttercup, prickly sow thistle (<i>Sonchus asper</i>), burdock (<i>Arctium sp.</i>), bulbous buttercup (<i>Ranunculus bulbosus</i>), chickweed and cock's foot.
C3.1– Other tall herb and fern – ruderal	Parcels of tall ruderal vegetation were identified north of Percoed reen (Figure 3). Species present included rosebay willowherb, dog rose, nettle and teasel.
F1 & F2.1 – Swamp and Marginal Vegetation	Parcels of tall ruderal vegetation were identified north of Percoed reen (Figure 3). Species present included rosebay willowherb, dog rose, nettle and teasel
G1 – Standing water	These habitats included parcels dominated by common reed (<i>Phragmites australis</i>) or greater pond sedge (<i>Carex riparia</i>), with marginal vegetation in areas also comprising yellow flag iris (<i>Iris pseudacorus</i>), bur-reed (<i>Sparganium sp.</i>), reed canary grass (<i>Phalaris arundinacea</i>), water horsetail (<i>Equisetum fluviatile</i>), water mint (<i>Mentha aquatica</i>), common hogweed (<i>Heracleum sphondylium</i>), common sedge, hard fern (<i>Blechnum spicant</i>), and meadowsweet previously identified during surveys undertaken in the summers of 2021 and 2023 for the substation application
J1.1 – Cultivated/disturbed land – arable	Field 1 is a parcel of arable land situated south of Percoed Reen which extends towards the railway line (F1; Figure 2) (Figure 3). This area has been recently cultivated with signs of old winter stubble present on the surface. Several mature oaks are scattered throughout this field.
J2.2.2 – Defunct hedge – species poor	Field 1 is a parcel of arable land situated south of Percoed Reen which extends towards the railway line (F1; Figure 2) (Figure 3). This area has been recently cultivated with signs of old winter stubble present on the surface. Several mature oaks are scattered throughout this field.
J2.3.– Hedge with trees – species poor	There are numerous hedges with trees present across the site. Tree species present within these hedgerows consisted of oak, willow, hazel, sycamore, hawthorn, blackthorn, buddleia and laurel (<i>Laurus nobilis</i>). Other species included bramble, nettle, horsetail, nettle, common reed, ivy, common hogweed and dog rose.
J2.6 – Dry ditch	Ditch 4 is situated within Field 5 and feeds into Wheel Lane Reen (D4; Figure 2). This ditch was dry in the northern extent, with heavy shading casted from both sides of ditch by dense bramble scrub with occasional scattering of pedunculate oak and hawthorn (Figure 3). Several ditches described in Section G2 above occasionally contained sections of dry ditches from reed grass, sediment build up and over-shading.
J3.6 – Buildings and structures	Buildings and structures on site comprised of National Grid substation located towards the north of the site and electrical substations associated with the railway line and bridge going over the railway. Other structures comprise terminal towers connected to the National Grid substation, pylons and overhead cables.
J5 – Gravel/Hardstanding	Hardstanding is present within the northern extent of the site, including Duffryn lane, which is regularly used for vehicular access to the National Grid substation site. Percoed lane situated along Percoed reen consists of a gravel/concrete pedestrian path which connects to Green Lane; a tarmacked road which runs adjacent to the cable route to the east (Figure 3). Other hardstanding areas present within site include the railway line which transects through the middle of the site (Photograph 50

4.2.3 National Vegetation Classification Survey

An NVC survey is a more detailed botanical survey to classify vegetation communities, in this case particularly the grasslands and reens, and highlight any notable or priority habitat within the survey area. Two surveys were undertaken, one to establish the flora present and the other to identify reën flora. Full results of the NVC surveys are detailed in the NVC Survey reports for both flora and reens provided in Appendix C.2 and Appendix C.3 and C.4.

The whole of the study area lies within the Gwent Levels St Brides SSSI, meaning that the diverse flora and invertebrate fauna associated with its reens and ditches should be treated as of national ecological significance. However, the flora NVC survey has shown that most of the proposed cable route crosses relatively species-poor fields, but the ditches and field margins support a flora with greater value for nature conservation.

Figure 6 provides an updated Phase 1 habitat map in respect to the Site boundary following the results of the NVC survey.

Flora NVC Survey:

Within the survey area, the majority of the improved grassland was representative of MG7b - *Lolium perenne* – *Poa trivialis* ley vegetation communities. These grasslands have been subject to herbicides and/or fertilisers and have generally species-poor flora with no significant conservation value.

A large proportion of the damp semi-improved grassland was classified as MG15 – *Alopecurus pratensis* - *Poa trivialis* - *Cardamine pratensis* grassland which is typical of flood-plain meadow grassland managed by hay-cutting. Many fields are managed by hay-cutting but the potential benefits of this method for biodiversity are limited by the use of herbicides and/or fertilisers.

Other NVC communities recorded on site during the June 2024 flora NVC survey (Appendix C.2⁶³) comprise:

- Rush-dominated field-grips: M23a *Juncus acutiflorus* – *Galium palustre* rush pasture
- Floating Sweet-grass-dominated field-grips: S22 *Glyceria fluitans* water-margin vegetation in field grips
- Open vegetation communities: OV21c *Poa annua* – *Plantago major*: *Polygonum aviculare* - *Ranunculus repens*
- Open vegetation communities: OV25 *Urtica dioica* – *Cirsium arvense*
- Aquatic and marginal vegetation communities - S26 *Phragmites australis*, S6 *Carex riparia*, A2 *Lemna minor*, A3 *Spirodela polyrhiza* – *Hydrocharis morsus-ranae*

The majority of the field ditches have not been managed for many years and therefore scrub has encroached, and dense hedges have established adjacent resulting in low botanical diversity. A small number of ditches have been maintained by periodic dredging and scrub clearance and therefore supported ditch flora species which feature on the SSSI citation.

Most of the plant species recorded were common species, but a few are included in the Guidelines for the Selection of Wildlife Sites in South Wales³¹ which includes a list of rare and scarce species, considered either Primary Species or Contributory Species, comprising:

- Tubular water-dropwort (*Oenanthe fistulosa*)
- Smooth brome (*Bromus racemosus*)
- Rigid hornwort (*Ceratophyllum demersum*)

⁶³ Sturgess Ecology (2024) Celtic Lakes Cable Route – Flora survey

- Great water-dock (*Rumex hydrolapathum*)
- Stone parsley (*Sison amomum*)
- Greater duckweed (*Spirodela polyrhiza*)

The notable plants are associated with the wetter ditches and field margins. The only Primary species was tubular water-dropwort and the others were contributory species. INNS recorded include Japanese knotweed (*Reynoutria japonica*).

There is some variation between the Phase 1 survey and the NVC survey habitat classifications. For example, NVC makes a distinction between types of scrub, such as bramble scrub, which is mapped as dense scrub within the Phase 1 Survey. Furthermore, the Phase 1 survey was not undertaken during the optimal survey period for vegetation surveys and therefore some species may not have been present during the survey or may have been missed as they were not in flower. Figure 6 displays an updated Phase 1 habitat mapping in relation to the study area, incorporating both results from the initial Phase 1 habitat survey and NVC survey for clarity

Reen NVC Survey:

Most of the plant species recorded were common species, but few are included in the Wildlife Sites Guidelines list of rare and scarce species, considered either Primary Species or Contributory Species, comprising:

- Arrowhead (*Sagittaria sagittifolia*) – also listed within the St Brides SSSI citation
- Frogbit (*Hydrocharis morsus-ranae*)
- Fat Duckweed (*Lemna gibba*)
- Great water-dock (*Rumex hydrolapathum*)
- Greater duckweed (*Spirodela polyrhiza*)
- Ivy-leaved Duckweed (*Lemna trisulca*)

The Primary Species recorded were arrowhead and frogbit, which indicated the reens of county value. Some sections of reens contained at least one Contributory Species but was not sufficient to meet the wildlife site guidelines and therefore are considered to be of local value. Several other notable species were recorded along longer reens such as small pondweed (*Potamogeton pusillus*), rigid hornwort and tubular water-dropwort.

INNS recorded include *Elodea* sp. which include Nuttall's waterweed (*Elodea nuttallii*) as listed on the Invasive Alien Species (Enforcement and Permitting) Order 2019 and Canadian pondweed (*Elodea canadensis*) as listed on Schedule 9 of the WCA 1981.

4.3 Species

Table 7 below summarises survey results for protected species. This includes results from the surveys for the Celtic Lakes Substation Development application in 2023, the Extended Phase 1 survey in 2024 and the further Phase 2 surveys undertaken, as recommended in the PEA (Appendix C.1). In addition, the legislation that applies to each species is shown.

Table 8: Summary baseline survey results for species within the study area.

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
Amphibians	Habitat Regulations - EPS species (Great crested newt) WCA (Sch5) EWA (Section 7)	Celtic Lakes Substation Development - 2023: GCN surveys for the substation application, including eDNA and presence/absence surveys undertaken in 2023 inclusive of the waterbody at the northern extent of the site did not identify any GCN and they were therefore considered likely absent from the site. Extended Phase 1 Survey - 2024: The survey noted that scrub, woodland, hedgerow, grassland and watercourses on and adjacent to the site provide suitable foraging and basking habitat for amphibian species, with scrub and woodland habitat providing suitability for hibernating amphibians. Phase 2 survey - 2024: During the 2024 great crested newt survey, no great crested newts or their eggs were recorded within any of the waterbodies during the four survey visits conducted between 09 April and 06 June 2024. However, suitable terrestrial and aquatic habitat for great crested newt was identified within the survey area.
Reptiles	WCA (Sch5) EWA (Section 7)	Celtic Lakes Substation Development - 2023: Reptile surveys undertaken for the substation application in 2023 identified grass snake and slow worm onsite. These species are considered likely to be present across all suitable habitats within the site boundary (woodland and scrub for hibernating reptiles) and grassland and bank habitats suitable for foraging and basking. Extended Phase 1 Survey - 2024: The survey noted habitat suitable for foraging, basking and hibernating reptiles including the hedgerows, grassland, watercourses, scrub and woodland.
Bats	WCA (Sch5),	Celtic Lakes Substation Development - 2021 and 2023:

⁶⁴ Abbreviations: 'S7' = Environment (Wales) Act 2016 Section 7 species; Wildlife and Countryside Act (WCA) 1981 (as amended); 'Sch8' = schedule 8 species of the WCA; 'Sch5' = schedule 5 species of the WCA; 'Sch1' = Schedule 1 Birds of the WCA; 'INNS' = Invasive non-native species; RD1 (Wales): Red Data Book listing for Wales based on IUCN guidelines; RD1 (UK): Red Data Book listing for the UK based on IUCN guidelines.

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
	Habitat Regulations (EPS), EWA (Section 7)	Transect and static surveys undertaken in 2021 in the northern extents of the site identified common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, serotine, greater horseshoe, brown long-eared and Myotis bats across a variety of habitats onsite. Habitats are well connected across the entire site and therefore a similar species composition is expected. Ground level roost assessments in 2023 found one oak tree with low potential to the southwest corner of the planning boundary and one building with high potential to the south of the planning boundary. Extended Phase 1 Survey - 2024: Two trees within site were noted to have potential bat roost features (PRFs) (TN4, TN12, Figure 3, Appendix C.5). The bridge over the railway was assessed to have low potential to support roosting bats due to gaps between the abutments. The site and surrounding areas were considered to hold high potential for flightpaths and foraging habitat for bats, as the site is well connected to the wider landscape through hedgerows, watercourses, woodland edges and tree lines, which are likely to be used by bats as flightpaths. The ditch and reed network across the site are likely to be used for foraging. Phase 2 survey – 2024: Ground Level Tree Assessment: The GLTA survey identified 20 trees with PRFs with suitability to support roosting bats. Of these 20 trees, nine trees were identified with PRFs which were at most suitable for individual bats or very small numbers of bats (thus categorised as PRF-I) and 11 trees were identified having at least one PRF which was suitable for multiple bats and may therefore be used by a maternity colony (thus categorised as PRF-M). Hibernation suitability was assumed for all trees with cavity-type PRF categorised as PRF-M. No bat roosts or evidence of bats were recorded in the trees where the PRFs were readily accessible during the GLTA surveys. Aerial inspection surveys: Aerial inspection surveys were undertaken on eight trees (T3, T5, T7, T8, T9, T15, T16 and T18, Appendix C.5). Throughout the course of the aerial inspections no bats or associated roosts were recorded within any of the PRFs previously identified as 'PRF-M' over the course of the three separate visits between August 2024 and May 2025. Furthermore, none of the inspections identified any evidence to suggest presence of bats such as smell, droppings, markings, staining and apex shape. Emergence surveys: No bats were observed emerging from any PRFs during surveys undertaken onsite

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
Birds – breeding	WCA (Sch 1)	Celtic Lakes Substation Development - 2023: A total of 43 bird species were recorded within the study area during the breeding bird survey in 2023. WCA Schedule 1 species Cetti's warbler was recorded as breeding on the site, with five territories noted within the study area, and are considered likely to be breeding in suitable scrub habitat across the site. WCA Schedule 1 bird peregrine (<i>Falco peregrinus</i>) was also recorded as being present. The site was also of breeding importance for four species of principal importance on Section 7 of the Environment Wales Act 2016, namely linnet (<i>Linaria cannabina</i>), bullfinch (<i>Pyrrhula pyrrhula</i>), dunnoek (<i>Prunella modularis</i>) and song thrush (<i>Turdus philomelos</i>). Five Red listed species, 14 Amber listed species and 23 Green listed species were recorded within the survey area and within 40m. Eight of the bird species recorded in the survey area are included as species of principal importance on Section 7 of the Environment Wales Act 2016; being herring gull (<i>Larus argentatus</i>), house sparrow (<i>Passer domesticus</i>), linnet (<i>Linaria cannabina</i>), starling (<i>Sturnus vulgaris</i>), bullfinch (<i>Pyrrhula pyrrhula</i>), dunnoek (<i>Prunella modularis</i>), kestrel (<i>Falco tinnunculus</i>) and song thrush (<i>Turdus philomelos</i>), although not all were confirmed or considered to be breeding within the study area. Incidental sightings include barn owl (<i>Tyto alba</i>) and kingfisher (<i>Alcedo atthis</i>). Extended Phase 1 Survey: During the Extended Phase 1 walkover in 2024, bird species observed include robin (<i>Erithacus rubecula</i>), carrion crow (<i>Corvus corone</i>) song thrush, long-tailed tit (<i>Parus caudatus</i>), blackbird (<i>Turdus merula</i>), chaffinch (<i>Fringilla coelebs</i>) and wren (<i>Troglodytes troglodytes</i>). A bird nests were observed in the trees along Percoed Reen (TN1, Figure 3, Appendix C.1). A buzzard was observed in a semi-mature oak in the arable field (TN5, Figure 3, Appendix C.1). Snipe (<i>Gallinago gallinago</i>) feeding holes were also observed within one of the fields situated towards the south of the site (TN11, Figure 3, Appendix C.1). The habitats within the survey area are likely to support breeding birds and the arable margins provide habitats for farmland birds. Phase 2 survey - 2024: During the breeding bird surveys in 2024, a total of 52 bird species were recorded. Of those species, a total of 28 were considered to be breeding on or within proximity of the site. Most territories were associated with hedgerows, patches of broadleaved woodland and scrub, with some also located within stands of common reed along the margins of the reens. A total of five Cetti's warbler territories were recorded, which is afforded protection under Schedule 1 of the WCA 1981. Three Birds of Conservation Concern in Wales red-listed species recorded includes goldcrest (<i>Regulus regulus</i>), common whitethroat (<i>Curruca communis</i>) and willow warbler (<i>Phylloscopus trochilus</i>). Amber-listed

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
		species include bullfinch (<i>Pyrrhula pyrrhula</i>), green woodpecker (<i>Picus viridis</i>), magpie (<i>Pica pica</i>), mistle thrush (<i>Turdus viscivorus</i>), and skylark (<i>Alauda arvensis</i>). The site was assessed as having suitable foraging and commuting habitat for barn owl (<i>Tyto alba</i>) and with two features on site identified as potential nest sites although no evidence of breeding barn owl was recorded.
Birds – wintering	WCA (Sch 1) Habitats Regulations, EWA (Section 7)	Celtic Lakes Substation Development – 2021 and 2022: During the wintering bird survey of plot 1, 2 and arable fields to the south, the only Severn Estuary/Ramsar feature recorded was mallard (<i>Anas platyrhynchos</i>). Five BoCC4 Red-listed Species were recorded: Fieldfare, kestrel, starling (<i>Sturnus vulgaris</i>), song thrush, and woodcock (notably 200 starlings were seen in December). Nine BoCC4 Amber-listed Species were recorded including: bullfinch, common gull, green woodpecker, grey heron, water rail, and others. Four Section 7 Species were recorded including: bullfinch, kestrel, starling, and song thrush. Due to suitability of habitats, it is likely that other wintering bird species including notable species recorded in the wider study area would be present on occasion. Extended Phase 1 Survey - 2024: During the Extended Phase 1 walkover in 2024, it was identified that the arable fields, waterbodies and marginal vegetation within the southern extent of the site provide suitable habitat for notable and/or protected wintering birds who qualify under the Severn Estuary Marine Site. Phase 2 survey - 2024: During the wintering bird survey, a total of 11 target species were recorded including one species of duck (mallard), three species of gulls (herring gull, black-headed gull and lesser black backed gull), two species of wader (common and jack snipe), two species of waterfowl (grey heron and moorhen) and three species of raptors (buzzard, sparrowhawk and kestrel). There was a noteworthy aggregation of starling with high numbers in November and December. Ten species of principal importance (as listed in the Section 7 of The Environment (Wales) Act 2016) were recorded. Nine Birds of Conservation Concern in Wales red-listed species recorded include goldcrest, meadow pipit, rook, black-headed gull, herring gull, lesser black-backed gull, lapwing, kestrel and starling. A total of 11 amber-listed species were recorded including chaffinch, green woodpecker, grey heron, jack snipe, magpie and mistle thrush.

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
Hazel dormouse	WCA (Sch 5), Habitats Regulations (EPS) EWA (Section 7)	Celtic Lakes Substation Development – 2021 Dormouse presence was confirmed within suitable habitats within the majority of plot 1 and plot 2 and surrounding woodland habitats with 34 nest tubes and boxes recoding probably or confirmed dormouse nests. Although no dormouse were found within nest tubes within the substation development planning boundary, six probable or confirmed nests were recorded immediately adjacent and it was estimated that habitats within the substation development planning site boundary could support a population of up to 8.6 dormice. Extended Phase 1 Survey - 2024: During the Extended Phase 1 walkover in 2024, no evidence of dormouse was recorded on site. Habitat appears suitable with parcels of scrub and hedgerows on site which may support dormice and provide connectivity between surrounding suitable adjacent habitats. Given distance of records, and previous surveys undertaken in 2021, and that the habitats are well connected it is considered that all habitats onsite that are suitable for dormice (i.e. woodland, scrub and hedgerows) are likely to contain populations of this species. Phase 2 survey – 2024/2025: The dormouse nest tube surveys undertaken confirmed dormouse presence within the study area. A total of 18 tubes and four boxes were found to contain confirmed or probable nests of dormice during the course of the surveys. A total of three dormice were recorded in May 2024, four in June 2024, four in October 2024, and one in May 2025.
Badger	Protection of Badgers Act 1992	Celtic Lakes Substation Development –2023: The habitat was confirmed as being suitable for badger however no badger signs or setts were found during 2023 surveys. Extended Phase 1 Survey - 2024: No definitive signs of badger were recorded on site, however disused mammal burrows were noted on the embankment south-east of the railway line. There is potential for badgers to use the site for foraging, with habitat and suitable substrate for sett creation on site and adjacent habitats. Badgers may use the parcels of broadleaved woodland south of the railway line for sett creation, along with adjacent habitats such as hedgerows and scrub which could provide suitable habitat for foraging.

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
Terrestrial Invertebrates	EWA (Section 7) INNS	Celtic Lakes Substation Development – 2021 and 2023: Terrestrial and aquatic invertebrate surveys in 2023 found the whole study area of plot 1 and 2 and adjacent connected habitats collectively supported a very good range of invertebrates which includes at least nine Section 7 (S7) listed species and four Nationally Scarce species. Invertebrate surveys in 2021 and 2023 recorded S7 and SSSI feature brown-banded carder bee and S7 cinnabar moth in the planning boundary area, as well as nationally scarce (NS) species of weevil (<i>Polydrusus formosus</i>). SSSI feature and S7 Shrill carder bee was not identified within the planning application area, but was present within higher diversity grasslands to the southeast, south and southwest of the site. The grassland compensation area supported relatively low numbers of brown carder bee and shrill carder bee was recorded close by. Invertebrates of note in the compensation area and land to the northwest included S7 species (shrill and brown-banded carder bee), and two NS species Adonis ladybird (<i>Hippodamia variegata</i>) and furrow-bee (<i>Lasioglossum malachurum</i>). Local species of note included the short- and long-winged conehead cricket (<i>Conocephalus dorsalis</i> and <i>C. flavus</i>) and lesser march grasshopper (<i>Chorthippus albomarginatus</i>). Extended Phase 1 Survey - 2024: The survey identified a mosaic of habitats suitable for a range of common and notable invertebrate species, such as the brown-banded carder bee and shrill carder bee. Phase 1 Survey 2024/25: 71 adult shrill carder bee were recorded at Celtic Lakes in August 2024. These were found across much of the site; the majority of records were from the southern section, where it was quite frequent on regenerating patches of flowering tufted vetch (<i>Vicia cracca</i>) in fields that had been cut earlier in the summer. Uncut fields with abundant flowering greater bird's-foot trefoil (<i>Lotus pedunculatus</i>) and common knapweed (<i>Centaurea nigra</i>) were also important. The count of 105 adult brown-banded carder bee is healthy and suggests that despite the cutting of much of the site, it still holds an important population of this species. Its distribution and abundance across the site were very similar to that shown by shrill carder bumblebee, with common knapweed, tufted vetch and greater bird's-foot trefoil being the most frequently recorded flower visits. The opportunities for both shrill carder bee and brown-banded carder bee at the Site are currently limited by existing management practices (heavily grazed fields with significant nutrient input). As such, foraging opportunities present at the Site are likely limited to short-term opportunistic foraging only.

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
Aquatic Invertebrates	EWA (Section 7), INNS	Celtic Lakes Substation Development –2023: Invertebrate surveys in 2023 found one NS aquatic species of crawling water-beetle (<i>Peltodytes caesius</i>), also a Contributory Species (CS) for SINC selection. The waterbodies onsite do not provide suitable substrates to support white-clawed crayfish which require gravel/stony habitats to provide refuge. Extended Phase 1 Survey - 2024: The reens are considered unlikely to support white-clawed crayfish (<i>Austropotamobius pallipes</i>), due to the soft substrates and slow-flowing water onsite. This species typically require gravel/stony habitats to provide refuge. Phase 2 survey – 2024/2025: Aquatic Invertebrates – Nature Metrics: There was a total of 109 freshwater aquatic invertebrates returned within the eDNA samples and other invertebrates which were not identified to species level. Aquatic Invertebrates – David Boyce: The aquatic invertebrate fauna at Celtic Lakes was found to be of only moderate interest. No key species with a national threat and/or rarity status were recorded. However, four local species that have a high fidelity to grazing marsh ditches in Britain were found including the hairy dragonfly (<i>Brachytron pratense</i>), which is cited within the Gwent Levels SSSI and recorded on Percoed Reen and Sunny Sealand-Sunnybank Link Reen. Other species include water beetles <i>Nartus grapii</i> and <i>Enochrus coarctatus</i> and the black colonel soldierfly (<i>Odontomyia tigrina</i>). Most of the smaller ditches here were either heavily shaded by overhanging trees and hedges and/or were dried up at the time of sampling. Secondly, the larger ditches that still held water and were not shaded (the Percoed and Sealand-Sunnybank Link Reens) had been cleared very recently and as a consequence were lacking the densely vegetated mid- to late-successional submerged, floating and emergent vegetation that is required by most of the rarer aquatic invertebrates found on the Gwent Levels. Notably hairy dragonfly, a feature of the St Brides SSSI on Site were observed along Percoed Branch West reen, Percoed reen and Sealand-Sunnybank link reens.
Riparian mammals - otter	WCA (Sch5), Habitats Regulation (EPS), EWA (Section 7)	Celtic Lakes Substation Development – 2021 and 2023: Arup conducted a riparian mammal survey at Celtic Lakes, Newport in 2021, to assess habitats for riparian mammals. Two watercourses showed high suitability for otters, while others were moderate to low. An initial footprint suggested otters might be present, however no other signs were found. In 2023, Ecus surveyed the site, finding no evidence of otters or water voles, though potential otter laydown areas were noted. Cameras were set up

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
		on two ponds at NRW's request, but no otter, badger, or water vole were recorded. Three potential otter slides were found within a 200m buffer, but no other signs were observed. Extended Phase 1 Survey – 2024: No evidence of otter was recorded on site, however, due to recent heavy rainfall, field signs may have been washed away. No otter signs were recorded along the watercourses; however, otters are likely to use reed and ditch system present across site for foraging and commuting to habitats within the wider landscape. The scrub and woodland habitats adjacent to the watercourses provides suitable resting places for otter. Phase 2 survey - 2024: Habitat Suitability Assessment: Nine watercourses were assessed to have moderate suitability for otter, with twelve watercourses offering low/negligible suitability. Those that were of moderate suitability were actively managed by NRW's Internal Drainage Board (IDB) and had an abundance of prey species and lack of pollution. However, the waterbodies were hindered by man-made modifications (i.e., sluice gates, weirs), disturbance (active dog-walking routes) and/or lack of suitable adjacent habitats (large arable fields present). Whilst otters are known to occupy all types of waterways, it could be considered that otters may be utilising sub-optimal waterbodies for resting places and commuting to areas with higher prey densities such as the reeds. Presence/Absence Survey: Several signs of otter were recorded including spraints, slides and potential pathways primarily confined to Percoed Reen which indicates regular foraging and commuting. Active otter breeding/resting sites were not confirmed on site but there are suitable habitats such as dense scrub lining the watercourses.
Riparian mammals - water vole	WCA (Sch5), EWA (Section 7)	Celtic Lakes Substation Development – 2021 and 2023: Of the 17 water bodies surveyed two were assessed as having high suitability for water vole, two were moderate or moderate to low and the remaining low, negligible or inaccessible/dry. No signs of water vole were recorded at any of the water bodies within the study area during the 2021 and 2023 surveys, however due to access issues preventing comprehensive survey of all waterbodies, the absence of water vole could not be assumed. Extended Phase 1 Survey - 2024: No evidence of water vole was recorded on site, however, due to recent heavy rainfall, field signs may have been washed away. The slow-flowing reed and ditch system present across the site is likely to support commuting and/ or foraging water voles, albeit limited due to overshadowing of hedges and trees. However, the steep, vegetated banks provide

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
		suitable habitat for burrow creation. Aquatic marginal vegetation including reedbeds and sedges provide suitable foraging habitat and cover for burrowing. Overall, the reens typically offer sufficient foraging and burrowing opportunities for water vole, with good connectivity to wider suitable habitats, with ditches providing less suitability for foraging burrowing water vole due to low water levels, overshading and little emergent vegetation. Phase 2 survey - 2024: Habitat Suitability Assessment: Five watercourses were assessed to have high suitability, six with moderate and 11 to have low/negligible suitability. Those that were of high or moderate suitability were actively managed by NRW's IDB, had areas of emergent and/or marginal vegetation, contained steep earth banks and ledges. These features provide foraging, commuting and coverage opportunities for water vole. Presence/Absence Survey: Several signs of water vole were recorded including food caches and latrines which were predominantly confined to watercourses maintained by NRW.
Fish	EWA (Section 7, Eels Regulations, Freshwater Fisheries Act Habitats Regulations	Celtic Lakes Substation Development – 2021 and 2023: In September 2023, four aquatic eDNA samples were collected across two ponds at the Celtic Lakes Substation site. Samples were sent to NatureMetrics for analysis and reporting. The western pond returned no amplifiable DNA in both samples, and therefore no species were reported in this pond. However, the eastern pond which is connected to the reen network and ultimately the Severn Estuary, returned positive eDNA samples for European eel, Northern pike (<i>Esox lucius</i>) and stickleback (<i>Pungitius sp.</i>)⁶⁵. The western pond was partially drawn down during construction works and a fish translocation carried out in late October/early November 2024. During the works 115 eel, 6 pike and 1 stickleback were translocated to the closely adjacent Percoed reen west⁶⁶. This demonstrates that European eel had migrated from the Severn Estuary through the reens to reach the ponds. Extended Phase 1 Survey - 2024: The reen and ditch system within the site boundary is likely to support both common and notable species of fish, including European eel. European eel are Critically Endangered (IUCN, 2018),⁶⁷ a notified species of the Severn

⁶⁵ eDNA results report reference 'NM-EFN513.S002635.Fish.Results' from samples received by Nature Metrics on 12/09/2023.

⁶⁶ Confirmed via email from Walters site agent to Arup ecologist on 6 Nov 2024 following the fish rescue.

⁶⁷ Pike, C., Crook, V. & Gollock, M. 2020. *Anguilla anguilla*. The IUCN Red List of Threatened Species 2020: e.T60344A152845178. <https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T60344A152845178.en>

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
		Estuary Ramsar site and forms part of the notable species sub-feature of 'estuaries' feature for the Severn Estuary SAC. Phase 2 survey – 2024/2025: Freshwater fish – Nature Metrics: Results from eDNA sampling confirmed presence of a total of six species: European eel, roach (<i>Rutilus rutilus</i>), northern pike (<i>Esox lucius</i>), three-spined stickleback (<i>Gasterosteus aculeatus</i>), nine-spined stickleback (<i>Pungitius pungitius</i>) and European perch (<i>Perca fluviatilis</i>). With the exception of European eel, all other species recorded are common and characteristic the common coarse fish assemblage of a lowland freshwater river. While not recorded during the eDNA monitoring, lamprey sp. ammocoetes are potentially present in the reen/ditch network and are assumed present on a precautionary basis. Other non-targeted results returned bird, amphibian and mammal species including common shelduck (<i>Tadorna tadorna</i>), Eurasian blackcap (<i>Sylvia atricapilla</i>), common blackbird (<i>Turdus merula</i>), smooth newt (<i>Lissotriton vulgaris</i>), European rabbit (<i>Oryctolagus cuniculus</i>), bank vole (<i>Myodes glareolus</i>), grey squirrel (<i>Sciurus carolinensis</i>) and common shrew (<i>Sorex araneus</i>).
Section 7 species/Other mammals	WCA (Sch5), EWA (Section 7)	Celtic Lakes Substation Development –2021 to 2023: During surveys for the substation site it was noted that suitable habitat exists across the site for west European hedgehog and European polecat (<i>Mustela putorius</i>) including scrub and grasslands. Signs of mole (<i>Talpa europaea</i>) and rabbit (<i>Oryctolagus cuniculus</i>) were also observed. Extended Phase 1 Survey - 2024: There were several signs of mammals previously present within the site, including paths, snuffle holes and disused burrow entrances. (TN6, TN9, Figure 3, Appendix A.1). The scrub, woodland, hedgerow and grassland habitats across site are likely to support various mammal species including brown hare, hedgehog, fox (<i>Vulpes vulpes</i>) and stoat. Two stoat were incidentally observed adjacent to Percoed Reen during GI works in the summer of 2025.
Notable plants	WCA (Sch9) RD1	Celtic Lakes Substation Development – 2021 and 2023: Surveys in 2021 and 2023 for the substation application were undertaken along sections of the Percoed West Branch reen and Percoed reen. Notable species within recorded included arrowhead (which is further listed within

Species/Taxon	Legal Status ⁶⁴	Field survey results (as defined for specific surveys) summary
		the St Brides SSSI citation), frogbit and rootless duckweed, all assemblage species of the SSSI and Primary species, with stone parsley and greater duckweed, both of which are Contributory species. Extended Phase 1 Survey - 2024: No notable vascular plant species were recorded on site; however, a detailed botanical survey was not undertaken. The survey was undertaken outside of the optimal vegetation season. Nonetheless, the site is likely to contain habitat suitable for notable vascular plant species associated with the various habitats on site, including notable SSSI plants. Phase 2 survey - 2024: During the flora NVC survey, most of the plant species recorded were common species, but few are included in the Wildlife Sites Guidelines list of rare and scarce species comprising tubular water-dropwort, smooth brome, rigid hornwort, great water-dock, stone parsley, greater duckweed. During the reen NVC survey, the rare and scarce species included arrowhead, frogbit, fat duckweed, great water-dock, greater duckweed and ivy-leaved duckweed.
Invasive Non-Native Plant Species (INNS)	WCA (Schedule 9) INNS	Extended Phase 1 Survey - 2024: During the Extended Phase 1 walkover in 2024, no INNS were recorded although the survey was undertaken outside of the optimal period to survey INNS. Surveys undertaken in 2021 and 2023 over a wider area to the north of the site identified several invasive species including false Virginia creeper (<i>Parthenocissus inserta</i>), Himalayan cotoneaster (<i>Cotoneaster simonsii</i>) and wall cotoneaster, Himalayan balsam, Japanese knotweed, Nuttall's waterweed, New Zealand Pigmyweed, entire leaved cotoneaster (<i>Cotoneaster integrifolius</i>), and Canadian pondweed. Phase 2 survey - 2024: The NVC flora and reen survey identified INNS including Japanese knotweed and waterweeds such as Canadian pondweed and Nuttall's waterweed.

5. Evaluation of Ecological Features

This section evaluates the nature conservation importance of the designated sites, habitats, and species considered to be present within the site and surrounding area in terms of their importance as per the geographic scale identified in Section 3.5.1.

Table 9 values all the ecological features present or potentially present within the survey area. Those features with less than local value or negligible value are not further assessed within the EcIA context unless there are related legal compliance requirements (for example INNS) and/or positive outcomes and enhancements to be assessed.

Table 9: Evaluation of ecological features

Ecological feature	Value	Evaluation
European Protected Sites		
Severn Estuary Marine Site (including Severn Estuary SAC, Special Protection Area (SPA) and Ramsar site)	International	SAC designated for presence of Annex I habitats and species of primary reason for designation including sea lamprey, river lamprey and twaite shad. SPA designated for supporting internationally important populations of regularly occurring Annex I, migratory, assemblages of wildfowl bird species. Ramsar site designated for important migratory fish assemblages and internationally important waterfowl populations largely during winter, and on passage and summer.
River Usk / Afon Wysg SAC	International	SAC designated for Annex II species including sea lamprey, brook lamprey, river lamprey, twaite shad and Atlantic salmon. The site is also designated for its habitats, although not a primary reason for site selection.
Nationally Protected Sites		
Gwent Levels St Brides SSSI	National	Noted for reed and field ditch network, including field grips which have been recorded within the majority of the fields within the study area from Lidar data although many have been degraded due to current management practices. The Site is also notified for the plant and invertebrate species for which this network supports.
Severn Estuary SSSI	National	Noted for estuarine habitats and bird populations.
River Usk SSSI	National	Noted for its riparian habitats and otter population.
Locally Protected Sites		
LG Duffryn Site 2	County	The site is of county value due to its neutral grassland and may be impacted by the proposed project as it is located within LG Duffryn Site 2.
Habitats		
Priority habitat: coastal grazing marsh and floodplain grassland	County	The habitat on Site is of county value. Works associated with the Project are located within fields considered to

Ecological feature	Value	Evaluation
		comprise this priority habitat, however, it should be noted these habitats are generally species-poor.
Woodland - Broadleaved semi-natural	Local	The woodland habitat present onsite is species-poor comprising oak and willow, with minimal understory or ground-flora and fly-tipping present throughout. Scattered trees, typically including semi-mature oak with standing deadwood, provide further value at the local level. Hedgerows on Site are also species-poor, the majority contain scattered trees, however many are defunct, heavily poached along the edges of field ditches and are interspersed with common reed. Dense scrub is present at the northern extent of the Site north of Percoed reen is a semi-natural habitat that is large in extent and contributes to a mosaics of habitats.
Hedgerow with trees – species poor		
Dense scrub		
Broadleaved scattered trees		
Semi-improved neutral grassland	Local	The small parcel of semi-improved neutral grassland located at the northern end of the Site is of local value as although this habitat is located within the designated SINC, encroaching scrub has reduced the species-richness of this habitat.
Improved grassland, poor semi-improved grassland including marshy grassland, arable fields	Less than local	These are common and widespread habitats that are not notable in terms of extent or botanical diversity with the NVC survey concluding that the proposed cable route crosses relatively species-poor fields. As such these habitats are not considered to be an important ecological feature of local value or above. It should be noted however that these habitats may still support species which are features of the SSSI (including foraging shrill carder bee) and the field margins along ditches and reens support an increased botanical diversity with greater value for nature conservation (as detailed in the relevant sections below). Field grips, a feature of the Gwent Levels St. Brides SSSI, have been recorded within the majority of the fields within the study area from Lidar data although many have been degraded due to current management practices. These have been assessed as part of the designated site valuation above as separate from the botanical diversity of habitats present at the Site.
Running water – reens and ditches	National	These habitats have a value for nature conservation at a national level due to being part of the Gwent Levels St Brides SSSI designation features.
Dry ditch	National	The dry ditches have a value for nature conservation at a national level, due to being part of the Gwent Levels St Brides SSSI designation features. The dry ditches and ditches they are connected to may support otter, water vole, amphibians and invertebrates.
Standing water - pond	Local	The pond on site supports notable plant species and amphibians but currently does not qualify as a priority habitat.

Ecological feature	Value	Evaluation
Tall herb and ruderal vegetation	Less than local	Common and widespread habitat that is not notable in terms of extent or botanical diversity and is not considered to be an important ecological feature of local value or above.
Arable land	Less than local	Common and widespread habitat that is not notable in terms of extent or botanical diversity and is not considered to be an important ecological feature of local value or above.
Buildings and structures	Negligible	Buildings and structures provide no ecological value.
Gravel/ Hardstanding	Negligible	Hardstanding provides no ecological value.
Species		
Hazel dormouse	County	Hazel dormice are an EPS species. The habitats onsite, such as the scrub, hedgerows and trees support good populations of dormice and have connectivity to other sites across the Gwent Levels.
Amphibians/ great crested newt	Local	The surveys did not identify any common amphibians or great crested newts on site. However, suitable terrestrial and aquatic habitat for great crested newt was identified within the survey area.
Badger	Less than local	No definitive signs of badger were recorded on site, however disused mammal burrows were noted. There is potential for badgers to use the site for foraging, with habitat and suitable substrate for sett creation on site and adjacent habitats.
Bats	Local	All bats are an EPS species. Noctule, common pipistrelle, soprano pipistrelle, brown long-eared bat, myotis species are recorded within the survey area. Also recorded were greater horseshoe bats that are listed on Annex II of the Habitat Directive. This species is only found in the southwest of Great Britain and within Carmarthenshire in the south and southwest of the county. The majority of species recorded foraging/commuting within the site and adjacent habitats are common and widespread. Although some rare species (brown-long eared bats) were recorded within the wider study area, the levels of activity were relatively low.
Birds -breeding	Local	The site has suitable habitat to support a range of breeding bird species and territories as found during the breeding bird survey. Species recorded include Schedule 1 species, Cetti's warbler, though noting that this species is common in South Wales, as well as Red-listed and Amber-Listed species.
Birds- wintering	Local	The habitats on site provide are likely to support notable and/or protected wintering birds who qualify under the Severn Estuary Marine Site. The site recorded 11 target species, ten species of principal importance as well as Red-Listed and Amber-Listed species.
Migratory Fish (SAC/Ramsar Species)	International: SAC/Ramsar Species	The reen network within the Gwent Levels is known to support a large population of European eel, a qualifying species of the Severn Estuary Ramsar. Furthermore, NRW considers that the reens and ditches of the Gwent Levels may potentially represent significant habitats for juvenile

Ecological feature	Value	Evaluation
		lamprey (ammocoetes) of all three species (river, brook and sea).
Common coarse fish assemblage	Local	In addition to European eel and lamprey sp. ammocoetes (see above) eDNA sampling revealed a total of five common coarse fish species: roach, northern pike, three-spined stickleback, nine-spined stickleback and European perch.
Terrestrial Invertebrates	National	The counts of 71 and 105 shrill carder and brown-banded carder bumblebees are quite high and suggest that, despite the cutting of many of the fields prior to this survey, Celtic Lakes is of National Importance for bumblebees.
Aquatic Invertebrates	County	The eDNA surveys returned 109 aquatic invertebrate species. The aquatic invertebrate fauna at Celtic Lakes is also of some note, including hairy dragonfly (cited as part of the SSSI features), though it lacks some of the other rarities found in grazing marsh reens on other parts of the Gwent Levels. It is assessed as being of County Importance for aquatic invertebrates
Reptiles	Local	The site offers suitable habitat such as hedgerows, grassland, watercourses, scrub and woodland for reptiles. There were no signs of reptiles during the 2024 Extended Phase 1 Survey.
Otter	County/ international (non-breeding)	Otters are an EPS and Section 7 species. They are likely to use reen and ditch system present across site for foraging and commuting to habitats within the wider landscape The otter population using the site may also commute through the River Usk and therefore are a feature as part of the international designation.
Water vole	Local	Water vole are a protected species under the Schedule 5 of the WCA and are known to be present in the reen and ditch network as field signs were identified during the Phase 2 survey.
Section 7 species ⁶⁸ / Other mammals	Local	The site comprises suitable habitat to support many other species such as European hedgehog, brown hare, fox and stoat.
Notable plant species	County	During both NVC surveys, most of the plant species recorded were common species, although there were ten rare or scarce species recorded on site. Some of the species such as frogbit and ivy-leaved duckweed are Primary and Contributory species respectively, and cited as part of the Gwent Levels SSSI.
Invasive Non-Native Species	N/A	This feature is considered to be of no ecological value but requires consideration given legal status.

⁶⁸ S7 species include: West European hedgehog, polecat and brown hare.

Ecological features that are of less than local value or negligible, but that are included within the impact assessment for compliance with legislation are:

- Badger
- Section 7 species/Other mammals
- INNS

6. Potential Impacts

The potential impacts of the Project are summarised below, with specific impacts to ecological features present on the Site or within the ZOI assessed within Section 7.

Direct and permanent impacts to designated sites, habitats and species, and ecosystem resilience, have been avoided and minimised where possible. Where impacts are unavoidable these are mitigated and compensated through the embedded biodiversity design, best practice construction practices and species-specific mitigation, as described in Section 7.

6.1 Potential construction impacts

Potential impacts of the works during the construction phase, which includes site preparation, may be categorised as follows:

- Permanent habitat loss and fragmentation of habitat through vegetation clearance;
- Temporary habitat disturbance and/or permanent or temporary degradation including pollution (to air and water);
- Temporary or permanent habitat severance or physical restrictions to species movements
- Disturbance to species during construction (noise, vibration and lighting); and
- Species mortalities and injuries – e.g. through collisions with construction vehicles and direct contact through excavation works, falling and trapping in open excavations during construction, vegetation clearance etc.

Potential indirect effects include displaced individuals occupying alternative habitat, which may result in reduced foraging success, increased competition and predation, genetic isolation and inbreeding, which can lead to local extinctions

6.2 Potential operational phase impacts

Potential impacts of the Project during the operations phase, may be categorised as follows:

- Potential impacts on fish behaviour and the development of fish eggs and juvenile fish, as a result of electro-magnetic fields (EMFs) emitted from the cable arrangement.

Operational activities would be limited to occasional, localised, small-scale maintenance works at most. As such no impact pathways to ecological features are identified during operation, with the exception of the potential for impacts of EMFs from the buried cables upon fish species.

7. Assessment of Impacts and Mitigation Measures

The assessment of impacts of the proposed project upon ecological features is undertaken with consideration of both construction activities and the operational use of the site. Mitigation measures are proposed in response to the impacts identified to avoid or reduce the ecological effects. The effects from both the construction and operation of the Project, taking into account the mitigation measures, are then assessed for all the relevant ecological features that are of local value or above. Impacts to features of less than local value are also considered where additional legal compliance measures may be required.

7.1 Embedded measures

Where possible, the Project has included the avoidance or reduction of potential impacts to ecological features through design.

Where ecological features will be retained within or in proximity to the Site, environmental best practice construction measures will be employed to protect these features. These include pollution prevention measures, tree protection measures, pre-construction surveys, the commitment to work under a European Protected Species licence for hazel dormouse and certain site works to proceed under site supervision by an Ecological Clerk of Works (ECoW). These measures will be described in the Construction Environmental Management Plan (CEMP). An Outline CEMP⁸ will be submitted as part of the SSSI assent required for works at the Site.

Further detail on embedded measures through design or construction best practice is provided in the sections below.

7.1.1 Design measures to avoid/ reduce ecological impacts

HDD was considered the most appropriate method of cable laying to avoid direct impacts to the ditch and reed network for which the Gwent Levels St. Brides SSSI is designated. The depths of the HDD have been designed to minimise the risk of frac-out and ground investigations for the Celtic Lakes Cable Connection were used to inform the design.

The temporary works associated with HDD (i.e. working areas, access, storage etc) have been sited within lower value habitats, avoiding those for which the SSSI is designated. These works will cause the temporary loss or damage of 3.25ha of predominantly species-poor agricultural grasslands which is within the SSSI boundary. These agricultural grasslands habitats will be re-instated upon completion in consultation with the relevant landowners. Semi-improved neutral grassland towards the northern extent of the site will be re-seeded using the mixes detailed within the substation LEMP⁷, with further management and monitoring of this area to be carried out by Welsh Government as conditioned in the consented planning application⁶⁹. . . Agricultural field grips, forming part of the Gwent Levels landscape and designation, have been recorded within the majority of the fields within the Site from Lidar data, although many have been degraded due to current management practices. Due to the nature and location of the Project temporary impacts to field grips cannot be avoided, however upon completion of the works these will be reinstated using existing field and Lidar data to ensure hydrological connectivity between the Site and the reed and ditch network is similar as to before the works.

The working areas as shown in Figure 1 have been designed to ensure they are situated a minimum of 7m from field ditches and 12.5m from reens to further avoid impacts to watercourses and associated vegetation (with the exclusion of access routes required). The installation of a temporary bailey bridge over Sunny Sealand-Sunnybank Link Reed to access the southern extent of the site was considered less impactful than utilizing existing agricultural gateways, since this would have involved the increased usage of track matting, in addition to removing further scrub and trees to widen several existing agricultural gateways to facilitate plant equipment access. Several further bailey bridges over field ditches would also have been required in

⁶⁹ Newport City Council (2024). Planning Application 23/0878: Notice of Decision. Available from: https://documents.newport.gov.uk/PublicAccess_Live/Document/ViewDocument?id=E30D33D85B5E4EE7AD227BDE60A807BD [Accessed June 2025]

this scenario. A second bailey bridge is required at an existing access over a field ditch to widen the access in this location. No working in water will be required to install the temporary bailey bridges, which will be built up and installed over the watercourse and ditch habitat, further reducing impact to bankside habitat. Boundary habitats will be left to naturally regenerate post-completion.

7.1.2 General best practice measures

This section describes established and uncontroversial standard best practice construction techniques and methods which will be employed to avoid or reduce the risk of potential impacts, in particular habitat damage, disturbance and species mortality. The following paragraphs describe some of the measures which will be adopted to avoid or reduce potential impacts.

This section also describes those protected species licences which may be required to be obtained in advance of construction taking place. The licences are likely to include those necessary to mitigate impacts on European Protected Species (dormice). Licences will be issued by NRW and will include details of the measures, techniques and strategies to be adopted. This section is based on a series of assumptions for the measures, techniques and strategies which will be conditioned as part of the licences, and these will be integrated into the working practices and methods for the construction.

In addition to that which is described below, the CEMP will also detail the requirement and timing required for pre-construction surveys for protected species (including badger, bats, otters, water vole and breeding birds). The CEMP will detail the requirement for an Ecological Clerk of Works (ECOW) to oversee management of ecological issues as they arise, and to educate site personnel in ecological issues where needed. This will include Toolbox Talks provided by a suitably qualified ecologist to all site personnel to inform them of ecological features at the site, including INNS, and protected and notable species prior to the commencement of construction works.

An associated registry of attendance will be signed and kept as a record, and a copy of the toolbox talk will be left at the site office. If any protected species or signs of protected species such as an otter holt, or other ecological features including new occurrences or increase in extent of INNS are encountered during the works, all work in the vicinity is to stop immediately and a suitably qualified ecologist contacted as soon as possible for advice.

The following general best practice measures to avoid or alleviate negative impacts upon ecological features will be implemented during the construction phase to comply with existing legislation and good practice as detailed below:

- **Lighting:** Sensitive lighting will be implemented to avoid disturbance to nocturnal species (bats, dormice and otters). If task lighting is required for extended hours, i.e. where light levels are low during winter months or for health and safety or security reasons, directional lighting will be employed (towards the ground) with minimal upward spill, and light spill will be avoided into adjacent habitats (i.e., the woodland, scrub and reens and ditches), or any surroundings known to support protected species. Lighting installations will be checked by the ECOW.
- **Excavations:** Good practice working methods will be adhered to which will prevent any adverse impacts to otters or other mammals at the site. Materials will not be left overnight in an area accessible to otters and other mammals, and excavations will not be left uncovered overnight. If any excavations are required to be left open overnight, a ramp will be created to allow any animals to escape.
- **Access and Materials:** Access to the working areas will be via designated tracks only and storage of materials will be a pre-agreed location (as shown in Figure 1 and detailed drawing in Appendix A.1).
- **All works** will be fenced to allow the safe crossing of animals through the site;
- **INNS:** All personnel undertaking works in proximity to invasive non-native plant species should comply with and implement standard good practice measures to avoid the potential spread of INNS. An Invasive Species Management Plan to be produced within the contractor's Risk Assessment and Method Statement (RAMS) if works are to be undertaken within 7m of invasive species.

- Protected species: If any protected species or signs of protected species or INNS are encountered during the works, all work in the vicinity is to stop immediately and a suitably qualified ecologist contacted as soon as possible for advice.

7.1.3 Principles of Tree Protection

All construction activities have the potential to cause harm to the retained trees on Site. It is therefore necessary that measures are employed across the Site to limit the potential for such harm and prevent any long-term negative impacts on the trees. Measures to protect trees to be retained within and immediately adjacent to the Site and access route in line with the British Standard BS5837:2012.

An Arboricultural Impact Assessment⁷⁰, Arboricultural Method Statement (AMS)⁷¹ and Tree Protection Plan (TPP)⁷² have been prepared that provide specific details on what protective measures are required, how they will be implemented and what supervision is required to ensure that the measures remain in place and fit for purpose.

The AMS includes full details for the protection of trees, but for ease of reference the following principles for the protection of retained trees will be adopted across the site for the duration of the Project:

- All retained trees will be identified as a Construction Exclusion Zone (CEZ).
- Where fencing cannot provide the necessary protection measures, alternative systems will be installed that will ensure retained trees are protected. This may include the use of temporary ground protection.
- There will be no storage of materials, or access for construction workers or machinery within any CEZ.
- There will be no excavation within a CEZ. All utilities and underground services will be located outside the CEZ or tap into existing service routes.
- Any storage or mixing station located outside of a CEZ will be located in a place that minimises the risk of contaminated runoff entering the CEZ and damaging the rooting environment. This may be achieved by using a non-permeable membrane on the ground, surrounded by sandbags to contain any spillage.

7.1.4 Pre-construction surveys

Pre-construction surveys will be undertaken in accordance with the proposed development to inform (if any) relevant protected species licence requirements from NRW. These surveys are anticipated to include:

1. **Breeding bird surveys / checks:** these will only be required if vegetation clearance is to occur during the breeding bird season (March-September inclusive). These will take place no more than 48 hours prior to vegetation clearance, with duration between checks to be further advised by the ECoW depending on the time of year and activity levels at the Site.
2. **Badger survey:** to confirm the presence/likely absence of badger/badger setts within up to 100m of the site (impact dependent). The survey will take place within the month prior to starting.
3. **Otter and water vole surveys:** presence/absence surveys within the site and within suitable habitat up to 100m from the Site (impact dependent), with focus on resting and breeding sites, will also be conducted to inform the requirement for an otter development licence. Water vole surveys will also be conducted to identify if any burrows are present within the proposed Bailey bridge footprints and/or cable duct laydown areas to inform if a water conservation licence from NRW will be

⁷⁰ Tree Frontiers (2024). Celtic Lakes, St Brides: Tree Constraints Plan. Ref - 283362-600-DRW-TCP

⁷¹ Tree Frontiers (2025). Celtic Lakes NGED Substation: Arboricultural Method Statement. Ref- 283362-600-RPT-AMS-FP

⁷² Tree Frontiers (2025). Celtic Lakes NGED Substation: Arboricultural Impact Assessment Ref- 283362-600-RPT-AIA

required. The presence/absence survey will take place within the month prior to construction starting.

4. **Invasive species survey:** A walkover survey of the Site will take place immediately prior to immobilisation to update on the presence and extents of any invasive non-native species present on Site and to advise on any avoidance or further mitigation measures required as a result of the Project.

7.1.5 Pollution prevention measures

A CEMP will be produced and maintained by the contractor during the construction phase to deliver the principles within the Outline CEMP. This will include site-specific methods to ensure that all site activities, especially those in proximity to watercourses and waterbodies are controlled and are in accordance with relevant legislation and undertaken in compliance with the relevant Guidelines for Pollution Prevention (GPP/PPG39⁷³) and industry best practice (GPP⁷⁴, CIRIA⁷⁵).

The recommended pollution measures should follow the guidance for pollution prevention (GPP) “Works and maintenance in or near water: GPP 5”⁷⁶. Pollution should be prevented from entering the adjacent waterbody. This will indirectly protect sites downstream as well as those features of the SSSI. Strict pollution prevention and biosecurity measures should be detailed within the CEMP and adhered to, including the thorough washing of any equipment prior to entering any watercourse should this be required (noting that no works are planned in watercourses, and therefore this should be restricted to a requirement only in the unlikely event of a frac-out impacting a watercourse as detailed in Section 7.1.7 below). Additional measures such as silt busters or bales may be used to prevent silt or contaminants from being released into connecting watercourses.

Appropriate measures should be included within the work method statements to reduce potential environmental impacts of any in-channel construction activities. This includes the following measures:

- Details of the construction programme including timetable, details of site clearance; details of site construction drainage, containments areas, appropriately sized buffer zones between storage areas and any watercourse or surface drain.
- Appropriate buffers from retained ecological features will be fenced or demarcated, including at least a 7m buffer for field ditches and 12.5m from reed watercourses from working areas (where reasonably practicable this has been embedded in the design, the exception being to facilitate access largely along existing routes) as shown in Figure 1 and Appendix A.1.
- Where avoidance of such habitat is not possible (i.e. installation of bailey bridges, widening existing gas in agricultural gateways), their loss or damage should be minimised. In particular, it is envisaged that works in the vicinity of the watercourse and boggy areas will utilise track pads, silt mats and best practice pollution measures to minimise silt dispersion downstream during works.
- Reinstate any impacted riparian or marginal habitats where necessary (natural regeneration of habitats is proposed as the preferred option).
- Good biosecurity practices are vital for preventing the spread of INNS and pathogens such as waterborne fish diseases. Measures should be adopted to minimise the risk of construction activities leading to the spread of invasive non-native species or pathogen.

⁷³ <http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

⁷⁴ Natural Resources Wales (NRW), the Northern Ireland Environment Agency (NIEA), Scottish Environment Protection Agency (SEPA) (2018). Guidance for Pollution Prevention – Works or maintenance in or near water: GPP5 v1.2 Feb 2018. <http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf>

⁷⁵ CIRIA (2018) CIRIA <http://www.ciria.org>

⁷⁶ Guidance for Pollution Prevention Works and maintenance in or near water: GPP 5 Version 1.2 February 2018 [gpp-5-works-and-maintenance-in-or-near-water.pdf](http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf)

- Bunding, storage facilities and spill kits will be employed to contain and prevent the release of fuel, oils and chemicals associated with the plant, refuelling and construction equipment into the marine environment. In the event of a pollution incident, work will cease in the vicinity of the incident and contaminants must be cleaned up immediately.
- NRW emergency help line (0300 065 3000) will be contacted in the case of an emergency spill.
- The storage and use of hazardous chemicals would be in accordance COSHH Regulations (1998).
- All waste materials will be disposed of in designated skips/areas.
- Emergency spill kits are to be maintained at every work location or be easily accessible at all times from a centralised location.
- Equipment to be stored on designated drip trays/bunded areas.
- Refuelling operations must always be manned, never left alone, or the fuel trigger jammed open.
- Hoses and valves to be checked regularly for signs of wear and renew as and when required. If a spill should occur, the following should be used: stop, contain and notify.
- Fine powder materials are to be delivered in enclosed tankers and stored with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials bags are to be sealed after use and stored appropriately to prevent dust.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Vehicles entering and leaving sites are to be covered to prevent escape of materials during transport.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Constant monitoring of dust levels and adopting effective methods of work to prevent dust becoming airborne at the source for example: using wet sweeping methods to prevent accumulation of dust and mud and using effective exhaust ventilation and filtering to minimise potential dust pollution.
- Noise reducing methods such as acoustic buffers or hoods on generators will be implemented

7.1.6 Frac-out measures

Frac-out is the unintentional release of drilling fluids to the surface during HDD. This occurs when the pressure of the drilling fluid exceeds the surrounding ground pressure, causing the fluid to escape through cracks or weak points in the ground. Drilling fluids are freshwater suspensions of inert clay particles (bentonite). While this is considered to be non-toxic, the potential for this to enter the water column or cover the bed of the watercourse in the event that frac-out occurred.

Frac-out is most likely during the drilling of the pilot hole entry and exit curves, when the depth of cover, formation consolidation and confining strength are at a minimum. Frac-out can also relate to drilling fluid travelling to the surface via existing pathways, e.g. previously installed utilities, foundation piles and existing boreholes. It should be noted that GI works carried out as part of the scheme were offset to the proposed drill line and sealed up on completion to minimise this risk, with the depth of the proposed HDD also reducing this risk. In the event of a frac-out, a contingency plan will be implemented as a mitigation measure which will include measures to prevent, contain and control the risk of frac-out including clean-up procedures. The principles of the frac-out contingency plan are described below, to be secured through the CEMP.

7.1.7 Frac-out contingency plan

All HDD will be carried out by a competent and experienced drilling contractor.

Prevention

Frac-out occurs when annular fluid pressures exceed formation fracture pressures. Pressures are minimised by constant monitoring of the drilling fluid parameters. The Drill Operator will monitor Drill Fluid levels in the mixing tank on a regular basis, (hourly), to ensure that the fluid levels decrease in volume. The Driller will monitor the Drill Fluid pressures of mud being pumped through the bore. Any increases in pump pressure will be investigated immediately to prevent the risk of pressure build up and to minimise the risk of frac-out. The Driller will watch the fluid levels in the entry and exit pits and note any unexpected changes. In the event that frac-out is experienced, the rig will immediately be shut off and the pumps and drilling assembly will be released to reduce annular pressure.

Containment

Prior to drilling, potential frac-out pathways will be identified, and contingency plans will be devised. Sandbags and straw bales will be available on-site during the drilling works to control drill fluid at surface if necessary. An excavator will be available on-site to dig a pit to contain fluid as necessary, with any such pits only to be used as a mitigation measure within low value agricultural habitats only (i.e. clearance of semi-natural habitats for this purpose will not be permitted). Vacuum trucks will be available to transfer drill fluid from the containment point back to the recycling system.

Control

The freshwater based, bentonite suspension, drill fluid systems are essentially low viscosity grouts. In most cases, the fracture pathways will quickly seal up. Frac-out is likely to indicate that the bore hole requires reaming to reduce the pressure required to return drill fluid to surface. A wiper trip⁷⁷ may be sufficient to prevent further frac-out. Drill fluid additives can be used to seal fractures in the formation.

Should mud circulation be lost as drilling progresses, operations will cease. An inspection of the drilling line will be implemented to determine if the fluid loss is to the surface or being lost down-hole into the surrounding formation. Should the fluid loss be to the surface, then the mud will be contained and if possible pumped back to the rigs mud containment pit and time allowed for the surface fracture to self-seal. Once the hole has been reconditioned, drilling can act to seal the fracture whereby new cuttings generated build up in the fracture. Loss of fluid to the surface in accessible areas remains a priority. This will be contained and controlled immediately. In the unlikely event that a frac-out occurred, the event will be subject to clean-up measures that prioritise the ecological sensitivity of the Site as advised by a suitably qualified ecologist. This may comprise removal of the material, especially if any blockages of watercourses were to occur.

7.2 Assessment of impacts

The assessment presented in Table 10 takes into account the potential impacts (Section 6) to each valued ecological feature (Section 5), the assumed construction practices and embedded biodiversity design measures (Section 7) and any additional mitigation required to determine the significance of any residual ecological effects. Operational activities would be limited to occasional, localised, small-scale maintenance works at most. As such no impact pathways to qualifying ecological features are identified during operation, with the exception of the potential for impacts of EMFs from the buried cables upon fish species.

⁷⁷ A wiper trip in drilling refers to a specific procedure used to maintain drilling efficiency and wellbore stability. It involves the movement of the drill string in and out of the wellbore to clean the hole and improve conditions for subsequent operations

Table 10: Assessment of Construction and Operational Effects

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
European Designated Sites				
Severn Estuary SAC, SPA and Ramsar site River Usk SAC (including River Usk SSSI⁷⁸)	Temporary habitat disturbance and/or permanent or temporary degradation including pollution (to air and water) Temporary or permanent habitat severance or physical restrictions to species movements Disturbance to species during construction (noise, vibration and lighting) Species mortalities and injuries – e.g. through collisions with construction vehicles and direct contact through excavation works, falling and trapping in open	A separate Habitats Regulations Assessment (HRA) screening (Stage 1) and Appropriate Assessment (Stage 2)⁶² has been undertaken, assessing the potential for effects on international statutory sites as required by Regulation 63(1) of the Habitats Regulations. A summary of impacts and mitigation are described below (which are further explained within the HRA): <u>Temporary habitat disturbance or temporary degradation including pollution</u> Given the distance of the Severn Estuary EMS and River Usk SAC from the land required for the Project (over 1km from any working area including local access), the scope and the temporal scale of the works proposed, it is considered that any changes in air quality during construction would be negligible and not result in any effects to qualifying habitats and their respective conservation objectives. Reen habitats within the Project area are located upstream of the Severn Estuary EMS and River Usk SAC, and as such are hydrologically connected to the works areas. The Severn Estuary EMS and River Usk SAC could therefore be affected by pollution and or sedimentation that occurs within the site during construction activities should it result in the contamination of nearby watercourses in the Gwent Levels. Given the distance of the Project from the EMS and River Usk SAC with standard pollution prevention measures adhered to during construction to protect the general water environment, no impacts to the qualifying habitats (and by extension to any qualifying species within the designated sites themselves) of the EMS or SAC through general water quality changes is identified. The proposed mitigation measures for frac-out will avoid potential effects to the European designated sites. Mitigation measures comprise a strict contingency plan to prevent, contain and control the event of frac-out. With mitigation measures adhered to, water pollution impacts (including sedimentation) as a result from frac-out events, no significant effect upon the integrity of the River Usk SAC and Severn Estuary EMS is identified. Given the distance of the Project from any European site and the standard pollution prevention measures set out in the Section 7, no impact through spread of INNS is identified. No de-watering and/or abstractions of reen and ditch watercourses are required to carry the works. The Gwent Levels naturally has a high-water table, it is likely that a small amount of ground water pumping would be required when installing the cable or the open-cut duct sections. This water would then be pumped through a silt buster filter system and then onto the land. Any water discharging will need to be monitored to ensure it is of an acceptable quality. Given the distance separating the River Usk SAC and Severn Estuary EMS and the temporal scale of the works proposed, no significant changes in hydraulic conditions are anticipated that could impact any qualifying features.	Not significant	Not significant

⁷⁸ The River Usk SSSI forms one of the several management units of the River Usk SAC and the impacts and mitigation detailed within the European Designated Sites section are relevant to this site.

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
	excavations during construction, vegetation clearance etc. Potential impacts on fish behaviour and the development of fish eggs and juvenile fish, as a result of electro-magnetic fields (EMFs) emitted from the cable arrangement.	<u>Temporary or permanent habitat severance or physical restrictions to species movements (FLL or supporting habitat for qualifying species)</u> There will no direct loss of habitat from any European site. The mosaic of improved and semi-improved wet pasture grasslands, scrub and woodland provide suitable habitat for wintering birds and there will be a temporary loss of arable grassland habitat at the site totalling 3.25ha. The Site is located over 1km from the Severn Estuary SPA/ Ramsar and a very low number of birds have been recorded within the site that are affiliated to these designated sites. These factors, considered alongside the large extent of suitable alternative habitats for qualifying species within the wider Gwent Levels and the very small extent of habitat to temporarily impacted by the Project, indicates that no significant effects through a loss of supporting habitat of the qualifying wintering birds of the Severn Estuary EMS are likely. No working within watercourses is anticipated and there will be no obstruction of watercourses planned during works. There is potential for construction works to disturb otters that are considered to forage and commute along watercourses within and adjacent to the land required for the Project, through potential visual, noise/vibration and lighting impacts. There will be no direct impacts to watercourses as part of this Project and embedded control measures to protect the general water environment would be employed to prevent pollution incidents to the watercourses. As such, no mortality or injury to otters is anticipated to result from construction works. The temporary installation of two bailey bridges in the south of the land required for the Project (as shown in Figure 1) would not result in significant fragmentation of riparian corridors used by otter. The fisheries element of the HRA considered potential effects upon lamprey species (ammocoetes) and European eel. The main noise and vibration causing activities from construction plant and machinery will occur within working areas situated within agricultural grassland fields, away from watercourses. However, during drilling operations, noise and vibration impacts in respect to fish are likely to occur when boreholes are being drilled beneath reens and watercourses. There is potential for fish present within the footprint of the cable corridor during the time of drilling to be disturbed, resulting in temporary displacement further up and/or downstream away from the works. The majority of the reen and ditch habitat available to fish will be unaffected by noise or vibration. As such, the potential impacts of small-scale and temporary disturbance to fish during construction are not considered likely to result in significant effects on qualifying fish species of the River Usk SAC and Severn Estuary EMS. Underground electricity cabling under rivers and watercourses can have a detrimental impact on fish, as electric cables create magnetic fields. The AC magnetic fields from the 132kV cables crossing under the Reens are the highest closest and directly above the cables and reduce rapidly with distance, with the maximum (or worst case) magnetic fields at the bed of Percoed Reen being 1.51 μT reducing to 1.20 μT at 1 metre above the bed. The magnetic fields also reduce quickly to the sides of the cables, reducing to 0.96 μT, 5 metres from the cable circuits and 0.48 μT, 10 metres from the cable circuits. Magnetic field for Sunnyland Sealand Link Reen and Wheel Lane Reen is considered to be less than this field strength given burial depths are greater. In terms of egg development and EMF impacts, the reens will not support eggs of European eel or lamprey; eel spawning occurs in the marine environmental (Sargosso sea) and the reens are considered unsuitable for lamprey spawning. There is an absence of information on the potential EMF effect on lamprey ammocoetes, which on a precautionary basis may be present in the vicinity of the cable crossings, however, the EMF levels are considered		

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
		very low, and any impact would be highly localised (EMFs reduce quickly to the sides of the cables). This impact would also occur within a potentially functionally linked watercourse, rather than within the European site itself. Based on these factors, it is considered that likely significant effects as a result of EMFs emitted during operation of the cable can be ruled out.		
Nationally Designated Sites				
Gwent Levels St. Brides SSSI	Temporary habitat disturbance and/or temporary degradation (including shrill carder bee habitat)	<u>Reen and Ditch Habitat and associated invertebrates</u> The reens and ditches are host to a wide range of aquatic plants, including many rare or scarce species, that in turn support a wide variety of other wildlife including the hairy dragonfly along three of the reens on Site for which the SSSI is in part notified. Direct impacts to reen and ditch habitat are largely avoided with cabling operations drilling beneath the habitats. Furthermore, all working areas will retain a minimum of 7m from field ditches and 12.5m from reens where reasonably practicable, noting that access required for the works are unable to avoid these buffers due to existing agricultural gateways and associated culverts. Two temporary bailey bridges will be installed towards the southern extent of the site to facilitate plant machinery and equipment to the respective working areas shown in Figure 1. The bailey bridges will be built up and installed above the watercourses and banksides, thereby avoiding impacts to the watercourse and bankside habitats, with no direct working in water required. The bailey bridges will cast a temporary shade on habitats beneath the bridge, however, given the size of the bridge and temporary nature of the works, this is not considered to have a significant impact on the reen and ditch habitats of the SSSI. Agricultural grips form part of the Gwent Levels landscape, they provide hydrological connections to the ditches and reens and provide wetter channels in the field which provide habitat for invertebrates. Damage to the grips can affect the hydrological connectivity of the interconnected drainage system and therefore could significantly affect the quantity and flow rate of water entering the SSSI reen and ditch network. In turn, this has the potential to affect the ability of the SSSI flora and fauna to survive in the watercourses. Due to the nature and location of the Project, temporary impacts to agricultural grips cannot be avoided. Upon completion of the works however, agricultural grips will be reinstated using existing field and LIDAR data to ensure hydrological connectivity between the site and watercourses are similar before development. With the embedded design measures for the reens and field ditches above, the buffer distances and the best practice measures to be followed to protect water quality during construction, no significant impacts are expected for aquatic flora and invertebrates that may be present near the site during construction. <u>Shrill carder bee and brown-banded carder bee</u> No permanent habitat loss is anticipated as a result of the Project, however, the during construction, the works will involve the temporary disturbance and/or loss of the following grassland habitats on site: 0.39ha semi-improved neutral grassland, 0.36ha improved grassland, 1.1ha cultivated arable field and 1.4ha poor semi-improved grassland. All agricultural grassland habitats will be re-instated upon completion of the works post-completion, with semi-improved neutral grassland to be re-seeded as detailed in Section 7. All of the grasslands present within the working areas have been noted to be species-poor, and unlikely to support significant opportunities for foraging shrill carder bee with the exception of the 0.39ha of semi-improved grassland at the northern extent of the Site (outside of the SSSI) which had previously held botanical diversity but has reduced due to significant scrub encroachment.	Not significant	Not significant

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
		Whilst the cable corridor is largely situated within species-poor semi-improved grassland pastures, and therefore unlikely to provide significant foraging habitat for shrill and brown-banded carder bee, the presence of shrill and brown-banded carder bee cannot be ruled out. There will be large areas of retained grassland habitat present within the fields and wider landscape which will provide sufficient foraging habitat for the species during construction. Furthermore, mobilisation and HDD works are programmed to commence during the autumn of 2026 when shrill carder bee will be preparing to hibernate. The banks of reens and field ditches on Site could hold some suitability for nesting and hibernating shrill carder bee however, as a result of embedded design measures including the avoidance of disturbance to these reen and field banks (the banks at Sealand-SunnyBank Reen being shallow and unlikely to support nesting) and with the re-instatement of grassland habitat post-construction, and implementation of best practice measures onsite (as detailed within Section 7), no significant impacts are identified for shrill carder bee during construction and operation. No works will commence within the SSSI until SSSI assent has been received from NRW.		
Severn Estuary SSSI	Temporary habitat disturbance and/or temporary degradation including pollution (to air and water)	The Severn Estuary SSSI forms one of the several management units of the Severn Estuary EMS and the impacts and mitigation detailed within the European Designated Sites section are relevant to this site. With the implementation of standard pollution prevention measures during construction to protect the general water environment, including those relating to frac-out no impacts to the qualifying habitats or species of the SSSI through general water quality changes is identified.	Not significant	Not significant
Locally Protected Sites				
LG Duffryn Site 2	Temporary habitat disturbance and/or temporary degradation including pollution (to air and water)	Approximately 0.39ha ⁷⁹ of the LG Duffryn Site 2 SINC will be temporarily disturbed as a result of the open cut cable method, HDD launch pit and temporary compound area. It should be noted that the existing habitat present within the consented substation boundary has been recently subject to significant groundworks and landscaping as a result of the substation development. Previous surveys had not identified Primary or Contributory species required for Wildlife Site selection, though it is noted that they may be present within the seedbank. As part of the substation development, a Landscape and Ecological Management Plan (LEMP) ⁸⁰ has been produced which details management and monitoring programme for re-instated and restored grassland within this area. Whilst works are ongoing the grassland in this area has either been disturbed and is currently bare ground, or where fenced off has begun to be encroached by bramble scrub. Whilst the works will temporarily disturb a localised section of this grassland habitat, this is not anticipated to have a significant effect on the SINC given the temporal nature of the works and existing condition of the habitats. Upon completion, grassland habitat will be re-seeded as using the seed	Not significant	Not significant

⁷⁹ This also includes semi-neutral grassland habitat outside of the SINC boundary which is proposed for mitigation as part of the Substation Development (to be reseeded following completion of works).

⁸⁰ Arup (2024). Celtic Lakes NGED Substation: 30-Year Habitat Management and Monitoring Plan. Available from: https://documents.newport.gov.uk/PublicAccess_Live/Document/ViewDocument?id=4EF7253D645E4A1CB8C07EDE2ABF1CD4 [Accessed June 2025]

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
		mix described in the planting schedule ⁷ works and will be managed and monitored by Welsh Government to ensure compliance of planning conditions for the Celtic Lakes NGED Substation Development ¹ .		
Habitats				
Priority habitat: coastal grazing marsh and floodplain grassland	Temporary habitat disturbance and/or temporary degradation	A large proportion of the cable corridor footprint is designated as coastal grazing marsh and floodplain grassland (See Figure 6), which is a habitat of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales. The design of the scheme has been carried out with the driving principle of avoiding and minimizing impacts to habitat, however, given the nature and location of the works, temporary disturbance to this habitat cannot be avoided. During construction, the works will involve the temporary disturbance and/or loss of the following grassland habitats on site which are identified as priority habitats under the Priority Habitat Inventory (however are noted to be species-poor on Site): 0.36ha improved grassland and 1.4ha poor semi-improved grassland. Grassland habitat will be reinstated upon completion of works. Best practice during construction including pollution prevention measures further minimises any habitat degradation as a result of water and air quality.	Not significant	Not significant
Broad-leaved woodland	Temporary habitat disturbance and/or temporary degradation	No impacts to woodland habitats are anticipated as avoided by the Project. Impacts to scrub / hedgerow habitat is largely avoided through the directional drilling methodology. Furthermore, with the design of the working areas adhering to 7m from ditches, and 12.5m from reens, this further reduces impacts to boundary habitats. However, approximately 30m² of scrub/hedgerow habitat will be temporarily lost to widen existing agricultural gateways to facilitate a maximum of 6m wide plant access at two locations. The hedgerows to be removed are species-poor self-seeded areas of scrub. The majority of the scrub / hedgerows will be retained and connectivity will be retained across the Site during the works. The removed vegetation will be left to naturally regenerate post-completion. Habitat regeneration will be monitored as per compliance of the dormouse licence. As such, the overall impact to the hedgerow/scrub habitats and the wider site is considered negligible. The temporary access roads within the Site will be formed using trackmatting, this will provide a load-bearing system that will minimise potential compaction damage to the underlying rooting environments. The system would be installed at the start of the Project and remain in place throughout the duration of the works. Any machinery utilised to install or remove the system will either work from on top of existing hardstanding, or from outside the Root Protection Areas of retained trees. Machinery access in the northwestern part of the site (near Maerdy Farm) will utilise an existing agricultural track. While this is within the nominal RPAs of adjacent trees, due to the existing surfacing and historic use, no additional protection measures have been proposed to minimise harm, and the works will not cause any additional impacts than the trees are already subjected to. With the principles of tree protection and best practice pollution prevention measures to be applied during construction, impacts to trees, hedgerow and scrub habitat are not considered significant. A Hedgerow Removal Notice will be submitted to the Local Planning Authority for the Project.	Not significant	Not significant
Dense / continuous scrub				
Broad-leaved scattered trees				
Hedgerow with trees (species poor)				

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
Neutral grassland semi-improved	Temporary habitat disturbance and/or temporary degradation	See the 'LG Duffryn Site 2' above – the neutral semi-improved grassland forms part of this SINC.	Not significant	Not significant
Running water – reens and ditches	Temporary habitat disturbance and/or temporary degradation including pollution (to air and water)	See 'Gwent Levels St. Brides SSSI' above – these features have been assessed as features of the SSSI.	Not significant	Not significant
Standing water – open pond	Temporary habitat disturbance and/or temporary degradation including pollution (to air and water)	No direct impacts to the ponds present towards the northern extent of the site are anticipated. Potential effects from construction activities, such as from pollution events or sediment run-off, will be avoided and reduced through standard best-practice techniques and methods described within Section 7.	Not significant	Not significant
Species				
Hazel dormouse	Temporary habitat disturbance (temporary loss of small amounts of habitat) Disturbance to species during construction (noise, vibration and lighting); and Species mortalities and injuries during vegetation clearance.	Dormouse are known to be using scrub habitats within the Site. Vegetation clearance of approximately 127m ² of reed/ tall ruderal vegetation and 30m ² of mixed scrub habitat over five locations will be temporarily lost and/or disturbed from widening existing agricultural tracks, including the installation of two bailey bridges and to facilitate cable duct laydown areas. The clearance of this scrub will be conducted under ecological supervision using hand tools only, in accordance with the NRW licence (when issued). Reed and tall ruderal vegetation will be subject to the same approach on the precautionary basis that dormice may use these connective habitats to pass through the site. A single-staged clearance methodology is proposed in line with small amounts of vegetation being lost, with vegetation proposed to be cleared in September/October outside of the dormouse breeding season but when dormice are still active. This is further detailed within the Dormouse License Method Statement ⁶ . Mixed scrub and reed/tall ruderal vegetation that is removed to facilitate construction of the access track is expected to regenerate naturally from adjacent retained habitat. There is a large amount of suitable dormouse habitat including hedgerows, scrub and woodland available in the adjacent areas, therefore no habitat creation or modification of existing habitat is proposed. Two post construction monitoring visits will take place to confirm the reinstatement of habitats and their ability to regrow, the first in the year construction is completed (2026) and the second visit within the growing season of the year after (2027). With implementation of supervised vegetation clearance (under the appropriate licence) and all other measures describe above, it is considered that any effects would not be significant. There is	Not significant	Not significant

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
		not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.		
Badger	Disturbance to species during construction (noise, vibration and lighting) Species mortalities and injuries	No evidence of badger has been recorded within the Site, however, due to the mobile nature of the species it is possible that they could start to use the site before construction commences. If badger were using habitats within the Site, there is the potential for individuals to be disturbed or harmed for example through site clearance or entrapment within open excavations. As described in Section 7, pre-construction checks will be undertaken within the site and adjacent habitats to confirm the presence/likely absence of badger. Best practice measures employed for otter during construction, including sensitive lighting and noise management, including the covering of open excavations at night-time, will also minimise such potential effects to badger. There is not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.	Not significant	Not significant
Bats	Temporary habitat disturbance and/or permanent or temporary degradation including pollution (to air and water) Disturbance to species during construction (noise, vibration and lighting)	The habitat at the site, comprising grasslands, scrub, woodland and watercourses, provides suitable foraging and commuting habitat for bats. Impacts to bats are largely avoided with embedded design of the scheme avoiding boundary habitats through directional drilling. A total of 127m ² of reed/ruderal and 30m ² of scrub habitat will be temporary lost and/or disturbed from widening existing agricultural tracks, including the installation of two bailey bridges. As such, vegetation clearance of boundary habitats is considered minimal, and predominantly confined to existing agricultural tracks where gaps in boundary habitats are present. Therefore, no key commuting and or foraging routes will be significantly affected as a result of the temporary habitat loss required to facilitate the work. Upon completion of the works, hedgerow habitats will be reinstated to ensure no permanent reduction in foraging habitat or fragmentation of commuting habitat as a result of the works. During the construction phase there is potential for disturbance from lighting either for use on the construction site which may reduce the area of functional foraging habitat further for bats and therefore cause temporary adverse impacts to bats. Best practice during construction including sensitive lighting and noise management will minimise any disturbance to retained habitats that could be utilised by foraging bats. Any impacts to bats as a result of disturbance from lighting are therefore considered to be minimal during construction. Surveys indicate that no bat roosts (within trees) will be lost during the construction phase. There are several trees within the wider landscape with the potential for roosting bats, however, the design of the scheme ensures impacts to these trees will be largely avoided and minimised. Any PRFs to be lost will be replaced with bat boxes on the nearest suitable retained trees.	Not significant	Not significant
Birds – Breeding	Temporary habitat disturbance and/or permanent or temporary degradation Disturbance to species during	The scrub, hedgerows, marginal vegetation, and grassland habitats provide nesting habitat for a range of bird species including notable species such as Cetti's warbler. During the breeding bird surveys in 2024, a total of 52 bird species were recorded. Most territories were associated with hedgerows, patches of broadleaved woodland and scrub, with some also located within stands of common reed along the margins of the reens. Impacts to boundary habitats supporting breeding birds are largely avoided through the directional drilling methodology. Furthermore, the design of the working areas adhering to 7m from ditches, and 12.5m from reens, further reduces impacts to breeding birds.	Not significant	Not significant

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
	construction (noise, vibration and lighting)	As aforementioned, a total of 127m² of reed/ruderal and 30m² of scrub habitat will be temporary lost and/or disturbed from widening existing agricultural tracks, including the installation of two bailey bridges and duct laydown areas. With mobilisation works to commence in September 2025 and therefore towards the latter end of the breeding bird season, impacts are largely avoided to breeding birds. However, a pre-construction check will be carried out to confirm habitats to be cleared and adjacent habitats which could be subject to disturbance do not contain active nests. Given the minimal amount of the boundary habitat required to be temporarily lost to facilitate the works, this is not considered to have an adverse effect on breeding birds. In the event the programme of works is delayed and construction works are carried out within the breeding bird season (February-September inclusive), an inspection within adjacent suitable breeding bird habitats, for breeding birds and their occupied nests (such as Cetti's Warbler), should be conducted by a suitably experienced ecologist no more than 24 hours prior to any works commencing, to ensure no disturbance could occur to breeding birds. If they are found to be present an (up to 40m) and as advised by a suitably experienced ecologist, may be implemented for construction whilst the nest is active to avoid the birds deserting the nest prematurely. During the site clearance phase, breeding birds are at risk from mortality and injury. However, with mitigation implemented to clear vegetation outside of the breeding bird season and with the provision of ECoW during the construction phase, this risk is considered to be reduced to a negligible level. As well as mitigation to reduce noise during construction and sensitive lighting design during construction, it is considered that there is enough suitable habitat within and adjacent to the site to enable birds to move away from noise or lighting disturbance and therefore any adverse impacts from disturbance would not be significant.		
Birds – Wintering	Temporary habitat disturbance and/or permanent or temporary degradation including pollution (to air and water) Disturbance to species during construction (noise, vibration and lighting)	The site and surrounding landscape are considered suitable for wintering birds. Furthermore, given the distance of the site to the Severn Estuary, and the vast array of arable and semi-improved grasslands across Gwent Levels, open, grassland habitats could be utilised as feeding and/or roosting sites for overwintering birds associated with the Severn Estuary SPA / Ramsar site, particularly at high tide. There is potential for qualifying wintering bird species utilising the land required for the Project and adjacent habitats to be subject to disturbance through increased noise from construction activities, lighting and injury/mortality during construction. The wintering bird survey results indicate that a very low number of birds affiliated to the Severn Estuary SPA and/or Ramsar site utilise the fields present within the land required for the Project with recordings limited to low numbers of waterfowl assemblage species in addition to lapwing in adjacent land. Any qualifying bird species present on site during the time of the works may be subject to temporary disturbance from the works (visual, sound and vibration). Give the results of the desk and field surveys, the large extent of suitable alternative habitats for qualifying species within the wider Gwent Levels and the temporary nature of the works, disturbance from construction works are unlikely significantly impact the wintering bird species associated within the Severn Estuary SPA and Ramsar site. Any individual birds which may be subject to disturbance as a result of construction are likely to be temporarily displaced into adjacent fields for the duration of the works. Furthermore, the dense, overgrown scrubby hedgerows which line the fields of the Project also offer natural visual barriers to birds present within the wider landscape, further reducing the potential for significant disturbance from the works. With best practice mitigation implemented to reduce noise from machinery and sensitive lighting design at construction and operation, it is considered that the remaining habitat retained within the wider site offers enough habitat for the low numbers of wintering birds	Not significant	Not significant

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
		present, to forage or roost away from either noise or lighting disturbance and therefore any adverse impacts are minor. There is not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.		
Migratory Fish (SAC/Ramsar Species)	Temporary habitat disturbance and/or permanent or temporary degradation including pollution (to air and water)	Aquatic eDNA sampling and a review of previous literature confirm that coarse fish and European eel (the latter comprising a qualifying feature of the Severn Estuary Ramsar site) are present in suitable waterways across the Gwent Levels. NRW also considers that the reens and ditches of the Gwent Levels may potentially represent significant habitats for juvenile lamprey (ammocoetes) of all three species (river, brook and sea). There will be no direct impacts to watercourses as part of this Project and embedded control measures to protect the general water environment would be employed to prevent pollution incidents to the watercourses. In addition, a strict contingency plan to prevent, contain and control the event of frac-out as detailed above in Section 7. With mitigation measures, water pollution impacts (including sedimentation) as a result of frac-out events would not result in an adverse effect upon migratory and common coarse fish assemblages present within the waterways. The main noise and vibration causing activities from construction plant and machinery will occur within working areas situated within agricultural grassland fields, away from watercourses. However, during drilling operations, noise and vibration impacts in respect to fish are likely to occur when boreholes are being drilled beneath reens and watercourses. There is potential for fish present within the footprint of the cable corridor during the time of drilling to be disturbed, resulting in temporary displacement further up and/or downstream away from the works. The majority of the reen and ditch habitat available to fish will be unaffected by noise or vibration. As such, the potential impacts of small-scale and temporary disturbance to fish during construction are not considered to have an adverse effect. Underground electricity cabling under rivers and watercourses can have a detrimental impact on fish, as electric cables create magnetic fields. A magnetic field assessment of the 132 kV underground cables crossing the respective reens was carried out for the Project. The magnetic field strength calculations for the Project were performed using worst case conditions including minimum burial depth for cables, and maximum rating. Minimum cable burial depth in this instance is 5.91m, which is the proposed depth below Percoed Reen as shown in Appendix A.2. Burial depths for Wheel Lane Reen and Sealand-Sunnybank Link Reen are 6.46m and 6.6m respectively. It should be noted that circuits are unlikely to operate at this maximum rating routinely, therefore resulting in lower typical magnetic fields on a day-to-day basis. The AC magnetic fields from the 132kV cables crossing under the Reens are the highest closest and directly above the cables and reduce rapidly with distance, with the maximum (or worst case) magnetic fields at the bed of Percoed Reen being 1.51 μT reducing to 1.20 μT at 1 metre above the bed. The magnetic fields also reduce quickly to the sides of the cables, reducing to 0.96 μT, 5 metres from the cable circuits and 0.48 μT, 10 metres from the cable circuits. Magnetic field for Sealand-Sunnybank Link Reen and Wheel Lane Reen is considered to be less than this field strength given burial depths are greater. Eels are magneto-receptive species and current understanding suggests that Anguillid species (eels), can detect AC magnetic fields in the order of micro Tesla. Studies⁸¹ on the migration of American eel (<i>Anguilla rostrata</i>) tested eel	Not significant	Not significant
Common coarse fish assemblage	Temporary or permanent habitat severance or physical restrictions to species movements Potential impacts on fish behaviour and the development of fish eggs and juvenile fish, as a result of electro-magnetic fields (EMFs) emitted from the cable arrangement		Not significant	Not significant

⁸¹ Nishi, T., Kawamura, G. and Sannomiya, S. (2005) 'Anosmic Japanese eel *Anguilla japonica* can no longer detect magnetic fields', Fisheries Science, 71 (101-106).

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
		response to EMFs in the near shore coastal environment. In this study eel were subjected to a maximum AC EMF of 0.19 μT (190 nT), however a DC EMF was also emitted from the cable in the study. The assessment of behavioural response was made in relation to the DC EMF, however, owing to the correlation between the DC and AC EMFs, the authors noted that it is plausible that eels responded to the DC EMF which was higher (7.5 μT deviation from baseline EMF level) and/or AC EMF. However, the major finding of this study was that, whilst eels were shown to respond to the EMF (AC and/or DC), the cables did not constitute an absolute barrier to migration. Based on this study it is considered unlikely that any behavioural response of eel to the EMF would result in an ecologically meaningful change in the eel movement, behaviour or delay. It should also be noted that within estuarine and freshwater systems olfactory cues become increasingly important drivers for eel migration, with odours, salinity, water current (in addition to magnetic cues) becoming important in the estuarine and freshwater parts of their life-cycle⁸² In terms of egg development and EMF impacts, the reens will not support eggs of European eel or lamprey; eel spawning occurs in the marine environment (Sargosso sea) and the reens are considered unsuitable for lamprey spawning. There is an absence of information on the potential EMF effect on lamprey ammocoetes, which on a precautionary basis may be present in the vicinity of the cable crossings, however, the EMF levels are considered very low, and any impact would be highly localised (EMFs reduce quickly to the sides of the cables). This impact would also occur within a potentially functionally linked watercourse, rather than within the European site itself. Based on these factors, it is considered that likely significant effects as a result of EMFs emitted during operation of the cable can be ruled out.		
Terrestrial Invertebrates	Temporary habitat disturbance and/or permanent or temporary degradation Disturbance to species during construction (noise, vibration and lighting)	See 'Gwent Levels St. Brides SSSI' above – these features have been assessed as features of the SSSI.' As aforementioned, both brown banded and shrill carder bee having been recorded in reasonably healthy populations within the wider area. No permanent habitat loss is anticipated as a result of the Project. Temporary grassland disturbance is generally limited to species-poor improved and arable grasslands with 0.39ha of grassland previously recorded as 'semi-improved neutral grassland' however currently in poorer condition due to ongoing construction works associated with the Celtic Lakes NGED Substation and bramble encroachment also to be disturbed temporarily. During site mobilisation, any grassland habitats will be sensitively cleared to minimise potential harm / mortality of individual foraging within the grassland. Habitats associated with nesting and hibernating brown banded and shrill carder bees have been avoided as part of the embedded design measures. There will be large areas of retained grassland habitat present within the fields and wider landscape which will provide sufficient foraging habitat for the species during construction. As a result of embedded design measures including the retention and re-instatement of grassland habitat post-construction, and implementation of best practice measures onsite (as detailed within Section 7), no permanent impacts are anticipated the temporary effects on habitats which may support occasional foraging terrestrial invertebrates are not considered significant. There is not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.	Not significant	Not significant

⁸² Cresci, A. (2020) A comprehensive hypothesis on the migration of European glass eels (*Anguilla anguilla*). Biol. Rev. (2020), 95, pp. 1273–1286. 1273doi: 10.1111/brv.12609

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
Aquatic Invertebrates	Temporary habitat disturbance and/or permanent or temporary degradation	Impacts to habitats supporting aquatic invertebrates are largely avoided through the directional drilling methodology. Furthermore, with the design of the working areas adhering to 7m from ditches, and 12.5m from reens this further reduces direct impacts. Two temporary bailey bridges will be constructed to facilitate the works towards the southern extent of the site, however, given the scale and temporal nature of the bridges, this is not considered to have a significant impact of aquatic invertebrates. There is a pathway for effect during construction from construction run-off entering the field ditch and reen network which could result in habitat degradation and indirect effects on aquatic invertebrates within reens / ditches. Standard best practice measures proposed (as detailed in Section 7) will ensure protection to the general water environment. Further measures have been proposed to prevent pollution incidents to the watercourses (e.g. in the unlikely event of a frac-out) and as such, run off events are considered unlikely and construction impacts will not be significant. There is not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.	Not significant	Not significant
Reptiles and amphibians (including great crested newts)	Temporary habitat disturbance and/or permanent or temporary degradation Disturbance to species Species mortalities and injuries	As detailed in Section 5, great crested newt is not anticipated to be present in terrestrial (nor aquatic) habitat within the Site boundary. Suitable habitat for reptiles and amphibians is present in the forms of woodland, scrub, grassland, watercourses and the edge of watercourse habitats. It is assumed reptiles and amphibians are present on Site due to the suitable habitat heterogeneity present. Impacts to riparian corridors which are likely to support populations of reptiles and amphibians are largely avoided through the directional drilling methodology. Furthermore, with the design of the working areas adhering to 7m from ditches, and 12.5m from reens this further reduces impacts. There will be no direct impacts to watercourses as part of this Project and embedded control measures to protect the general water environment would be employed to prevent pollution incidents to the watercourses. There will be a temporary loss of 3.25ha of arable/grassland habitats on Site. Grassland habitats to be disturbed are considered be sub-optimal for reptiles given the working landscape, notably the agricultural grassland habitats which are subject to regular disturbance as a result from silage cuts and grazing from livestock. In addition, fields present within the cable corridor footprint are not considered suitable for hibernating reptiles given that they are prone to inundation and boggy conditions during the winter season and are more likely to utilise boundary habitats where abiotic conditions remain stable. However, intermittent use of these habitats by reptiles cannot be ruled out and particularly if fields are unmanaged during works there is a potential risk that reptiles and amphibians present on site could utilise track matting as refugia and/or hibernation during construction, increasing the risk of direct species mortality and injury of reptiles or amphibians. Vegetation will be managed within 2m of the track matting to dissuade any reptiles from using the track mats as refugia (this will be undertaken under ecological supervision, include a two-phase cut⁸³ if deemed necessary by the ECoW). Once mats are laid, sides will be blocked up with type 1 stone and sand (or similar) to reptiles and amphibians gaining access to track matting for refugia. Maintenance checks by a suitably competent and experienced ecologist will be carried out to ensure gaps beneath the matting are still blocked for the duration of the works. Furthermore, during site demobilisation and track matting removal, this will be carried out under supervision of an ecologist to ensure any reptiles and/or amphibians present can be safely translocated away from the active working area.	Not significant	Not significant

⁸³ A two-phase directional cut would involve cutting vegetation down in stages, first to 150mm, then to the ground to disperse reptiles directionally towards suitable adjacent retained habitat.

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
		Best practice construction methods, including provision of a suitably competent and experienced ecologist throughout the site clearance and construction phase will minimise the risk of mortality and injury to reptiles and amphibians. With sensitive lighting design at construction, it is considered that the remaining habitat retained within the wider site during the operational phase will offer enough habitat for reptiles and amphibians to move away from either noise or lighting disturbance and therefore any adverse impacts. There is not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.		
Otter	Temporary habitat disturbance and/or permanent or temporary degradation Disturbance to species Species mortalities and injuries	The reen and ditch network present within the site and across the Gwent Levels are known to provide foraging and commuting opportunities for otter, which are a mobile Annex II species of the River Usk SAC. The survey results and review of previous survey data have confirmed the presence of foraging and commuting otter notably along Percoed Reen. Signs of otter were recorded on one moderate suitability waterbody, consisting of old and fresh signs (spraints), a possible slide and pathway. No otter resting places and/or holts were identified during any of the riparian mammal surveys. Impacts to riparian corridors which may support commuting foraging and commuting are largely avoided through the directional drilling methodology. Furthermore, with the design of the working areas adhering to 7m from ditches, and 12.5 from reens, this further reduces impacts to otter. Two temporary bailey bridges will be constructed to facilitate the works towards the southern extent of the site, however, given the scale and temporary nature of the bridges, this is not considered to sever or fragment any riparian corridor routes. There is potential for construction works to disturb otters that are considered to forage and commute along watercourses within and adjacent to the land required for the Project, through potential visual, noise/vibration and lighting impacts. The Project are located within a working landscape with regular agricultural disturbance (i.e., livestock rotation, farming activities), crossed by the South Wales railway line which generally runs during the day and night. Reen watercourses are regularly maintained by NRW and are subject to disturbance as a result of flood management activities. Otter usage of the site is likely to be shaped by these existing disturbance levels to a degree. There is an abundance of suitable alternative habitat for otter within the surrounding landscape, should individuals be temporarily disturbed from their commuting and foraging activities. There will be no direct impacts to watercourses as part of this Project and embedded control measures to protect the general water environment would be employed to prevent pollution incidents to the watercourses. Further measures including covering any excavations and capping pipes/ducts rather than leaving open overnight, as described in Section 7, will ensure risks of mortality or injury to otters is minimal as a result of construction works. Best practice during construction including sensitive lighting and noise management, will also be of benefit to otter. Additionally, as outlined in Section 7, pre-construction checks are to be undertaken for otter within the site and adjacent habitats prior to the works. There is not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.	Not significant	Not significant
Water vole	Temporary habitat disturbance and/or permanent or temporary degradation	Several signs of water vole were recorded including food caches and latrines which were confined to watercourses maintained by NRW, however no burrows were identified on Site. Impacts to riparian habitats supporting water vole are largely avoided through the directional drilling methodology. Furthermore, with the design of the working areas keeping 7m from ditches, and 12.5 from reens this further reduces direct impacts. Two temporary bailey bridges will be constructed to facilitate the works towards the southern extent of the site, notably the bridge being constructed over Sealand-Sunnybank Link Reen will require working within proximity to riparian habitat where signs of water voles have been recorded along the banksides. A small section of marginal vegetation (comprised of predominantly	Not significant	Not significant

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
	Disturbance to species Species mortalities and injuries	common reed) will be cleared as a result of the bridge installation. Whilst no direct groundworks of the bankside habitat will be carried out, a pre-construction survey of the bailey bridge footprint and adjacent habitat (within 30m) will be surveyed to ensure the Project do not disturb any water vole burrows. In the event that a burrow is identified that would be impacted by works, the siting of the bridge will be relocated wherever practicable to ensure a 5m buffer from any burrow is retained. If this is not possible, a conservation licence will be sought from NRW. The ECoW will provide advice to the site team regarding safe working within and adjacent to suitable water vole habitat, and provide a toolbox talk to the site team prior to the commencement of works. With mitigation implemented such as best practice pollution measures, pre-construction surveys of bailey bridge footprints and presence of an ECoW during works near to watercourses (i.e. installing bailey bridges), no adverse impacts on water vole are anticipated during construction. There is not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.		
Section 7 species / other mammal	Disturbance to species Species mortalities and injuries	Other mammals using the Site may include Section 7 species such as west European hedgehog. The mosaic of habitats on the site provides suitable habitat for these species such as fox, rabbit and mole. Any mammal species may be impacted during construction by temporary habitat loss degradation from pollution, disturbance due to noise and vibration and potentially mortality during the construction phase of the Project. Construction and operational impacts and best practice methods are similar to those described above for otter. There is the potential for harm to small mammals within the site, although best practice during construction as described in Section 7 will avoid significant impacts. There is not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.	Not significant	Not significant
Notable plants	Disturbance to species	During the flora NVC survey, most of the plant species recorded were common species, but few are included in the Wildlife Sites Guidelines list of rare and scarce species comprising tubular water-dropwort, smooth brome, rigid hornwort, great water-dock, stone parsley and greater duckweed. During the reed NVC survey, the rare and scarce species included arrowhead (listed within the St Brides SSSI citation), frogbit, fat duckweed, great water-dock, greater duckweed and ivy-leaved duckweed. Generally, these species described above are confined to the reed and ditch network present on Site and therefore impacts to these species will be largely avoided as a result of the directional drilling methodology. Furthermore, with the design of the working areas adhering to 7m from ditches, and 12.5m from reeds this further reduces direct impacts to notable species associated with watercourses. As aforementioned, there will be a temporary loss of 157m² of marginal habitat comprising common reed and tall ruderal vegetation. Upon completion of the works, marginal vegetation habitat will naturally re-establish and therefore no permanent habitat loss is anticipated. There will be no direct impacts to watercourses as part of this Project and embedded control measures to protect the general water environment would be employed to prevent pollution incidents to the watercourses. There is not predicted to be an operational adverse effect as existing operational activities will remain largely similar as per previous activities onsite.	Not significant	Not significant
Invasive non-native species (INNS)	Disturbance / spread of INNS	Schedule 9 INNS listed under the Invasive Alien Order, including Japanese knotweed, Canadian pondweed and Nuttall's waterweed were recorded within the land required for the Project. A stand of Japanese knotweed was recorded in one hedgerow during the ecological baseline surveys for the Cable Route, however, this is located over	Not significant	Not significant

Ecological Feature	Potential Impacts	Summary of Embedded Design, Assumed Construction Practices and Mitigation Measures	Residual Effect During Construction	Residual Effect During Operation
		10m away from the nearest access point for the Project, south of the gateway requiring widening at Location 5 (as described in Table 1). Aquatic INNS have been recorded within reen watercourses (Percoed Reen, Wheel Lane Reen and Sealand-Sunnybank Link Reen), and should be precautionarily assumed to be present in most wet ditches given the hydrological connectivity between the watercourses within the landscape. No direct working in water will be required to carry out the Project. With respect to aquatic invasive species, working areas adhering to 7m away from ditches and 12.5m from reens, will further ensure the spread of INNS are avoided. A pre-construction survey will be undertaken to confirm the location and extent of this species and any other invasive non-native species within the Site prior to works commencing. Standard good practice measures will be implemented to avoid the potential spread of INNS. All site members will be made aware of the presence of invasive species and if they suspect that they may be present in other areas, they should immediately inform the supervisor.		

8. Conclusions

National Grid Electricity Distribution (NGED) commissioned Arup to undertake a comprehensive suite of ecological assessments, including an Ecological Impact Assessment (EcIA), to support the installation of four 132kV underground electricity cables between the consented Celtic Lakes NGED Substation in Newport and the existing distribution network to the south. The majority of the installation is to be undertaken through the Gwent Levels – St Brides Site of Special Scientific Interest (SSSI) and to be completed using Horizontal Directional Drilling (HDD) methods.

A suite of ecological surveys was undertaken between 2023 and 2025 to inform the assessment of potential effects associated with the Project. These surveys included an extended phase 1 habitat survey, National Vegetation Classification (NVC) surveys for both terrestrial and aquatic flora, faunal surveys comprising those for breeding and wintering birds, bats, dormice, otter and water vole, great crested newt, aquatic and terrestrial invertebrates (including bumblebee surveys) and fish. These assessments have been complemented by data collected for the Celtic Lakes NGED Substation Development application (data collected 2021–2023), providing additional context and baseline information. This included results from previous habitat, botanical, and protected species surveys, ensuring a robust and comprehensive ecological baseline for the current Project.

Surveys have confirmed the presence of nesting dormice within scrub and hedgerow habitat on Site and a range of breeding bird species including five Cetti's warbler territories present in habitats along the proposed cable route. No significant aggregations of wintering birds (as associated with the Severn Estuary designations) were noted during surveys. The results of the eDNA surveys demonstrated that coarse fish and European eel use the reens (the latter also being cited with the Severn Estuary Ramsar designation). A number of Potential Roost Features (PRFs) were identified for bats, however no roosting was identified on Site. Similarly, although evidence of otter and water vole was noted on Site, no resting sites for either species were identified.

Foraging shrill and brown banded carder bee, features of the St Brides SSSI, have been noted on Site, though much of the grassland habitats across the Site are species-poor providing short-term foraging opportunities only. Hairy dragonfly, another SSSI feature, was observed along three of the reens within the Site. The NVC surveys on Site identified a number of Primary and Contributory species associated with the South Wales Guidelines for the Selection of Wildlife Sites in South Wales³¹, including arrowhead which is listed within the SSSI citation. All notable flora species were associated with the reens/ditches or margins of these waterbodies on Site. Aquatic invasive species were recorded within the reens including Nuttall's waterweed and Canadian pondweed, with one small stand of Japanese knotweed recorded over 10m from the nearest proposed working area on Site.

Targeted pre-construction surveys are recommended for breeding birds, badger, otter, water vole, and invasive non-native species to confirm the current status of the features at the time of Project mobilisation and inform any necessary licensing or further mitigation required. SSSI assent will be obtained prior to any works within the SSSI.

The scheme has been carefully designed to avoid and minimise impacts on key ecological features with HDD methods employed to ensure that the reen and ditch network associated with the SSSI will not be directly impacted, along with reducing the requirement for hedgerow crossings and modification and therefore minimising impacts to dormice and breeding birds. A minimum buffer from watercourses has been maintained comprising at least 7m from any working area to a field ditch, and 12.5m between working areas and reens (excluding using existing access tracks and the requirement for access over Sealand-Sunnybank Link reen using a bailey bridge).

Through sensitive design, vegetation clearance requirements have been minimised, with temporary vegetation clearance only required at five locations comprising a total of 30m² of mixed scrub habitat, and 127m² of common reed / ruderal vegetation. This localised vegetation clearance will be undertaken during

September/October under a development licence for dormice (outside of the dormouse breeding season). Hedgerow Removal Notice will be submitted to the Local Planning Authority prior to start of works.

A further 1.35ha of grassland habitat, largely comprising species-poor arable and grazed improved or semi-improved grassland, will be impacted temporarily to facilitate access to the Site, working areas for the HDD pits and associated cable laydown.

An Outline Construction Environmental Management Plan (CEMP)⁸ has been prepared which sets out strict pollution prevention and biosecurity measures, including buffers from watercourses, silt control, and emergency spill procedures. These have been further assessed with the Habitats Regulations Assessment (HRA) for the Project which has concluded that no likely significant effects are reasonably foreseeable with the adoption of the mitigation measures proposed.

With the adoption of these embedded design principles and mitigation measures, the assessment concludes that the installation of the Celtic Lakes cable connection will not result in significant adverse effects on ecological features present, including the statutory sites. All residual effects during construction and operation are assessed as not significant, provided that the recommended mitigation and management measures are fully implemented.

Figures

Figure 1: Site location and proposed works

Figure 2: Site boundary in relation to Celtic Lakes Substation Development

Figure 3: European designated sites within 10km

Figure 4: National designated sites within 2km

Figure 5: Non-statutory designated sites and priority habitats within 1km

Figure 6: Updated phase 1 habitat survey

Appendix A – Detailed Drawings

A.1 Parameter Plan

A.2 Reen Crossings

A.3 Vegetation clearance drawings

Appendix B – Legislation

B.1 Legislative Context

A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. This is described in the following sections. The reader will refer to the original legislation for the definitive interpretation.

B.2 Designated Sites

A network of nationally designated sites has been established through the designation of Sites of Species Scientific Interest (SSSI) and National Nature Reserves (NNR) under the Wildlife and Countryside Act 1981 (as amended). The protection afforded by the Act means it is an offence to carry out or permit to be carried out any operation listed within the notification without the consent of the Statutory Nature Conservation Organisation (Natural Resources Wales).

The protection afforded to SSSIs is used to underpin the designation of areas at an International (European) Level. International Sites comprise Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar Sites protected under the Conservation of Habitats and Species Regulations 2017 (as amended) (also known as the Habitat Regulations) and the International Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention).

Wetlands of International Importance (Ramsar Sites) declared under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are normally also notified as SSSIs but are only considered International Sites as a matter of UK and Local Government Policy.

The Habitats Regulations transpose the requirements of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) into law within England and Wales, while the Wildlife and Countryside Act transposes Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive) in the law within England and Wales. Equivalent legislation exists to transpose these directives in the law within Scotland and Northern Ireland.

The Habitats Regulations require that consideration is given to the implications of plans and projects (developments) on International Sites are considered. Specifically, Regulation 63(1) states:

“A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which –

(a) is likely to have a significant effect on a European Site or European Marine Site (either alone or in combination with other plans or projects), and

(b) is not directly connected with or necessary to the management of that site,

must make an appropriate assessment of the implications for that site in view of that Site’s conservation objectives..”

The formal consideration of effects on International Sites is therefore undertaken by the determining authority such as the LPA.

Local Nature Reserves (LNRs) can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949 (as amended). However, this protection is usually conveyed through inclusion of protection within local planning policy relating to these sites and other non-statutory sites such as Sites of Importance for Nature Conservation.

These sites are protected by the relevant legislation regardless of whether planning permission is required. Where planning consent is required, they will also be protected by Planning Policy.

Country Parks, Local Wildlife Sites (LWS) including Sites of Importance for Nature Conservation (SINC), and Ancient Woodlands are protected by Planning Policy, which will apply to schemes which require planning consent.

B.3 Protected/Notable Species

These legislations protect different species to varying degrees, and in most cases their habitats also, regardless of whether planning permission is required. In addition, these species are also afforded protection through Planning Policy, which requires that they are a ‘material consideration’ of any planning application.

B.3.1 European Protected Species

The Habitats Regulations convey special protection to a number of species which are listed in schedule 2 of the Regulations and are referred to as European Protected Species (EPS):

- All UK resident bat species;
- All whale and dolphin species;
- Large blue butterfly (*Maculinea arion*);
- Hazel dormouse
- Pool frog (*Rana lessonae*);
- Sand lizard (*Lacerta agilis*);
- Fisher’s estuarine moth (*Gortyna borelii lunata*);
- Great crested newt (*Triturus cristatus*)
- Otter (*Lutra lutra*)
- Wild cat (*Felis silvestris*);
- Lesser whirlpool ram’s-horn snail (*Anisus vorticulus*)
- Smooth snake (*Coronella austriaca*);
- Sturgeon (*Acipenser sturio*);
- Natterjack toad (*Bufo calamita*); and
- All marine turtles.

Regulation 43 makes it an offence to:

- Deliberately capture, injure or kill any wild animal of a EPS;
- Deliberately disturb wild animals of such a species;
- Deliberately takes or destroys the eggs of such a species;
- Damages or destroys a breeding site or resting place of such an animal.

Disturbance in the context of the offences above is disturbance which is likely to impair the ability of the animals to survive, to breed or reproduce, to nurture their young, to hibernate, to migrate; or to significantly affect the local distribution of the species.

Licences can be granted by the relevant Statutory Nature Conservation Organisation (SNCO) for developments (sometime referred to as EPS Licences or Derogation Licences) providing the purposes of the licence is for “preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.”

B.3.2 UK Protected Species

The Wildlife and Countryside Act 1981 provide protect to both EPSs and other species including wild birds, water voles and reptiles.

All wild birds, their nests and eggs are protected with some rare species afforded extra protection from disturbance during the breeding season (these species are listed in Schedule 1 of the Act). It is illegal to take any wild bird or damage or destroy the nests and eggs of breeding birds. There are certain exceptions to this in respect of wildfowl, game birds and certain species that may cause damage.

In England and Wales water voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981, receiving full protection since 2008. The Wildlife and Countryside Act 1981 together with amending legislation, lists the following offences:

- Intentionally killing, injuring or taking a water vole by any method;
- Intentionally or recklessly damaging or destroying a water vole place of shelter or protection;
- Intentionally or recklessly damaging disturbing a water vole whilst it is occupying such a structure or place it uses for shelter or protection;
- Intentionally or recklessly obstructing access to a water vole's place of shelter or protection;
- Selling, offering for sale, or possessing or transporting for the purposes of sale, any live or dead water vole, or any part or derivative, or advertising any of these for buying or selling.

All native reptile species in the UK are subject to partial protection from intentional or reckless killing or injury only.

B.3.3 The Protection of Badger Act 1992

Badger and their setts are protected under the Protection of Badgers Act 1992 which makes it an offence to kill, injure or take a badger, or interfere with a sett.

B.3.4 Eels (England & Wales) Regulations 2009

This implements Council Regulation (EC No. 1100/2007) of 18 September 2007 establishing measures for the recovery of the stock of European Eel. The Regulation requires Member States to implement a number of short and long-term measures to achieve a target of ensuring that at least 40% of the potential production of adult Eels return to the sea to spawn on an annual basis.

B.3.5 Salmon and Freshwater Fisheries Act 1975

This law was created to protect salmon *Salmo salar* and sea trout *Salmo trutta* from commercial poaching, to protect migration routes, to prevent wilful vandalism and neglect of fishery's, ensure correct licensing and water authority approval.

B.3.6 Other Legislation Relating to Species

Public authority listed in the Environment (Wales) Act 2016, including LPAs “must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in doing so promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions”.

Ecosystem resilience is defined as the capacity for ecosystems to adapt, and comprises the key characteristics:

- Diversity between and within ecosystems;
- The connections between and within ecosystems;
- The scale of ecosystems; and

- The condition of ecosystems (including their structure and functioning).

In complying with the Biodiversity and Resilience of Ecosystems Duty, it is necessary to have regard to:

- The list published under Section 7;
- The State of Natural Resources Report (SoNARR) published under Section 8; and
- Any area statement published under Section 11 for an area that includes all or part of an area in relation to which the authority exercises functions.

Section 7 lists species and habitats which are ‘of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales’ (as decided by WG in consultation with Natural Resources Wales (NRW)).

Locally Protected Species which may be identified within County Local Biodiversity Action Plans (LBAP), the Royal Society for the Protection of Birds (RSPB) ‘Birds of Conservation Concern’ or Red Data books for example.

B.3.7 Invasive Species

Schedule 9 of the Wildlife & Countryside Act 1981 (as amended) lists certain plants and animals that are not native to Great Britain and could pose a threat to our native species and habitats.

Under this legislation it is an offence to plant or otherwise causes to grow in the wild any plant which is included in Part II of Schedule 9. It is also an offence to sell or to release into the wild any plants or animals on the Schedule.

The Invasive Alien Species (Enforcement and Permitting) Order 2019 allows for the enforcement of the EU Invasive Alien Species Regulation 1143/2014 on the prevention and management of invasive alien plant and animal species in England and Wales, including the relevant licenses, permits and rules for keeping invasive alien species. Species on this list are no longer listed on Schedule 9 of the Wildlife & Countryside Act 1981 (as amended).

People undertaking works in proximity to INNS should take all reasonable steps and exercise all due diligence to avoid committing an offence.

B.4 Hedgerow Regulations 1997

The Hedgerow Regulations 1997 set out a framework for the protection of hedgerows against removal where they are deemed to be important either due to their age, ecological or archaeological features. Approval is required from the local authority prior to the removal of hedgerows deemed Important under the Hedgerows Regulations.

B.5 National Park and Access to the Countryside Act 1949 (as amended)

Local Nature Reserves can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949. However, this protection is usually conveyed through inclusion of protection within local planning policy relating to these sites and other non-statutory sites such as Sites of Importance for Nature Conservation.

B.6 The Well-being of Future Generations Act

The Well-being of Future Generations Act 2015 places a duty on public bodies to carry out sustainable development. In this Act “sustainable development” means the process of improving the economic, social,

environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals.

The action a public body takes in carrying out sustainable development must include:

(a) setting and publishing objectives (“well-being objectives”) that are designed to maximise its contribution to achieving each of the well-being goals, and

(b) taking all reasonable steps (in exercising its functions) to meet those objectives.

The seven well-being goals include: a resilient Wales, a prosperous Wales, a healthier Wales, a more equal Wales, more cohesive communities, a Wales of vibrant culture and thriving Welsh language and a globally responsible Wales.

Of most relevance is 'A resilient Wales', which seeks to maintain and enhance a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).

Appendix C – Ecological Baseline Reports

Please refer to separate appendices documents.

C.1 Preliminary Ecological Appraisal

Please refer to separate appendices document.

C.2 National Vegetation Classification Survey Report

Please refer to separate appendices document.

C.3 Aquatic Flora Survey Report (2024)

Please refer to separate appendices document.

C.4 Aquatic Flora Survey Report (2025)

Please refer to separate appendices document.

C.5 Interim Bat Report

Please refer to separate appendices document.

C.6 Breeding Bird Survey Report

Please refer to separate appendices document.

C.7 Wintering Bird Survey Report

Please refer to separate appendices document.

C.8 Invertebrate Survey Report

Please refer to separate appendices document.

C.9 Riparian Mammal Survey Report

Please refer to separate appendices document.

C.10 Dormouse Survey Report

Please refer to separate appendices document.

C.11 Great Crested Newt Report

Please refer to separate appendices document.

C.12 Aquatic Invertebrates: eDNA Results

Please refer to separate appendices document.

C.13 Freshwater Fish: eDNA Results