ARUP

Dŵr Cymru Welsh Water

Pont-y-felin

Ecological Impacts Assessment (EcIA)

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1. Introduction

This Ecological Impact Assessment (EcIA) has been prepared by Ove Arup and Partners ('Arup') for Dŵr Cymru Welsh Water (DCWW) and supports the delivery of the Pont-y-felin Combined Sewer Overflow (CSO) wetland/reedbed biodiversity enhancement scheme (hereafter named the 'site').

1.1 Site Context

Pont-y-felin is located in New Inn, Pontypool (Ordnance survey Grid Reference: ST3026999067, nearest postcode: NP4 0QF). Pont-y-felin comprises a popular site of recreation for the local community, comprising an open field bordered with tree lines and scrub. Footpaths are present across the site and the Afon Lwyd is adjacent to the western extent of the site. See Figure 1 for the site location plan.

1.2 Proposed Works

Pont-y-felin Lane CSO is currently subject to a high number of spills. The root cause of this is hydraulic failures, and the asset is severely impacting on the receiving watercourse (Afon Lwyd). Solutions have been considered for this site through 2021. A short list was then assessed in more detail against regulatory, environmental and wellbeing drivers. The preferred solution is a Nature Based Solution (NBS). This will treat CSO discharges and will result in better river quality; the scheme driver is to reduce pollution from the CSO into the river through treatment. The solution aims to consider the context of the site and to provide maximum benefit to the community and the environment.

Elements of the scope been proposed to include:

- A new screening chamber and associated infrastructure, such as fenced compound/electricity upgrade/kiosk;
- New flow split chamber;
- New pipework;
- New reedbed and integrated constructed wetland;
- New access roads;
- New placemaking elements. such as paths, plazas, play spaces and gardens; and
- New biodiversity enhancements.

1.3 Purpose of this Document

This Ecological Impact Assessment (EcIA) has been undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland[1]. It describes and evaluates the ecological features that have been found within and adjacent to the site; assesses the impacts of construction and operation of the development; and specifies avoidance, embedded mitigation, compensation, enhancement, as well as post construction monitoring and management measures as appropriate to provide the LPA with the information they need to reach a decision on the planning application.

1.4 Objectives

The objectives of the EcIA are as follows;

[1] CIEEM. (2019). Guidelines For Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Available at: ECIA-Guidelines-Sept-2019.pdf (cieem.net)

- To establish baseline ecological conditions on the site and within the immediate vicinity, including its potential to support notable habitats and notable/protected species;
- To set out the mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- To identify how mitigation measures will/could be secured;
- To provide an assessment of the significance of any residual effects;
- To identify appropriate enhancement measures and biodiversity net benefit and for ecosystem resilience; and
- To set out the requirements for post-construction management and monitoring.

2. Legislative and Policy Context

2.1 Relevant Legislation

A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. The following core legislation exists to protect habitats and species of nature conservation importance.

This is described in the following sections.

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

The Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations') transpose the previous 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. These regulations provide for the designation and protection of sites of European importance known as European Sites under the National Site Network[2].

European Sites comprise:

- Special Areas of Conservation (SACs), including candidate sites, designated under the Conservation of Habitats and Species Regulations 2017 (as amended)[3].
- Special Protection Areas (SPAs) including candidate sites, designated under the Wildlife and Countryside Act 1981 (as amended)[4].
- Ramsar Sites designated under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are also considered as European Sites as a matter of UK Government policy along with proposed SACs and SPAs.

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

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

[2] Formerly known as Natura 2000 Sites.

[3] The Habitats Regulations transposes the requirements on Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora in to UK law.

[4] The Wildlife and Countryside Act 1981 transposes the requirements of Directive 79/409/EEC on the Conservation of Wilde Birds (Birds Directive) in to UK law. The Birds Directive has been updated through Directive 2009/147/EC on the Conservation of Wild Birds.

i. 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

ii. is not directly connected with or necessary to the management of that site.

b) 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 European Sites is therefore undertaken by the determining authority such as the Local Planning Authority under the Town and Country Planning Act 1990. The determining authority is known as the Competent Authority with the Regulations.

The Habitats Regulations also 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). 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 take or destroy the eggs of such a species;

• Damage or destroy 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 affect significantly 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"*.

2.1.2 Ramsar Convention 1971

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

2.1.3 Wildlife and Countryside Act 1981 (as amended)

A network of nationally designated sites has been established through the designation of Sites of Special Scientific Interest (SSSIs) under the Wildlife and Countryside Act 1981. 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 a European Level.

The Wildlife and Countryside Act also places obligations on Welsh Ministers and other public bodies with regard to the conserving and enhancing of the features of SSSIs in the exercise of their functions.

The Wildlife and Countryside Act 1981 provides protection 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.

The Act also includes provisions for the control of invasive non-native species (INNS). Under these provisions it is an offence to:

• Release or allow to escape into the wild any animal which is not ordinarily resident or a regular visitor to Great Britain, or is included in Schedule 9 of the Act.

• Plant or otherwise cause to grow in the wild any plant which is included in Schedule 9 of the Act.

People undertaking works in proximity to invasive non-native plant species should take all reasonable steps and exercise all due diligence to avoid committing an offence.

2.1.4 The Invasive Alien Species (Enforcement and Permitting) Order 2019

The Invasive Alien Species (Enforcement and Permitting) Order 2019 came into effect on 1st December 2019. This allows for the enforcement of the European Union (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.

This Order is similar to existing EU legislation, but there are a number of changes that apply to regulated species. If it is not a species of EU concern, then the Wildlife & Countryside Act (WAC; Section 14, Schedule 9) still applies.

Those working with in-scope plants need to be aware that the movement of live plants, or propagules, are covered by the Order – so, unless plants, or parts of plants are being moved for the purpose of eradication, then a licence would be needed from NRW to carry this action out.

It is an offence under Part 2 Article 3 (2) to:

'release or allow to escape into the wild any specimen which is of a species of animal which (a)is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state, or (b) is included in Part 1 of Schedule 2'.

It is also an offence under Part 2 Article 3 (3) to:

'plant or otherwise cause to grow in the wild any specimen which is of a species of plant which is included in Part 2 of Schedule 2'.

Part 1 of Schedule 4 of the Order also amends the Wildlife and Countryside Act 1981 (as amended) to remove the animals and plants listed on Part 1, Schedule 2 of the Order from Schedule 9 of the Wildlife and Countryside Act.

2.1.5 National Park and Access to the Countryside Act 1949 (as amended)

Local Nature Reserves (LNRs) 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 (SINCs).

2.1.6 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. Local authorities can enforce the retention of Important Hedgerows through the issuing of Retention Notices.

2.1.7 The Protection of Badgers Act 1992

Badger (*Meles meles*) 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.

2.1.8 Wild Mammals (Protection) Act 1996

This Act operates in parallel with the legislation listed above conferring specific protection on rare or threatened mammal species by protecting all wild mammals from any action intended to cause unnecessary suffering.

2.1.9 Salmon and Freshwater Fisheries Act 1975 (as amended)

The Salmon and Freshwater Fisheries Act (SAFFA) is legislation that aims to protect freshwater fish, with a particularly strong focus on salmon (*Salmo salar*) and trout (*Salmo trutta*). 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 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 have been rebuilt over at least one half of their length.

2.1.10 Eels (England and 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 (*Anguilla anguilla*). The regulations are focussed 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 (Environment Agency and SNCO i.e. Natural Resources Wales) to implement eel 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 include water intakes and outfalls, dams and weirs, sluices or any other in-river obstruction. Where any such structure exists, the owner, occupier or person in charge of the land on which the dam, structure or obstruction lies may be required to construct and operate an eel pass to allow the free passage of eels.

2.1.11 The Environment (Wales) Act 2016

The Environment (Wales) Act 2016 places a duty on public bodies in Wales to conserve and enhance biodiversity in the exercise of their functions. This duty includes consideration of the ‘resilience of ecosystems’ in terms of their diversity, extent, condition and connectivity. The Act also reinforces duties in relation to the lists of species and habitats of importance and the duties to conserve and enhance those species and habitats. Within this EcIA these are referred to as Section 7 Habitats and Species unless covered under other legal protections.

2.1.12 The Well-being of Future Generations Act (2015)

This Act 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.

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

• Setting and publishing objectives ("well-being objectives") that are designed to maximise its contribution to achieving each of the well-being goals, and

• 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).

2.2 Planning Policy

2.2.1 Future Wales – the National Plan 2040

Future Wales – the National Plan 2040[5] is the national development framework for Wales, setting the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key 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 our communities. As the national development framework, Future Wales is the highest tier of development plan and is focused on solutions to issues and challenges at a national scale. Its strategic nature means it does not allocate development to all parts of Wales, nor does it include policies on all land uses. It is a framework which will be built on by Strategic Development Plans at a regional level and Local Development Plans at local authority level.

Welsh Government has also produced a Nature Recovery Action Plan[6] which is aimed at addressing the underlying causes of biodiversity loss by putting nature at the heart of its decision-making, by increasing the resilience of Wales' natural systems (ecosystems), and by taking specific action for habitats and species. It sets out how Wales will deliver the commitments of the EU Biodiversity Strategy and the UN Convention on Biological Diversity to halt the decline in our biodiversity by 2020 and then reverse that decline. The Nature Recovery Action Plan links to and complements The Well-being of Future Generations (Wales) Act 2015 and the Environment Act (Wales) 2016. Developments should seek to complement this, in order to meet objectives set out in the Environment Act and Well-being Act.

2.2.2 Planning Policy Wales (2021)

Planning Policy Wales[7] 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, with Technical Advice Note (TAN) 5[8] being of particular relevance to this chapter as it sets out the consideration of nature conservation in the determination of planning applications.

[5] Update to Future Wales - The National Plan 2040 (gov.wales)

[6] Nature recovery action plan | GOV.WALES

[7] Welsh Government (2018) Planning Policy Wales

[8] Welsh Assembly Government (2009) Technical Advice Note 5: Nature Conservaton and Planning. Cardiff

At national level, Chapter 6 of Planning Policy Wales[9] (which relates to conserving and enhancing the natural environment) requires development plan strategies, policies and development proposals to consider the need to:

- support the conservation of biodiversity, in particular the conservation of wildlife and habitats;
- ensure action in Wales contributes to meeting international responsibilities and obligations for biodiversity and habitats;
- ensure statutorily and non-statutorily designated sites are properly protected and managed;
- safeguard protected and priority species and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil, including peat; and
- secure enhancement of and improvements to ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks.

Developers must ensure that they comply with the above legislation by fully assessing the potential impacts on protected species and habitats from the proposed development. Where planning permission is required, this assessment must be finalised prior to and included with the submission of the planning application. The Planning Authority can then ensure that the necessary protected species and habitats information has been provided to inform an assessment and that proposals are in full accordance with relevant legislation and planning policy.

A recent letter from Welsh Government to the Heads of Planning[10] has strengthened the requirement for Local Planning Authorities to ensure a net benefit for biodiversity in all planning applications. Consequently, unless other significant material considerations indicate otherwise, there is a risk that planning permission may be refused in the absence of biodiversity enhancement.

2.2.3 Nature Recovery Action Plan 2015

Welsh Government has produced a Nature Recovery Plan which is aimed at addressing the underlying causes of biodiversity loss by putting nature at the heart of its decision-making, by increasing the resilience of Wales' natural systems (ecosystems), and by taking specific action for habitats and species. It sets out how Wales will deliver the commitments of the EU Biodiversity Strategy and the UN Convention on Biological Diversity to halt the decline in our biodiversity by 2020 and then reverse that decline. The plan builds on Wales' ground-breaking new legislative framework The Well-being of Future Generations (Wales) Act 2015.

2.2.4 Local policy

Under Section 11 of the EWA, Area Statements have been produced detailing the key challenges that are faced in different localities across Wales. The South East Wales Area Statement[11] 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.

The first theme, 'Linking our Landscapes' is about identifying local opportunities for protected sites, and natural and built environments to contribute towards the resilience of wider priority habitat networks in the region. These opportunities for improving ecosystem resilience should support ecological connectivity between sites, across boundaries and at a landscape scale. 'Climate Ready Gwent' is about identifying

[9] Welsh Government Planning Policy Wales Edition 11. February 2021. Planning Policy Wales - Edition 11 (gov.wales)

[10] https://gov.wales/sites/default/files/publications/2019-11/securing-biodiversity-enhancements.pdf

[11] Natural Resources Wales / South East Wales Area Statement (Accessed 03/05/22).

landscape and regional scale opportunities and collective interventions for climate adaptation and mitigation which enhance local ecosystem and community resilience. The third theme, 'Healthy Active Connected' is about identifying opportunities and collaborative interventions that protect and improve health and well-being; connecting people, communities and service delivery to nature for the benefit of both people and the environment. And lastly, 'Ways of Working' is about identifying the benefits of strategic regional collaboration and identifying what needs to be done at a regional scale to maximise local delivery.

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, Invasive Non-Native Species (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).
- 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

The Blaenau Gwent and Torfaen Local Nature Partnership (LNP)[12], funded by the Welsh Government and working as part of the broader Wales Biodiversity Partnership, have produced the Greater Gwent State of Nature report [13] and are currently drafting the Local Nature Recovery Action Plan and State of Nature Report for the region. In the LNP has highlighted the following features and species as being of particular importance in Torfaen: lesser horseshoe bat (*Rhinolophus hipposideros*), important wintering wildfowl populations at Llandegfedd Reservoir, bee orchid (*Ophrys apifera*), lapwing (*Vanellus vanellus*), adder (*Vipera berus*), otter (*Lutra lutra*), barn owl (*Tyto alba*), badger (*Meles meles*), great crested newt *(Triturus*

[12] https://www.biodiversitywales.org.uk/Torfaen (Accessed 27/05/22).

[13] Jones S M, Karran A, Bosanquet S, Barter G, Garrett H and Hancocks. 2021. Greater Gwent State of Nature. Produced by the Resilient Greater Gwent Partnership. The exact locations of these records are not provided but represented as grid squares and it is therefore possible that records fall within 2km of the site boundary.

cristatus), brown-banded carder bee (*Bombus humilis*), and water ladybird (*Anisosticta novemdecimpunctata*).

To comply with the above legislation and policy, developers must complete a full assessment of the potential impacts on protected species and habitats from the proposed development. Where planning permission is required, these assessments must be finalised prior the submission of the planning application so that planning authority can assess the proposal's compliance with the relevant legislation and policies.

3. Methodology

The following sections set out the methodology used to establish baseline conditions and assess the effects of the proposed development both in terms of construction and operational effects.

The baseline ecological information for the proposed development was collated through a combination of a desk study and ecological surveys. Extensive ecological surveys have been conducted within and surrounding the site in 2022, with further surveys to be undertaken in 2023. This included surveys for habitats and species as follows:

- Preliminary ecological appraisal (March 2022);
- Badger (May and October 2022);
- Bat – aerial inspections, emergence/re-entry and activity surveys (June – October 2022);
- Great crested newt (GCN) – habitat suitability index assessment and eDNA (June 2022);
- Hazel dormouse (July – November 2022. Further survey visits May and June 2023);
- Hedgerow (September 2022);
- Invasive non-native species (INNS) (September 2022);
- Otter (June and November 2022);
- Reptiles (June – September 2022. Further survey visits in April and May 2023); and
- Water vole (June and November 2022).

The methodology for establishing baseline conditions is set out in the following sections.

The preliminary ecological appraisal was undertaken by a number of suitably qualified professional ecologists employed by Arup[14]. Surveyors were assessed as being competent in terms of their knowledge and experience to lead surveys for that particular species or habitat group. The phase 2 species surveys were undertaken by an ecologist from APEM Ltd[15].

3.1 Methodologies and Surveys Scoped out of Assessment

Wintering birds were scoped out of the surveys to establish the ecological baseline within the site due to the habitats not being suitable to support large assemblages of over-wintering birds. The site comprises an open field bordered with tree lines and scrub.

Fish surveys were also scoped out due only one watercourse being present on the southern site boundary that was considered either to be too small and over-shaded by scrub and woodland to support large assemblages of fish species.

3.2 Establishing Ecological Baseline

3.2.1 Desk Study

A desk study was undertaken to identify any existing ecological information for the site (i.e. red line boundary) and surrounding area.

[14] Arup. (2022). Pont-y-felin CSO. Preliminary Ecological Appraisal.

[15] APEM. (2022). Pont-y-felin CSO Interim Ecological Report.

Species records obtained from Aderyn: The Biodiversity Information and Reporting Database of Local Environmental Records Centres Wales on 9th March 2022 by Arup and on 17th November 2022 by APEM Ltd. The records have been curtailed to the last ten years to ensure validity. The further following sources have been consulted as part of the desk study:

- Multi-Agency Geographical Information for the Countryside (MAGIC) website[16];
- Joint Nature Conservation Committee (JNCC)[17];
- Natural Resources Wales (NRW) Wildlife and Biodiversity Guidance and Advice[18];
- The Blaenau Gwent and Torfaen Local Nature Partnership[12] (Including the Resilient Greater Gwent State of Nature report)[13].
- OS Open Maps[19]; and
- Lle: A Geo-Portal for Wales[20].

3.2.2 Field Survey

Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey was undertaken by Arup Associate Ecologist Dr Pippa Wood (CEcol MCIEEM) and Arup Graduate Ecologist Rosie Seager-Jones (QCIEEM) on the 17th March 2022. An updated survey will be carried out in spring 2023.

The site was inspected to establish the presence, or potential presence, of protected or notable species or habitats (or invasive species) which would be affected by the proposed works. Habitats were mapped on the Extended Phase 1 Habitat Survey Plan with reference to JNCC 'Handbook for Phase 1 Habitat Survey. Target Notes (TNs) were used to highlight any features of interest, such as those that provide suitable habitat for protected species, or habitats that were too small to appear at the drawing's resolution.

Dormouse Surveys

Dormouse nest tubes were attached to trees and shrubs within suitable habitat on 14th June 2022, with 100 nest tubes being deployed at 20m intervals. Surveys were undertaken monthly between July and November 2022, in accordance with the Dormouse Conservation Handbook methodology[21]. Further surveys are to take place in spring 2023.

Several nest tubes were destroyed or went missing throughout the survey season but were replaced immediately. Despite this, the minimum score of 20 on the probability index[21] will be met once the 2023 surveys are completed.

See the interim ecological report[15] for further methodology details.

Badger Surveys

Full detailed badger surveys were undertaken within the site boundary on the 4th May 2022 and 5th October 2022. Surveys were conducted within and adjacent to the Site boundary to identify any signs or evidence of badgers. The survey methodology used was in accordance with the best practice survey guidance[22]. See the interim ecological report[15] for further methodology details.

[16] https://magic.defra.gov.uk/MagicMap.aspx
[17] https://jncc.gov.uk
[18] https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity
[19] https://www.openstreetmap.org
[20] https://lle.gov.wales/home
[21] Bright, P., Morris, P. & Mitchell-Jones, T. (2006). The Dormouse Conservation Handbook (second edition). English Nature, Peterborough.

[22] Harris, S., Cresswell, P. and Jefferies, D., (1989). Surveying Badgers. Mammal Society.

Bat Surveys

During the Phase 1 Habitat survey, on 17th March 2022, suitably experienced Arup ecologists assessed trees within the study area for potential roost features.

Aerial Inspection Survey

An aerial inspection survey was undertaken on 11th August 2022, on two mature oak trees *(Quercus robur)* that were identified by the PEA. The survey involved visual inspection of the tree for field signs of bat, with any Potential Roost Features (PRFs) being inspected using an endoscope. See the interim ecological report[15] for further methodology details.

Emergence / Re-entry Survey

Three surveys were conducted on each of the two mature oak trees between June and August 2022. Each survey involved visits at dawn or dusk to identify any bats emerging or re-entering the trees. All aspects of the tree were visible during survey. The species, activity, and time was recorded for any bats heard and/or seen during the survey. See the interim ecological report[15] for further methodology details.

Manual Bat Activity Transect Surveys

Surveys were undertaken monthly between June and October 2022. Each survey involved two ecologists waking a pre-determined route of the entire Site, designed to ensure coverage of all habitats throughout the Site. The species, activity, and time of any bats heard and / or seen during the survey was recorded. The surveyors were equipped with an Elekon Batlogger M or Echo Meter Touch Pro. Dusk surveys commenced at sunset and finished 2 hours after sunset. Dawn surveys commenced 2 hours before sunrise and finished at sunrise and / or when bat activity ceased[23]. One survey comprised a dusk and pre-dawn survey within a 24-hour period.

Automatic / static surveys were not considered suitable due to high usage by the public and cattle. The vegetation in the fields caused high levels of interference such that bat activity could not be adequately heard, thus two five-minute stopping points were conducted in each field. See the interim ecological report[15] for further methodology details.

Further bat activity transects will be conducted in April and May 2023.

Bat data analysis

Recordings of echolocation calls were analysed using Kaleidoscope Pro software. All records were checked to ensure automatic species identification was accurate. Each call was linked to a time and location by GPS tag. Due to difficulty in separating some species, the data were classified into species groups.

Otter and Water Vole Surveys

Otter and water vole (riparian mammals) surveys were carried out on 15th June and 14th November 2022 to identify any signs or evidence of otter or water vole along the Afon Lwyd and/or the stream south of the Site. An updated survey will be carried out in spring 2023 to compensate for the sub-optimal survey in November 2022.

A habitat suitability assessment was undertaken for each waterbody to assess their suitability to support otter and water vole, using criteria specific to each species. This involved a walkover along the riverbanks, including up to 200m upstream and downstream of the Site boundary. All field signs were recorded, and the survey extended as required.

The survey on the 14th November was undertaken after a period of heavy rain; however, this was not considered a significant limitation given there were many areas above the water line which could support field signs of otter and water vole.

See the interim ecological report[15] for further methodology details.

[23] Collins, J. (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.).* London: The Bat Conservation Trust.

Great Crested Newt Surveys

A GCN Habitat Suitability Assessment (HSI)[24] and Environmental DNA (eDNA) survey was undertaken on the pond at 280m south of the Site, on 16th June 2022. Twenty eDNA samples were collected from the pond, with the samples being collected from locations evenly spread around the waterbody edge. Samples were taken from both open water and vegetated areas if present and avoided water that was less than 10cm deep where possible. The weather had been suitable for the GCN surveys throughout the two-week period prior to the sample day (i.e., overnight temperatures generally above 5°C). See the interim ecological report[15] for further methodology details.

Reptile Surveys

Reptile surveys using visual inspection and artificial refuges (felt tiles) and following best practice guidelines[25]. Seven surveys were undertaken between June and September 2022 to assess reptile populations present. A total of 150 roofing felt refuges (1m x 50cm) were placed within suitable habitat on 15th June 2022. The refugia were left for two weeks before the first survey to allow them to 'bed in'. All surveys were undertaken in optimum or sub-optimum weather conditions.

Several artificial refugia were either destroyed or went missing, however the number of missing refugia were relatively small compared to the number deployed, and thus not considered a significant constraint.

See the interim ecological report[15] for further methodology details.

The United Kingdom experienced higher than average temperatures during the heatwave across the summer months of 2022. To compensate for these surveys, four further reptile surveys will be undertaken in April 2023 and May 2023.

Terrestrial INNS Surveys

An INNS survey was undertaken on 6th September 2022 the specialist company Knotweed Control. A walkover of the whole site was conducted, recording the locations of any INNS identified.

See the interim ecological report[15] for further methodology details.

Hedgerow Surveys

Field surveys were carried out following best practice guidance by DEFRA[26] on 23rd September 2022. The survey involved assessment of a 30m section of hedgerow, chosen objectively as per the survey guidelines[26]. Where access allowed, both sides of the hedgerow were surveyed and a standardised set of parameters was recorded for each. In several cases however, only one side of the hedgerow was able to be surveyed due to backing onto private land.

Further details are outlined in the interim ecological report[15].

Summary

The surveys undertaken and methodology used are summarised in Table 3.1.

[24] Amphibian and Reptile Groups of the UK (2010). ARG UK Advice Note 5, Great crested newt Habitat Suitability Index.

[25] Froglife (1999). Reptile Survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

[26] DEFRA. (2007). *Hedgerow Survey Handbook. A standard procedure for local surveys in the UK*. London.

Table 3.1. Dates of survey visits and methods employed during presence/absence and population assessment surveys.

Survey Type	Dates	Methods	Number of visits	Limitations
PEA	17th March 2022	Extended phase 1 habitat survey	1	PEAs can be undertaken at any time of the year but during subsequent site visits more botanical diversity became apparent. An updated phase 1 habitat survey will be carried out in spring 2023.
GCN	16th June 2022	HSI assessments and eDNA testing of waterbodies.	1	None identified.
Otter and Water Vole	15th June and 14th November 2022	Walkover of riverbanks including 200m upstream and downstream of the site boundary.	2	The survey on the 14th November was conducted after a period of heavy rainfall. Additional survey to be carried out in spring 2023.
Reptile	June – September 2022 Further surveys to be carried out in spring 2023	One hundred and thirty-three artificial refugia were placed within suitable habitat on the 15th June 2022. The refugia were left for two weeks before the first survey.	7	Several artificial refugia were destroyed or went missing. However, the number of missing refugia were relatively small so not considered a significant constraint. The summer of 2022 was exceptionally hot, therefore, four additional survey visits will be undertaken in spring 2023.
Badger	4th May 2022 and 5th October 2022	Walkover of the entire Site, recording the locations of any field signs.	2	Any evidence of badgers using the Site is only accurate at the time the surveys were undertaken.
Dormouse	Nest tubes deployed 24th June 2022. Surveys undertaken monthly between July and November 2022. Further surveys to be undertaken in spring 2023.	Ninety-eight nest tubes were attached to trees and shrubs in suitable dormouse habitat	5	Several nest tubes were destroyed or went missing but were replaced on the following survey visit.
Terrestrial INNS	6th September 2022	Walkover of the entire site, recording the locations of any INNS identified. Undertaken by Knotweed Control.	1	None identified.
Bat	17th March 2022	Ground level tree assessment	1	None identified.
	11th August 2022	Aerial inspection survey	1	Possible that bats could occupy the PRF before or after the survey.
	30th June 2022 6th July 2022 29th July 2022 11th August 2022	Emergence / re-entry survey	4	Possible that bats could occupy the PRF before or after the survey.
	16th June 2022 14th July 2022 11th August 2022	Manual Bat Activity Transect Surveys Recordings analysed using Kaleidoscope Pro software.	6	The site was not considered suitable for automated/static surveys. High levels of interference from vegetation.

Survey Type	Dates	Methods	Number of visits	Limitations
PEA	17th March 2022	Extended phase 1 habitat survey	1	PEAs can be undertaken at any time of the year but during subsequent site visits more botanical diversity became apparent. An updated phase 1 habitat survey will be carried out in spring 2023.
	1st September 2022 2nd September 2022 5th October 2022 Further surveys to be carried out in spring 2023			Difficulty separating some species through echolocation, so classified into species groups.
Hedgerow	23rd September 2022	Assessment of 30m sections of hedgerow, objectively chosen. A standardised set of parameters were recorded for each hedge section.	1	For several hedgerows, only one side could be assessed due to access limitations.

3.3 Assessment Methodology

The assessment of impacts from construction and operation has followed the methodology which is set out in the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland[27].

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.

3.3.1 Zone of Impact for Ecological Receptors

All plant and animal species, habitats and integrated plant and animal communities that occur within the 'zone of impact' of the proposed development are defined as potential 'ecological receptors'. The zone of impact for ecological receptors varies, depending on the nature and behaviour of the receptors, and the type of impact that may affect them. As a rule, in this report, the assessment of individual receptors is considered for the whole of the site plus the distances listed in Table 3.

Table 3.2. Maximum Zone of Impact from Scheme Boundary for Ecological Receptors.

Ecological Receptors	Maximum Zone of Impact from the site Boundary
Statutory designated European sites (including faunal species included as part of the designation), e.g. SAC.	5 km
Statutory designated European sites for which bats are a qualifying feature	10 km

[27] CIEEM. (2019). Guidelines For Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Available at: ECIA-Guidelines-Sept-2019.pdf (cieem.net)

Ecological Receptors	Maximum Zone of Impact from the site Boundary
Statutory Nationally designated sites (including faunal species included as part of the designation), including SSSIs and National Nature Reserves (NNRs)	2 km
Non-statutory designated sites - LNRs and SINCs	2 km
Records of protected and or notable species	Up to 2 km
Protected and notable species / habitats	Within/adjacent to the site
Non-native Invasive species	Within the site only

3.3.2 Valuing Ecological Receptors

The CIEEM guidelines recommend that the value of ecological receptors 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. South East Wales);
- County (i.e. Torfaen);
- Local (i.e. within circa 5km); and
- Less than Local (i.e. within the context of the proposed development and immediate vicinity).

3.3.3 Predicting and Characterising Ecological Inputs

In accordance with CIEEM guidelines, 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 receptor, e.g. a pollution event reducing the food source for a species such as otter or water vole.

3.3.4 Significance Criteria

In accordance with the CIEEM guidelines, a significant impact, in ecological terms, is defined as ‘an impact (whether negative or positive) on the integrity[28] of a defined site or ecosystem and/or the conservation

[28] Integrity is the coherence of ecological structure and function, across a site’s whole area that enables it to sustain a habitat, complex of habitats and/or the levels of populations of species.

status[29] of habitats or species within a given geographical area, including cumulative and in-combination impacts'. The integrity of a site is defined within TAN 5[30] as: *"…the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or the levels of populations of the species for which it was classified."*

It is important to note however that in accordance with the CIEEM guidelines, the actual determination of whether an impact is ecologically significant is made irrespective of the value of the receptor in question. In this respect the CIEEM methodology differs from some other approaches to EIA.

The value of a feature that will be significantly affected is used to determine the geographical scale at which the impact is significant, e.g. an ecologically significant impact on a feature of county importance will be considered to represent a significant impact at a county level. This in turn is used to determine the implications in terms of legislation, policy and /or development management.

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

Any significant impacts remaining after mitigation (the residual impacts), 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.

3.3.5 Mitigation and Enhancement

It is important as part of any environmental impact assessment, wherever possible, to clearly differentiate between mitigation 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; and

• Enhancement is used to refer to measures that would result in positive ecological impacts, but which do not relate to specific significant negative impacts or where measures are required to ensure legal compliance.

3.3.6 Ecosystem Resilience Assessment

A separate assessment of ecosystem resilience has been undertaken, which considers the existing ecosystem resilience of the Future Baseline and how likely this is to change as a result of the implementation of the scheme.

The assessment considers the key attributes of resilience; diversity, extent, condition, connectivity and adaptability, for each broad ecosystem type as set out in the Environment Wales Act; local planning policy and within Natural Resources Wales guidance[31] .

3.4 Limitations and Assumptions

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. Nevertheless, these surveys were conducted at the optimal survey periods and using methodologies which are widely accepted by NRW and other statutory bodies.

The results of the ecological survey allow evaluation of nature conservation value, assessment of the significance of potential impacts that may arise from the proposed development and consideration of

[29] Conservation status for habitats is determined by the sum of the influences acting on the habitat and its typical species that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area. Conservation status for species is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area.

[30] Welsh Government (2009) Technical Advice Note 5: Nature Conservation and Planning. Cardiff

[31] Natural Resources Wales (2016) The State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources. Technical Report. Chapter 4. Resilient Ecosystems.

appropriate mitigation measures. Every effort was made to ensure that the findings of the study present as accurate an interpretation as possible of the status of flora and fauna located within the planning boundary.

Species survey specific limitation are outline in Table 3.1 above.

4. Baseline Conditions

4.1 Statutory and Non-statutory Designated Sites

The search using highlighted one international designated site within 10 km of the Site (the River Usk / Afon Wysg Special Area of Conservation (SAC) and one nationally designated statutory site (Llandegfedd Reservoir SSSI) within 5 km. Details of these sites can be found in Table 4.

Table 4.1. Statutory designated sites for Nature Conservation.

Designated site	Site description	Distance and direction from Site
International Statutory sites		
Special Area of Conservation (SAC)		
River Usk / Afon Wysg SAC	The River Usk SAC 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 (*Petromyzon marinus*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*), twaite shad (*Alosa fallax*), Atlantic salmon (*Salmo salar*), bullhead (*Cottus gobio*) and otter (*Lutra lutra*), with allis shad (*Alosa alosa*) 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 Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation are also noted to be a qualifying feature of the site, though not a primary reason for its selection.	7.20km east
National Statutory sites		
Site of Special Scientific Interest (SSSI)		
Llandegfedd Reservoir SSSI	This reservoir is the largest inland open water habitat in the county and is one of the three regionally important overwintering wildfowl refuges in Wales, further noted for this in the LPD. The site is particularly important for the overall numbers and variety of wintering wildfowl, with large numbers of wigeon (*Mareca penelope*), pochard (*Aythya ferina*) and mallard (*Anas platyrhynchos*). Other notable species include goosander (*Mergus merganser*), teal (*Anas crecca*) and goldeneye (*Bucephala clangula*). The area around the reservoir includes grassland, important for feeding and roosting wildfowl, woodland and scrub.	1.4km east

A total of nine non-statutory designated sites (Wildlife Sites/ Sites of Importance for Nature Conservation (SINC)) were identified within 2 km of the Site, as detailed in Table 5.

Table 4.2. Non-statutory designated sites for Nature Conservation.

Non-statutory Designated sites	Site description	Distance and direction from Site
Wildlife Site / Sites of Importance for Nature Conservation (SINC; Adopted)		
Afon Lwyd River[32]	A core ecological network in the county, the Afon Lwyd flows from Blaenavon, through Pontypool, and eventually into the River Usk at Caerleon.	Immediately adjacent to the red line boundary to the west
Pont-y-felin Verge and ditch	The site comprises marshy grassland, neutral grassland and scrub. Quality is good and ditch system around old rechem site provides good connectivity for otters.	228m south
Butcher's Wood	An ancient woodland site retaining a few species from the SINC criteria in 1977.	282m southwest
Pont-y-felin rush pasture	The site comprises rush pasture, woodland with species-poor flora overall but richer along edges. It is adjacent to Afon Llwyd.	402m south
Butcher's Grassland	The site comprises neutral grassland and ancient woodland, considered over-grazed in quality (MG5).	455m west
Craig y felin Field	The site comprises a grazed meadow; species-rich neutral grassland / marshy Grassland.	540m south
Craig-y-felin Wood	The site comprises partially replanted ancient woodland.	670m south
Newhouse Farm	The site comprises semi-improved neutral grassland, relatively species rich but the sward dominated by grasses. Previous management was a hay cut.	805m east
Coed y Canddo	The site comprises ancient woodland.	820m north
A4042 bank meadow	Unimproved neutral grassland road verge with high invertebrate and botanical interest.	843m south

The Afon Lwyd is a tributary of the River Usk and as such a potential impact pathway exists through this hydrological connection. A Habitat Regulations Assessment (HRA) has been carried out as part of this application[33].

There is no hydrological connection between the site and Llandegfedd reservoir SSSI and works are unlikely to impact the SSSI and remainder of SINCs identified due to the distance from the site to these areas. As such, these sites are not further considered within this report.

There are 15 pockets of ancient semi-natural woodland within 1 km of the site, the closest of which is located 28m northwest of the site, along the banks of the Afon Lwyd. There are three further sites recorded

[32] The Afon Lwyd was not returned as a non-statutory designated site by the data search, however is considered as one in the Torfaen Local Plan, available at: https://www.torfaen.gov.uk/en/Related-Documents/Forward-Planning/Adopted-Torfaen-LDP-Writen-Statement.pdf

[33] Arup (2023). Pont-y-felin CSO. Habitats Regulations Assessment.

as “Ancient woodland site of unknown category”, and an additional three sites recorded as “Plantation on Ancient Woodland site”.

One standing waterbody was noted within 500m of the Site, located at Coed y Felin approximately 280m south of the Site.

Locations of the internationally and nationally designated sites for nature conservation identified during the desk study are displayed in Figure 1.

4.2 Extended Phase 1 Habitat Survey

The data search returned records of 11 different protected or notable mammal species, 16 protected bird species, one amphibian species, and numerous invertebrate species within 2 km of the site for the last 10 years. This included:

- Lesser Horseshoe Bat (*Rhinolophus hipposideros*): regionally important species in the LNP.
- Otter (*Lutra lutra*): regionally important species in the LNP.
- Dingy skipper (*Erynnis tages*), and moths, brindled beauty (*Lycia hirtaria*), and small phoenix *(Ecliptopera silaceata*): invertebrates listed under section 7 of the Environment Act Wales (2016).

The field survey in 2022 identified a total of 7 JNCC Phase 1 Habitat types within the Site. The habitats are summarized below, for further details of the habitats refer to the PEA[14], along with the target notes and photographs.

The site is predominantly comprised of a field of poor semi-improved grassland, which is grazed and managed for amenity use. The even sward field is dominated by grasses including creeping bent (*Agrostis stolonifera*), perennial rye grass (*Lolium perenne*) and Yorkshire fog (*Holcus lanatus*). The margins and damp pockets of the field display more diversity, with species including hemlock (*Conium maculatum*), nettle (*Urtica dioica*), and bittercress (*Cardamine* sp.). A muck heap with limited vegetation was identified in the southwest corner of this field. The field is bordered by dense scrub to the northwest of the site, which is dominated by bramble (*Rubus* sp.), buddleia (*Buddleja*), rose (*Rosa* sp.), great willowherb (*Epilobium hirsutum*), and occasional myrtle *(Myrtus* sp.*)*. The Northern boundary of the Site is bordered by a species-rich hedge, comprised of holly (*Ilex* sp.), sycamore (*Acer pseudoplatanus)*, oak (*Quercus* sp.), alder (*Alnus glutinosa*), ash (*Fraxinus excelsior*), hazel *(Corylus avellana)*, hawthorn (*Crataegus monogyna*), dog rose (*Rosa canina*), bramble, ivy (*Hedera helix*) and willow (*Salix* sp.).

A tributary of the Afon Lwyd was identified running westward along the south of the site, approximately 1.5m wide, with banks comprised of broadleaved woodland and a mature tree hedgerow. The Semi-natural broadleaved woodland surrounding the Eastern extent of the stream includes willow, oak, alder, hazel, ash, elder, and cherry. The understorey is dominated by bramble, hemlock, lesser celandine (*Ficaria verna)*, cleavers *(Galium aparine)*, nettle and occasional hart’s tongue fern *(Asplenium scolopendrium)* and scarlet elf cup fungi *(Sarcoscypha austriaca)*. The hedgerow consists of alder, ash, oak, elder *(Sambucus nigra)*, cherry (*Prunus avium)*, willow, silver birch *(Betula pendula)*, holly with bramble and bird’s foot trefoil *(Lotus corniculatus)*.

The Afon Lwyd runs adjacent to the red line boundary to the west of the site. A semi-natural broadleaved woodland borders the river to the north, comprising mature oak, horse chestnut *(Aesculus hippocastanum)*, sycamore, hazel, holly, alder and hawthorn. Ground flora in this woodland includes lesser celandine, lords and ladies *(Arum maculatum)*, ivy, hart’s tongue fern, dog’s mercury *(Mercurialis perennis)* and wild garlic *(Allium ursinum)*. A stand of variegated dwarf bamboo *(Pleioblastus variegatus)*, roughly 10mx10m, was also present. Dense scrub and broadleaved parkland with scattered trees border the remainder of the river, with a section of this being dominated by buddleia and a stand of Japanese knotweed *(Reynoutria japonica)*. The scattered trees are comprised of mature oak, willow, birch (*Betula* sp.), and a small stand of semi-mature blackthorn trees (*Prunus spinosa*).

An access road to the southwest of the Site comprise the only area of hard standing.

Japanese knotweed and three-cornered garlic *(Allium triquetrum)*, both Schedule 9 invasive non-native species, were identified on Site during the PEA, the former within the broadleaved parkland to the west of the site, bordering the Afon Lwyd, and present as saplings in grassland to the southeast. Three cornered

garlic was recorded in broadleaved woodland in the south-eastern extent of the site. The location of these species can be seen in Figure 3 of the PEA report[14].

4.3 Dormouse

The data search returned no records of hazel dormouse *(Muscardinus avellanarius)* for the past ten years within 2 km of the site[34], and no evidence was recorded on site during the phase 1 habitat survey. The nest tube surveys in 2022 recorded no dormice, however the results of the 2023 surveys are required to confirm likely absence. The habitats present within the site were assessed as suitable dormouse habitat, given the foraging opportunities and suitable nest-building habitat in the diversity of hedgerows, woodland and scrub. Whilst the areas of suitable habitat within the site are degraded by human activities and cattle/horse grazing, they are also not considered large enough to support a population of dormouse alone. However, the site is connected to larger areas of suitable in the wider landscape which may enable dispersal to other suitable habitat patches in the surrounding area, such as the ancient woodland to the west and north of the Site.

4.4 Bat

Ninety-nine records of 7 species were returned by the data search over the last 10 years, within 2 km of the Site, including soprano pipistrelle *(Pipistrellus pygmaeus)*, Common pipistrelle *(Pipistrellus pipistrellus)*, lesser horseshoe *(Rhinolophus hipposideros)*, serotine *(Eptesicus serotinus)*, noctule *(Nyctalus noctule)*, brown long-eared bat *(Plecotus auratus*) and Daubenton's bat *(Myotis daubentonii)*.

The 2022 Phase 1 Habitat survey identified one mature oak tree (T2[35]) with high bat roost potential, and several trees with features of moderate roosting potential (T1[36]). In addition, suitable foraging and commuting habitat was identified within and adjacent to the Site boundary, including scrub, woodland, mature trees, and hedgerows.

Aerial inspection surveys in 2022 confirmed the suitability of these trees, with one PRF being identified on T1 and seven PRF on T2. No field signs of bats were observed at either tree during the survey.

Emergence / re-entry surveys observed two common pipistrelle bats appearing to emerge from the southern aspect of the tree T1 on 30th June 2022. Whilst the exact location of the cavity was not confirmed, it is considered likely they were using a cavity within the horizontal branch, on the southwest aspect of the tree, identified as a PRF during the aerial inspection survey. On the 29th July 2022, one common pipistrelle was observed flying towards the western aspect of the T1, and on a separate occasion one common pipistrelle was seen circling the south-eastern and eastern aspect of T1. However, whether any bats entered the tree is unconfirmed.

A pipistrelle bat of unknown species was seen returning to T2 on 29th July 2022. It was observed entering a large trunk cavity on the north-eastern aspect of the tree, the opening of which was approximately 30cm x 10cm. The feature extended 20cm up the trunk beyond the top of the opening.

Both T1 and T2 are as such considered confirmed roosts.

Six bat species were recorded during the manual bat activity transect, including common pipistrelle, soprano pipistrelle, noctule, lesser horseshoe, brown long-eared and myotis (unconfirmed species). Two hotspots were identified including T1 and the intersection of H4, H5, H7 (Figure 13 of interim ecology report[15]). This is considered to indicate that hedgerows within the Site are important foraging and commuting corridors for all bat species on Site.

The manual bat activity transect surveys recorded a total of 577 bat passes, most of which were common pipistrelle (405 passes) and soprano pipistrelle (137 passes). Both these species were widespread throughout the Site. Seventeen passes of noctule were recorded, with several being located at the H4, H5, H7 (Figure 13 of interim ecology report[15]) intersect, in addition to in the open playing field north of the Site boundary.

[34] Aderyn. (2022, November 17). *LERC Wales' Biodiversity Information & Reporting Database*. Retrieved from https://aderyn.lercwales.org.uk/search/6997005/map?key=q6BWR1aPJyTwq1My

[35] Referenced as TN2 in the PEA report.

[36] Referenced as TN1 in the PEA report.

Eleven myotis species passes were recorded, with a hotspot located in the southwest corner of the Site, adjacent to the Afon Lwyd and woodland habitat. Six lesser horseshoe passes were recorded at four locations throughout the site. A singular pass of brown long-eared bat was recorded.

4.5 Otter and Water Vole

The data search returned nine records of otter over the last 10 years, within 2 km of the proposed red line boundary. Evidence of otter (spraints and potential resting site) was recorded on site during the 2022 Phase 1 Habitat survey. In addition, watercourses associated with the Site, and adjacent woodland, were considered to provide suitable resting places or otter holts within the PEA. Good food availability and connectivity further contribute to the high suitability for foraging and commuting otter.

Two otter spraints were recorded during the otter survey on the 15th June 2022, both on the western bank of the river. Habitat to the south of the Afon Lwyd was considered suitable to support resting otters, consisting of rock armour at the bend in the river. One of the spraints was located on this rock armour. No field signs were identified during the survey undertaken on 14th November 2022.

No recent records of water vole were returned by the data search; however, two historical records from 2000 were noted within 1 km of the Site. No field signs were recorded during the Phase 1 Habitat survey, and both watercourses on/adjacent to the Site were considered to have low suitability to support the species. In addition, no water vole field signs were recorded in species-specific surveys conducted in 2022, and water vole are therefore considered likely absent from the Site.

4.6 Badger

The data search returned four records of badger over the last 10 years, the most recent being in 2018, within 2 km of the Site. No evidence of badger was recorded on site during the 2022 phase 1 habitat survey; however, the habitats present were considered potentially suitable to support foraging badger and sett creation, in particular the broadleaved woodland.

No badger evidence was identified during the badger surveys conducted in 2022.

4.7 Other mammals

The data search returned hedgehog (*Erinaceus europaeus)* and polecat *(Mustela putorius)*, most recently recorded in 2021 and 2016, respectively. The only field sign of other mammals recorded during the 2022 Phase 1 Habitat survey was footprints recorded alongside the streaming to the south of the Site, likely from a mustelid species. The mosaic of habitats present on Site were considered likely to support other mammals, including hedgehogs and small mustelids.

4.8 Breeding Birds

The data search returned 134 records of birds listed under Schedule 1 of the WCA[37], of 16 species. Of these, 15 species listed under Section 7 of the Environment (Wales) Act 2016 and either the red or amber list within the RSPB's Book of Conservation Concern Wales (BoCCW) 2018.

During the 2022 Phase 1 Habitat survey, the following bird species were recorded on site: chiffchaff *(Phylloscopus collybita)*, grey wagtail *(Motacilla cinerea)*, sparrowhawk *(Accipiter nisus)*, robin *(Erithacus rubecula)*, blackbird *(Turdus merula)*, blue tit *(Cyanistes caeruleus)*, wren *(Troglodytes troglodytes)*, goldcrest *(Regulus regulus)*, woodpigeon *(Columba palumbus)*, great tit *(Parus major)* and lesser black-backed gull *(Larus fuscus)*. Additional breeding bird surveys were deemed unnecessary as the proposed designs will to avoid impacts to breeding bird habitats.

[37] Birds listed under Schedule 1 are afforded further protection from disturbance at or near an active nest during the breeding season. All returned records of birds listed under this schedule within 2km of the site over the last ten years have been included within Table 6, however, it should be noted that may of the species returned (e.g. redwing, scoter, fieldfare) are unlikely to be present during the breeding season as the site is located outside of their usual breeding range.

4.9 Amphibians

Only two records were returned from the data search of common frogs *Rana temporaria*, in 2017, in a suburban garden.

The mosaic of terrestrial habitats was considered to hold potential for GCN, palmate or smooth newt, and common frogs and toads. One standing waterbody was located within 500m of the site. This was located 280m south of the site and was considered to provide suitable conditions for breeding of amphibian species. The eDNA sample taken from the waterbody 280m south of the Site in 2022 returned no indication of the presence of GCN, and as such GCN are considered likely absent from the Site.

4.10 Reptiles

No reptile records were returned in the data search. The PEA[38] identified areas of the Site that were suitable to support reptile populations, namely the woodland and river edges, scrub and hedgerows on site. No reptiles were recorded in surveys conducted in 2022. Two further surveys are planned for April and May 2023.

4.11 Invertebrates (Aquatic and Terrestrial)

The data search returned numerous records of invertebrate species, including three Section 7 species (listed in section 4.2). The presence of the notable species golden ringed dragonfly (*Cordulegaster boltonii*) and glow worms (*Lampyris noctiluca*)[39] is noted by Aderyn and the LDP. In addition, the Environment (Wales) Act 2016 Section 7 Priority Species brown banded carder bee[40], has been noted to be present in wider area, as per the Greater Gwent State of Nature report[41] and the APEM interim report[15] highlighted the presence of brown-banded carder bee (*Bombus humilis*) within the site boundary. A 2019 Strom Overflow Assessment Framework (SOAF) assessment of the Afon Llwyd recorded a total of 62 aquatic invertebrate species, including flatworms, leechs, snails, pea mussel, freshwater shrimp (*Gammarus pulex*), a number of stoneflies, mayflies and caddisflies, various midges and other flies, diving beetles and riffle beetles. The assemblage included species that are sensitive to organic pollution.

The mosaic of habitats on site are considered suitable to support a wide range of notable terrestrial and aquatic invertebrates, with good connectivity to the wider landscape. White-clawed crayfish *(Austropotamobius pallipes)* may be present within watercourses on and adjacent to the site with noted fast-water flows, suitable gravel substrates and historical presence in the Afon Llwyd. However, they were not recorded during the SOAF assessment in 2019. Phase 2 surveys for white-clawed crayfish were scoped out, given that the proposed scheme will not directly impact white-clawed crayfish habitat.

4.12 Fish

No records of fish were returned by the data search within the defined criteria. The Afon Lwyd adjacent to the Site was considered suitable for a range of common and notable fish species, both migratory, including eel (*Anguilla anguilla*), and resident fish species, including brown trout (*Salmo trutta*).

No Phase 2 fish surveys were undertaken, given that the purpose of the proposed scheme aims to reduce impacts to the river.

[38] Arup. (2022). Pont-y-felin CSO. Preliminary Ecological Appraisal.

[39] Adopted-Torfaen-LDP-Writen-Statement.pdf (accessed 26/05/22).

[40] Section 7 Priority species (pdf) (accessed 26/05/22).

[41] Jones S M, Karran A, Bosanquet S, Barter G, Garrett H and Hancocks. 2021. Greater Gwent State of Nature. Produced by the Resilient Greater Gwent Partnership. The exact locations of these records are not provided but represented as grid squares and it is therefore possible that records fall within 2km of the site boundary.

4.13 Notable flora and fungi

No European protected plant species were recorded within 2km of the site boundary. There are eight records of bluebell (*Hyacinthoides non-scripta*), a nationally protected species under schedule 8 of the WCA recorded within 2 km of the site boundary.

No notable vascular plant species were recorded on site during the 2022 Phase 1 Habitat survey; however, it is noted that the survey was undertaken outside the optimal time of year for botanical surveys and a full vegetative survey was not undertaken. The species rich hedgerows, woodlands and surrounding habitats may support notable species of flora.

The hedgerow survey carried out identified all three hedgerows as 'important' under the Hedgerow Regulations 1997, see Figure 13 of the interim ecological report[15].

4.14 Invasive Non-Native Species

Eleven INNS records were returned within the search criteria, with the closest record being of Japanese knotweed approximately 100m southeast of the Site. The PEA reported several species of INNS, including extensive Japanese knotweed, three-cornered garlic, and one potential montbretia (*Crocosmia* spp.) species.

The dedicated INNS survey undertaken in 2022 identified two INNS within the Site boundary, with the species outlined below:

- Japanese knotweed (Schedule 9);
- Cotoneaster (*Cotoneaster horizontalis*) (Schedule 9);

Several patches of Japanese knotweed were identified in the southwestern section of the Site, which appeared to have been treated. The only patch that appeared untreated was identified within the woodland in the southeast corner of the Site. Small and isolated patches of cotoneaster were identified within the northern boundary hedgerow.

Additionally, one INNS was recorded outside of the Site boundary, Himalayan balsam (*Impatiens glandulifera*), running parallel to the western side of the Afon Lwyd.

5. Evaluation of Ecological Features

This section initially evaluates the nature conservation importance of the habitats and species present within the site and surrounding area in terms of their importance in an international, national, regional, county, local and less than local context as per the geographic scale identified in Section 3.3.2.

Table 5 evaluates all the ecological resources present or potentially present within the site and surrounding area. Those receptors with less than local value are not further assessed within the context of EcIAs unless there are related legal compliances and/or positive outcomes and enhancements to be assessed.

Table 5.1. Evaluation of Ecological Features.

Ecological Feature	Value	Evaluation
European Protected Sites		
River Usk / Afon Wysg SAC	International	European Sites are designated at an international level and are therefore of international value.
Nationally Protected sites		
Llandegfedd Reservoir SSSI	National	SSSIs are designated at a national level and are therefore of national value.

Ecological Feature	Value	Evaluation
Local Sites		
10 SINCs (see 4.2 for details)	County	SINCs are designated for their presence of habitats or species of local or regional importance by local authorities and are therefore of county value.
Habitats		
Semi-natural broadleaved woodland	County	Importance referred to in the Greater Gwent State of Nature Report. This habitat is associated with notable species including dormice, bat species, and breeding birds.
Running water	County	Potential to support notable migratory species of fish, in addition to otter.
Species rich hedge with trees	County	Potential to support notable species of flora, in addition to reptile populations, nesting birds, bats, and small mammals.
Poor semi-improved grassland and other habitat (including gravel and hard standing)	Less than Local	These habitats are considered to have a low nature conservation value.
Invasive Non-Native Species (plants)	Not of value	These habitats are not of value but are assessed below due to their legislation and because they are identified as a key risk to Gwent's ecosystems by the Southeast Wales area statement[42].
Species		
Dormouse	Less than local	No dormice were identified in 2022.N.B. surveys will continue in May and June 2023.
Bats	Local	Two pipistrelle roosts were found within the Site. Given these species are common and widespread, they are considered to be of local value.
Otter and Water vole	Local	Evidence of otter was found within the site. Suitable resting places, food availability, and connectivity were also identified. No evidence of water vole was recorded, and the watercourses were considered to be of low suitability.
Badger	Less than local	No evidence of badger was found. However, habitats present were considered potentially suitable to support foraging badger and sett creation.
Other mammals	Less than local	No signs found within the site, but suitable habitat for mammals including hedgehog and other species of mustelids were identified on site.
Breeding birds	Local	A small number of amber listed species of breeding bird were recorded on site.

[42] Natural Resources Wales / South East Wales Area Statement (Accessed 03/05/22).

Ecological Feature	Value	Evaluation
Amphibians	Less than Local	Common frog were recorded in habitats surrounding the site.
Reptiles	Less than Local	No reptiles were recorded within the Site, from neither historical records or recent surveys. Areas on and surrounding the site were considered suitable to support reptile populations.
Terrestrial Invertebrates	National and Local	Brown banded carder bee, a Section 7 species of national importance, is known to be present in the wider Gwent area[43]. There are additionally historical records of the following Schedule 7 species: dingy skipper, moths brindled beauty, and small phoenix. All other terrestrial invertebrates were relatively widespread and considered to be of local value.
Aquatic Invertebrates	Local	No aquatic species were recorded onsite. Areas of habitat on site were however considered suitable for white clawed crayfish, with historical presence noted.
Fish	National	The adjacent Afon Lwyd is suitable for a range of the Annex II species including sea lamprey that are a designated feature of the River Usk/ Afon Wysg SAC. The Afon Lwyd is a tributary of the River Usk/Afon Wysg.

6. Potential Impacts

The potential impacts to habitats and species may be both permanent and temporary, and direct and indirect. The direct effects are of habitat loss and severance, species mortality through vehicle collisions, habitat damage from changes in air quality, surface run-off and pollution events.

Direct and permanent impacts to habitats and species, and ecosystem resilience, have been avoided and minimised through the embedded biodiversity design, as well as the assumed construction practices as described in Section 7 and 8 below. This section here summarised the potential impacts through construction and operation of the proposed development.

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 through vegetation clearance;
- Temporary habitat disturbance and/or degradation including pollution;
- Temporary and/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 excavations during construction.

[43] Jones S M, Karran A, Bosanquet S, Barter G, Garrett H and Hancocks L. 2021. Greater Gwent State of Nature. Produced by the Resilient Greater Gwent Partnership.

Indirect effects are on 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 Impacts

Potential ecological impacts of the works during the operational phase may be direct or indirect and may be categorised as follows:

- Habitat degradation through the air pollution and water pollution.
- Habitat disturbance through increased use of the site and immediate surrounds;
- Species disturbance through increased light and noise pollution;
- Species mortalities and injuries through collision with vehicle traffic.

7. Assumed Construction Practices and Licence Requirements

This section describes some 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. These will be described in detail in the Construction Environmental Management Plan (CEMP), which will be provided at a later date under an anticipated planning condition, and the adoption and implementation of these measures and best practice construction techniques will be secured through the submission of schemes to discharge appropriate planning conditions.

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 (bats). 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 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 badgers, bats, otters and water voles), an Ecological Clerk of Works (ECoW) to, for example, 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 experienced ecologist to all site personnel to inform them of ecological features at the site including INNS, 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 left at the site office.

If any protected species or signs of protected species such as a badger sett, 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.

7.1 Habitats and Plants

There is a risk that construction activities may inadvertently lead to dust, pollution events, or sediment run-off resulting in damage to those habitats (including designated sites and watercourses) that are within relatively close proximity and / or are hydrologically connected to the construction footprint. These risks will be avoided or reduced through following standard best-practice techniques and methods which will be detailed within the CEMP and are summarised below.

All works will be undertaken in accordance with a CEMP. The CEMP will include site-specific methods to ensure that all site activities in proximity to watercourses and waterbodies are controlled and are in accordance with relevant legislation and undertaken in compliance with the relevant Guidance for Pollution Prevention (e.g. GPP5[44],) and industry best practice (CIRIA[45], CIRIA C741[46]). Additional measures such as silt fencing, silt busters or bales may be necessary to prevent silt or contaminants from being released into connecting watercourses.

The watercourse on the southern boundary of the site, a tributary of the Afon Lwyd, will be directly impacted by the proposed development. A culvert crossing will be temporarily installed, during construction works only, in accordance with the relevant Guidance for Pollution Prevention (e.g. GPP5[47],) and industry best practice (CIRIA[48], CIRIA C741[49]). The culvert will be removed and the watercourse reinstated. All other development and/or construction activities are over 7m from the Afon Lwyd. The outflow of the CSO will utilise the existing headwall on the Afon Lwyd.

Retained hedgerows, scrub and trees may also be at risk of root damage. These risks will be avoided or reduced through the implementation of the Arboricultural Method Statement (AMS) and Tree Protection Plan (TPP) in line with the British Standard BS5837:2012 as outlined within the Arboricultural Impact Assessment[50]. All trees that require removal for safety reasons[50] will undergo appropriate ecological assessment.

Schedule 9 INNS, Japanese knotweed, three cornered garlic, cotoneaster and potential montbretia, were recorded within the site. Under the Environmental Protection Act 1990, Schedule 9 INNS are considered controlled waste and therefore have to be disposed of safely at a licensed landfill if they need to be removed during construction. A specialist INNS Management Plan should be developed as part of the detailed CEMP for the treatment and/or avoidance of these species. All equipment and footwear will be cleaned thoroughly before entering the site with a suitable disinfectant. In addition, all equipment and footwear will be thoroughly cleaned and disinfected when leaving site, particularly in areas where INNS have been located.

Access to the working areas will be via designated tracks only. This will require the removal of 8m of the hedgerows on the southern boundary of the site. The construction access will be created using the methods outlined within the Arboricultural Impact Assessment[51], to reduce impacts to the root protection areas of adjacent retained trees. Storage of materials will be at pre-agreed locations, on existing hardstanding and/or low value grassland areas within the site (which will be enhanced post construction, as described in Section 8 below).

7.2 Fauna and Protected Species

7.2.1 Dormice

At present, no dormice have been identified on site through surveys. However, should the 2023 update surveys record dormice on site, an EPS development licence will need to be obtained from NRW to clear any suitable dormouse habitat. Under this scenario, details of the mitigation methods to be implemented will be

[44] 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

[45] CIRIA (2018) CIRIA http://www.ciria.org

[46] CIRIA C741 'Environmental Good Practice on Site'; Fourth Edition (2015).

[47] 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

[48] CIRIA (2018) CIRIA http://www.ciria.org

[49] CIRIA C741 'Environmental Good Practice on Site'; Fourth Edition (2015).

[50] Treescene (2023). Arboricultural Impact Assessment, Pont-y-felin Lane, New Inn, Pontypool. Treescene Limited, Cardiff.

[51] Treescene (2023). Arboricultural Impact Assessment, Pont-y-felin Lane, New Inn, Pontypool. Treescene Limited, Cardiff.

determined in consultation with NRW. Further mitigation may be required, such as timing of vegetation clearance, restrictions of the amount of vegetation clearance, and/or the need for two-stage clearance.

7.2.2 Bats

Neither of the trees containing bat roosts will be removed. One of these trees is outside the site boundary. The other will be protected from construction as per the Tree Protection Plan within the Arboricultural Impact Assessment[50].

Trees where the potential for roosting bats cannot be ruled out after a pre-construction survey (aerial or dusk/dawn survey) will be soft felled, methodologies will be full detailed within the CEMP. Disturbance licences may also be required for any building or tree roosts within 100 metres of construction, depending on the type of roost, environmental factors and type of construction activity within the area.

No key commuting and/or foraging routes will be significantly impacted, so no dead hedging is considered necessary during construction. Temporary construction lighting required within bat activity periods will be directional lighting (towards ground) and designed to ensure there is no light spill onto any identified roost or commuting and foraging areas. This will be secured through the planning application. This will also apply for dormouse habitat (as described above, should they be present) and the watercourse of the southern boundary (as described below for potential use by otter and water vole).

7.2.3 Otter and Water Vole

Suitable otter resting places were recorded adjacent to the site, with field signs of otter also present. No water vole resting places were recorded within or adjacent to the site. Pre-construction surveys will be conducted to establish whether there are any changes to this current baseline which may result in the need for an EPS development licence for otter and a Conservation licence for water vole obtained from NRW.

Night-time works could disturb resting, foraging or commuting otters within approximately 100m of the proposed development, and all day and night works could disturb resting and breeding up to 200m . Details on work timings to reduce disturbance to otters will depend on the pre-construction results and any associated development licence requirements; any restrictions will be within the final detailed CEMP.

Any open excavations during construction should be covered at night or a means for escape such as ramps provided to reduce the risk of trapping or injuring otters and water vole (as well as other mammals badger should they venture into the site) and a buffer zone should be maintained around field ditches at night to avoid unnecessary adverse impacts to otter, details of which would be incorporated into the CEMP.

7.2.4 Breeding Birds

Vegetation clearance within the breeding bird season (March-August inclusive) should be avoided to prevent damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require an inspection for breeding birds and their occupied nests by a suitably experienced ecologist no more than 24 hours prior to any works commencing. If nesting birds are found during the pre-construction checks, a buffer around the nest will be implemented of at least 5 metres as agreed with the ecologist and further work within the immediate and surrounding area will be delayed until young have fledged and left the nest, and the nest is no longer in use.

7.2.5 Amphibians and Reptiles

Clearance of vegetation suitable for reptiles and amphibians (long grass, hedges and scrub) will be undertaken in two-stages, strimming towards retained habitat. Where possible, ground clearance works (including removal of tree roots) will avoided or be kept to a minimum during the reptile hibernation period (November to February), where possible. If required during this time, clearance will also be overseen by a suitably experienced ecologist.

7.2.6 Terrestrial Invertebrates

Measures should be undertaken to protect sensitive features, including ancient woodland, and pollution prevention enacted. Vegetation cutting should be timed to allow wildflowers to set seed, and taller vegetation should be retained over the winter months.

The Section 7 bee species, brown-banded carder bee, has been recorded within the site boundary. Therefore, the semi-improved grassland habitat will be cut in two stages. The first cut should be to 150mm during winter, with clearance of topsoil to be undertaken from mid-May when the bees are active.

7.2.7 Fish and Aquatic Invertebrates

Current design plans will not impact the Afon Lwyd. However, the watercourse on the southern boundary of the site will be crossed to create the construction access route. Any equipment entering the watercourse will be thoroughly washed beforehand to prevent any pollutants entering the watercourse. Strict pollution prevention measures should be detailed within the contractor's risk assessment method statement document (RAMS).

Should de-watering of either watercourse be required, a fish rescue will be undertaken, and pumping equipment be fitted with permeable mesh.

8. Embedded Biodiversity Design

Where possible, the proposed development has been designed to avoid or reduce the magnitude of the potential impacts and risks. These ecologically driven designs are embedded into the proposed development and have therefore been taken account of during the assessment. The embedded designs to avoid or reduce such operational impacts to the ecological resource of the site are described in the subsequent sections.

The potential impacts identified during the construction and operation of the proposed development were habitat loss, degradation and severance, and species mortality and species disturbance, described in Section 6 above.

For the purposes of this EcIA, the embedded designs comprise the following: reedbed filtration space, wetland meadow and aquatic planting, footpaths and boardwalks, access track for maintenance vehicles and parking area, amenity space and educational areas, CSO compound, and all of the ecological habitat creation proposed within the General Arrangement (see Drawing B16789-102503-01-XX-DR-LA-PN0203 submitted with the planning application). They are summarised in Table 8.1 below.

Table 8.1. Embedded biodiversity design habitat creation summary.

Landscape masterplan reference	Description of proposed habitat*	Area/No. of created habitat	Habitat creation by Phase 1 code	Total area created by Phase 1 code
Species-rich grassland seeding	The 100% wildflower mix proposed comprises re-seeded the existing poor semi-improved grasslands and semi-improved neutral grasslands, with species selected to create foraging habitat for brown-banded carder bee. Species will include kidney vetch (*Anthyllis vulneraria*), red clover (*Trifolium pratense*), betony (*Stachys officinalis*), bird's-foot trefoil (*Lotus corniculatus*), knapweed (*Centaurea nigra*) and wild thyme (*Thymus polytrichus*).	4,586m^2	Under proposed creation and management regimes it is anticipated that this habitat will tend to **B2.2 good-quality neutral semi-improved grassland.**	13,107m^2
Wetland meadow (includes aquatic planting)	The mix proposed comprises a planting mix for wetlands area of the NBS for the CSO. The planting mix has therefore been specified as 40% grass species and 60% wildflower species to provide further habitat for brown-banded carder bee including yellow flag iris (*Iris pseudacorus*),	8,521m^2		

Landscape masterplan reference	Description of proposed habitat*	Area/No. of created habitat	Habitat creation by Phase 1 code	Total area created by Phase 1 code
	purple loosestrife (*Lythrum salicaria*) and water mint (*Mentha aquatica*).			
Reedbed filtration spaces	Reedbed filtration spaces of the CSO will be dominated by common reed (*Phragmites australis*).	2,586m^2	Under proposed creation and management regimes it is anticipated that this habitat will tend to **F1 swamp.**	2,586m^2
Buffer planting to reedbed	Mix comprising a range of native woody-scrub species. Species will include hazel, holly, hawthorn, dog rose, willow, elder and blackthorn.	1,694m^2	Under proposed creation and management regimes it is anticipated that this habitat will tend to **A2.1 Dense/continuous scrub.**	1,694m^2
Broadleaved woodland tree planting	Mix comprising a range of native woody-scrub and tree species, tolerant of wet and drier ground conditions. Species will include pedunculate oak, alder, elder and silver birch.	49no.	Under proposed creation and management regimes it is anticipated that these habitats will resemble **A.3.1 Broadleaved scattered trees**	49no.

* planting schedule to be confirmed at full planning stage

Table 8.2 compares the loss of habitat as a result of the proposed development against the habitats to be created during construction and developed through operational phases through management and monitoring (as detailed within Section 12 below). This table indicates the approximate ratio of net gains and net losses where appropriate. Whilst there will be a loss of some habitats, the habitats being created will be of higher quality than those being lost, in terms of species-richness and diversity, connectivity and condition once they reach maturity. For the purposes of these calculations habitat which will be enhanced has initially been considered as lost as part of the proposed development, in part due to the likely construction impacts on these habitats.

Net losses are described in relevant sections below but include those of hardstanding, intensively grazed poor condition semi-improved grassland.

Table 8.2. Net habitat changes as a result of the proposed development.

Baseline habitats		Development impacts		Habitat creation	
Habitat Type (Including phase 1 code)	**Habitat amount within planning boundary (m^2)**	**Amount of habitat to be retained**	**Amount of habitat to be lost**	**Amount of habitat to be created**	**Net habitat change (and approximate created: lost ratio)**
Semi-natural broadleaved woodland (A1.1.1)	1984	1,984	0	0	No net change
Broadleaved parkland/ scattered trees (A3.1)	1,595	1,595	19no.	49no.	Increase of 30 trees **Ratio 2.6:1**
Dense scrub (A2.1)	1,070	1,070	0	1,694	Increase of 1,694m^2 Ratio not applicable
Poor semi-improved grassland (B6)	24,199	3,369	20,830	0	Loss of 20,830m^2 Replaced by higher quality habitat, see below

Baseline habitats		Development impacts		Habitat creation	
Moderate-quality neutral semi-improved grassland (B2.2)	0	n/a	n/a	13,107	Increase of 13,107m^2 Ratio not applicable
Swamp (F1)	0	n/a	n/a	2,586	Increase of 2,586m^2 Ratio not applicable
Running water (G2)	293	293	0	0	No net change Ratio not applicable
Gravel and hard standing (J5)	241	0	241	3,684	Increase of 3,443m^2 of hard standing **Ratio 15.3:1**

8.1 Habitats and Plants

8.1.1 Woodland, Scrub and Trees

The majority of the woodland, scrub, and trees have been retained. However, one mature oak tree will be removed for the proposed development. This loss is unavoidable due to the tree's location with the proposed reedbed filtration space which cannot be relocated due to the topographical character of the site.

A total of 18 individual trees will require removal for arboricultural reasons. The majority of these trees are ash and are suffering from ash dieback disease, their removal is necessary to prevent the further establishment and spread of disease and would be necessary irrespective of the proposed works. Embedded compensatory planting and habitat enhancement has been designed to provide a total of 49 trees, including broadleaved tree planting (oak, field maple and hazel) in the north of the site, adjacent to the wetland meadow, and southeast of the site, adjacent to the reedbed filtration space. In addition, wet woodland trees (willow and alder) will be planted along the southern border of the site.

Buffer planting of 1,694m^2 of scrub will be planted on the western and southern edges of the reedbed and wetland meadow areas.

8.1.2 Species-poor hedgerow with trees

The existing hedgerows will be retained and protected, except for 8m of the hedgerows either side of the watercourse on the southern boundary of the site. These 8m section will be removed to create the construction access for the site and will be replaced like-for-like with mature trees following completion of the proposed development.

8.1.3 Grassland

Where possible, grassland has been retained and enhanced for biodiversity. However, given the nature and scale of the works the majority of the poor semi-improved grassland will be lost, a total of 20,830m^2 with 3,369m^2 retained). However, 13,107m^2 of semi-improved grassland will be created as per the below. These areas of grassland will be of better quality that the existing habitat.

A wet species-rich species area is to be planted in the north-eastern corner of the site, within the interactive play area. The species mix will be chosen to encourage the brown banded carder bee, a Section 7 priority species, and glow worms.

A species-rich grassland area will be created in the west of the site, the species mix will be chosen to encourage the brown banded carder bee and glow worms and will include kidney, red clover, betony, bird's-foot trefoil, knapweed and wild thyme.

8.1.4 Wetland and reedbed

Two areas of wetland meadow (totalling 6,680m^2) are to be created adjacent to 2,586m^2 of reedbed filtration space. These meadows will be planted with a wet species-rich grassland seeding mix suitable for occasional flooding. The paths surrounding the wetlands will be gated to discourage dogs (with the exclusion of the southern secondary filtration bed which will be accessible to the public), reducing the potential for disturbance of fauna using the wetlands. These new wetland habitats have the potential to support notable assemblages, including wading birds, dragonflies, and bats.

8.2 Lighting

The principles of lighting strategy for the proposed development have incorporated considerations to the ecology of the site and have been designed with reference to artificial lighting guidance for bats[52]. No formal lighting strategy is proposed for the development as only one permanent light fitting will be included within the compound. Nevertheless, the key ecological principles for lighting are described below and will be secured through the planning conditions.

Any permanent or construction lighting will be controlled to limit back spill, limit upward light and limit glare through the use of hood, cowls or baffles. The lighting strategy proposes to minimise any illumination of areas that contain ecologically sensitive habitats, such as scrub and woodland being used by bats, and water features such as the watercourse on the southern boundary and proposed reedbed area that could be used by otter. The light fixture within the compound will be fitted with a passive infra-red sensor to ensure that the light is only on when required.

9. Assessment of Effects

The assessment presented in this section takes into account the potential impacts (Section 6) to each valued ecological receptor (Section 5) and the assumed construction practices (Section 7) and embedded biodiversity design measures (Section 8) to determine the significance of the effects.

Measures to further mitigate for these impacts and/or enhancements which go beyond mitigating to attain biodiversity net benefits are described in Section 10 below, with the significance of any residual impacts then assessed (Section 11).

A separate assessment of ecosystem resilience has been undertaken, detailed in Section 9.3 below, which considers the existing ecosystem resilience of the Future Baseline and how likely this is to change as a result of the implementation of the scheme. The assessment considers the key attributes of resilience: diversity, extent, condition and connectivity, for each broad ecosystem type.

Ecological features of nature conservation value at less than Local or those considered to have negligible ecological value have been scoped out of further ecological impact assessment. However, assumed construction practices and licence requirements as detailed above (Section 7), will be applied during construction to ensure individual species are not harmed and no offence is committed under the relevant legislation i.e. Wildlife and Countryside Act 1981 (as amended).

9.1 Assessment of Construction Effects

9.1.1 Statutory Designated Sites

The proposed construction of the biodiversity enhancement has the potential to affect statutory protected sites via the following pathways and mechanisms:

1. Water quality effects via hydrological connectivity
2. Modification of hydromorphology of the River Usk

[52] Bat Conservation Trust (2016). Bat Surveys for Professional Ecologists (3rd Edition); Good Practice Guidelines.

3. Loss of habitat used by Annex II species
4. Spread of INNS
5. Physical disturbance of habitats used by Annex II species
6. Disturbance/displacement of faunal species.

Breeding bird and fish surveys were scoped out from the methodology of establishing ecological baseline, due to the design aiming to have no impacts on these groups. As such, no direct impacts on the qualifying features of the River Usk/ Afon Wysg SAC are anticipated.

The remaining potential effects are partially mitigated by the distance of the scheme from the River Usk/ Afon Wysg SAC 7.20km East. Potential effects from construction activities, such as from dust deposition, pollution events or sediment run-off, will be avoided and reduced through standard best-practice techniques and methods as described within Section 7 above. The HRA[33] concluded that there will be no likely significant effects on the SAC Therefore, any construction effects on the SAC are considered to be **not significant at an international level.**

Llandegfedd Reservoir SSSI, located 1.4km east of the site, is designated for overwintering wildfowl. The reservoir is not hydrologically connected to the site and works are unlikely to impact the SSSI due to the distance from the site. Therefore, any construction effects on the SSSI are considered to be **not significance at a national level.**

9.1.2 Locally Designated Sites

There are ten SINCs within the search area. No other locally designated sites are presently within the search area. No construction effects are considered likely for most of the sites due to the distance from the site to these areas, with the majority being over 200m from the site. The Afon Lwyd and an area of ancient woodland 28m west of the site, have the potential to be affected by disturbance, however, dust deposition, pollution events or sediment run-off, will be avoided and reduced through standard best-practice techniques and methods as described within Section 7 above. The construction pollution prevention measures described in Section 7 will ensure that water quality and flow is regulated prior to reaching any connecting waterbodies. Therefore, the indirect effects on the SINC relating to pollution events or sediment run-off are considered to be **not significant at a county level**.

9.1.3 Habitats and Plants

The proposed construction of the studios has the potential to affect the habitats via the following pathways and mechanisms:

- Habitat loss; and
- Habitat degradation through air and water pollution.

A range of habitats have been recorded within the site, which may be affected by construction.

The nature of the proposed development will result in the loss of habitat within the site. However, the majority of the site comprises habitat of low ecological value (poor semi-improved grassland). The works will avoid the majority of the boundary features of the site which are of higher ecological value such as woodland, hedgerows and scrub. Areas of habitat loss due to the proposed development have been calculated using the mapping within the 2022 Extended Phase 1 Habitat Survey. Calculations of habitat loss, retention, and replacement are provided in Table 8.2, with respective ratios of increase vs loss.

Waterbodies

The watercourse on the southern boundary will be retained. However, an 8m section will be affected by a culvert crossing to create the construction access to the site. This impact will be temporary as the culvert will be removed on the conclusion of the works. All other development and/or construction activities are over 7m from watercourses, the nearest watercourse, the Afon Lwyd, is adjacent to the west of the site. Standard practice mitigation measures and working practices as detailed in Section 7, which will be secured through the CEMP and associated planning condition, will minimise risks and impacts to the habitats of the

watercourses. As such, the significance of effect on the waterbodies habitats during construction is considered to be **not significant at a county level**.

Trees, Woodland, Hedgerow and Scrub

One mature oak tree will be removed for the proposed development, as it is within the proposed reedbed filtration space. A total of 20 individual trees will require removal for arboricultural reasons. The majority of these trees are ash and are suffering from ash dieback disease. An Arboricultural Impact Assessment (AIA) has been undertaken which recommends outline protection measures for the retained trees.

Compensatory planting has been embedded into the design to provide a total of 1,694m^2 of native scrub on the western and southern edges of the reedbed and wetland meadow areas. Approximately 49 individual and grouped trees will be planted throughout the site including oak, field maple, hazel, willow and elder, which provides a greater diversity than those lost. This provides a net benefit ratio of 1.6:1 for this habitat group.

There will be a temporary impact to the hedgerows on the southern boundary of the site as 8m of these hedgerows will be removed to create the construction access. These sections of hedgerow will be replanted like-for-like with mature trees on completion of construction.

Other impacts on retained woodland habitats such as root damage to retained trees, pollution events, dust and sediment run-off will all be avoided or reduced through techniques and standard construction practices and methods detailed in Section 7 which will be secured through the CEMP and associated planning condition. As such, these effects are considered to be **not significant at a local level**.

9.1.4 Dormouse

No dormice were recorded during the 2022 Phase 2 dormouse survey, with update surveys to be undertaken in 2023 to confirm likely absence. However, suitable habitat was identified in the form of scrub, hedgerows, and broadleaved woodland. The most significant construction effects are likely to be disturbance and removal of habitat.

This receptor will be assessed fully following the completion of the surveys in May and June 2023.

9.1.5 Bats

The construction of the proposed development has the potential to impact bats through habitat loss, severance and fragmentation, habitat damage, disturbance, and species mortality during site clearance.

Two confirmed bat roosts were identified within the site, which will be retained. Any works within the canopy of these trees will carried out using the no-dig method outlined within the Section 7. Pre-construction surveys will be carried out to identify whether any further trees with bat roosting potential have become roosts in the time between the surveys and construction.

The temporary loss of a total of 16m of hedgerows suitable for bat commuting and foraging due to construction will be reinstated on completion of the proposed works. The length of the hedgerow to be impacted is not considered to be significant impact to the functionality of the hedgerows as a commuting or foraging feature. The small amount of temporary loss of potential foraging and commuting habitat is considered to be a minor impact and as such **not significant at a local level.**

Commuting and foraging bats may be subject to disturbance effects including noise, vibration, movement of plant and personnel, and lighting. This will be avoided or reduced by sensitive timing of works, keeping works within the bat activity period to a minimum. Temporary construction lighting required within bat activity periods will be directional lighting and designed to ensure no light spill onto any identified commuting and foraging areas, as detailed within Section 7 which will be further detailed within the CEMP, secured through planning conditions. With these measures in place, the effect on bats from construction is predicted to be **not significant at a local level.**

9.1.6 Otter and Water Vole

The construction of the proposed development has the potential to impact otters and water voles through habitat loss, severance and fragmentation, habitat damage, disturbance, and species mortality during site clearance. Water voles were deemed unlikely to be present in the Preliminary Ecological Appraisal and the

dedicated surveys found no evidence of this species and they are considered to be absent from the site. However, evidence of otters was found on the banks of the Afon Lwyd, adjacent to the western site boundary. It is also likely that otters will use the watercourse on the southern boundary as a commuting route. No otter resting sites were identified within the site or associated habitats to the west of the site. Pre-construction surveys will be carried out to identify whether any otter resting sites have established in the time between the surveys and construction.

None of the existing waterbodies within the site will be lost to the development and development will maintain at least a 7m buffer from the watercourse on the southern boundary of the site. However, an 8m culvert crossing will be installed on this watercourse to create the construction access. This width of this crossing is not considered to be a significant barrier to otter movements and there is also extensive alternative habitat available within the adjacent areas, which any displaced otter could utilise. The effects of disturbance and potential for mortality during construction, are considered to be of potential significance to otter. Construction activities can cause temporary disturbance to otter, which are known to be highly susceptible to human disturbance and can subsequently lead to effects such as abandonment of territory or of young. Temporal restrictions to working and exclusion zones, such as avoiding works in certain areas at certain times, and control of noise or light spill may be implemented and would be detailed within the final CEMP. Temporary construction lighting required within bat activity periods will be directional lighting and designed to ensure no light spill onto any identified commuting and foraging areas, as detailed within Section 7 which will be further detailed within the CEMP, secured through planning conditions.

There is also the potential for riparian habitat to be damaged due to pollution run-off, dust or sedimentation during operation of construction vehicles or during the transportation of potentially polluting materials or substances. This pollution could negatively impact prey species, such as fish species that maybe present in the Afon Lwyd and its tributary on the southern site boundary, thus indirectly affecting otters by reducing foraging opportunities. This would be avoided or reduced by the implementation of best practice construction techniques for pollution prevention and control as detailed in Section 7, which will be detailed within the CEMP and secured through planning conditions.

Otters may potentially become injured or trapped in excavations during construction. Any open excavations would therefore be covered at night, or a means of escape provided, to be detailed within the CEMP. Direct species injury or mortality may occur during construction of the proposed development, due to vehicle collisions or inadvertent damage to a holt or burrow (if present). Speed limits and work timings, which will be detailed in the final CEMP, would be implemented to reduce the risk of mammal collisions with construction vehicles.

With the above measures taken into consideration, the effects on otters are considered to be temporary and minor, resulting in a **not significant effect at a local level**.

9.1.7 Breeding Birds

Twenty trees and two 8m sections of hedgerow are to be removed during construction. However, 1,694m^2 of native scrub and 49 trees will be planted as part of the design plan, and the hedgerow will be reinstated on completion of construction. Therefore, this loss will be temporary.

During the construction phase, breeding birds are likely to be affected by disturbance and displacement associated with construction activities, and nest destruction could also occur in the absence of assumed mitigation measures.

Pollution control measures and timing of vegetation clearance to avoid impacts on nesting birds are described in Section 7 and will be detailed within the CEMP and secured through planning conditions. Furthermore, the embedded design provides new habitats that would be of use to breeding birds.

With these measures in place, and considering the abundance of similar habitats locally, it is predicted that no significant impacts would occur on the populations of breeding birds within the planning boundary, and legal compliance with regard to avoiding destruction of active nests can be achieved. As such, construction effects are assessed to be temporary and minor and **not significant at a local level**.

9.1.8 Invertebrates (Aquatic and Terrestrial)

Potential impacts on terrestrial invertebrates as a consequence of the proposed development include; habitat loss, habitat severance, and direct mortality (during site clearance). Potential impacts on aquatic invertebrates are related to watercourses (as described in 9.1.3).

The Section 7 bee, brown-banded carder bee, was recorded within the site boundary and the construction, will result in the loss of poor semi-improved grassland. However, the intensive management regime of the grassland reduces its value to the brown-banded carder bee and is unlikely to be frequently used for foraging and nesting. Nevertheless, it is considered that there will be a temporary minor impact for brown-banded carder bee which is considered to be **not significant at a national level**.

The mosaic of habitats are considered suitable to support a wide range of notable terrestrial invertebrates, with good connectivity to the wider landscape. Three Section 7 species (listed in section 4.2) and the notable species golden ringed dragonfly (*Cordulegaster boltonii*) and glow worms (*Lampyris noctiluca*)[53] have been recorded in the wider area. A total of 20,830m^2 of grassland will be lost during the construction of the proposed development (although it is noted that the poor semi-improved grassland is of poorer quality, being intensively grazed). However, the compensatory planting and enhancements of grasslands, wetland areas and reedbed, as detailed in Section 8, will provide up to 17,387m^2 of potential habitat for a range in invertebrate species.

With the above measures taken into consideration, and those associated with watercourses (as described above), the impact on invertebrates is considered to be temporary and minor during construction and are **not significant at a local level**.

9.1.9 Fish

Pollution of watercourses has the potential to impact fish directly. However, risk will be minimised by the implementation of strict anti-pollution measures.

Standard practice mitigation measures and working practices as detailed in Section 7, which will be secured through the CEMP and associated planning condition, will minimise risks and impacts to the watercourses. As such, the significance of effects on the watercourses, and therefore on fish, during construction is considered to be **not significant at a national level**.

9.1.10 Invasive Species

The proposed construction has the potential to affect INNS via disturbance and spread from the site.

Japanese knotweed, three cornered garlic, cotoneaster and potential montbretia were identified on site. There is potential for these species to be spread from the site during construction, which would result in a breach of UK legislation.

Standard good practice measures will be implemented, and detailed within an INNS Management Plan as required, which will avoid the potential spread of these species.

The construction compound will be located in the southeast corner of the site. There is a stand of Japanese knotweed in this location. The INNS Management Plan will include the treatment and removal of this stand prior to works commencing. An INNS specialist will be consulted on the production of the INNS Management Plan.

With the above measures taken into consideration, the effects on invasive species are **not significant** during construction.

9.2 Assessment of Operation Effects

It should be noted that wildlife populations within the planning boundary already exist within a baseline of some level of disturbance from the existing activities, namely grazing and amenity use of the poor semi-improved grassland field.

[53] Adopted-Torfaen-LDP-Writen-Statement.pdf (accessed 26/05/22).

The assessment of effects from operation assumes that the planting within the created and enhanced habitats of the proposed development have fully established and are capable of supporting the existing species populations, such as the many invertebrate groups, and extended habitats for existing populations adjacent to the site, such as several bat species, which have been described and assessed above.

A common potential impact for all enhanced and proposed habitats, is the mismanagement of these habitats resulting in failure to establish and thus the reduction in biodiversity net benefit. Section 12 details the general management and monitoring that would be required for each of the proposed created and enhanced habitats, if these conservation prescriptions are not followed then the habitats may not establish and reach their target biodiversity benefit. The assessment below, assumes that the management and monitoring prescriptions are followed, and thus target assemblages, condition and biodiversity benefits are achieved. The management and monitoring will be further detailed in a Landscape and Ecology Management Plan (LEMP) and secured through a planning condition.

9.2.1 Statutory Designated Sites

Potential operational effects to the River Usk/ Afon Wysg SAC could arise as a result of being hydrologically connected to the site. Given the scheme is proposed to reduce pollution entering the Afon Lwyd and therefore improve water quality, the effects on the River Usk/ Afon Wysg SAC related to operation are considered to be permanent and moderately **beneficial significance at an international level.**

The Llandegfedd Reservoir SSSI is not hydrologically connected to the site and operation of the proposed development is unlikely to impact the SSSI due to the distance from the site. Therefore, any operational effects on the SSSI are considered to be **not significant at a national level.**

9.2.2 Locally Designated Sites

No effects on the majority of the SINCs identified are considered likely due to their distance from the scheme. The Afon Lwyd will likely be impacted by operation of the scheme, however impacts are anticipated to be significantly positive, through improvement of the water quality as a result of treating the CSO discharges. The area of ancient woodland directly adjacent to the site has potential to be impacted by increased recreation within the developed site, resulting in increased disturbance to species using the woodland. However, given the location of the woodland within an urban area, any increase in disturbance is unlikely to be significant. As such, the effects on locally designated sites related to operation are considered to be **not significant at a county level**.

9.2.3 Habitats and Plants

The habitats being created and enhanced generally equal or exceeds those being lost in terms of extent, but with appropriate management and monitoring will also provide enhanced diversity, adaptability (through diversification), connectivity and condition. The habitats being created are as follows with their associated increase vs loss ratios (where ratios are not stated no habitat is being lost):

- 19 individual trees will be lost to the development with 49 trees being planted resulting in a net benefit;
- 1,070m^2 of scrub will be retained with an additional 1,694m^2 of scrub being created, resulting in a net benefit;
- 20,830m^2 of poor semi-improved grassland is being lost with 13,107m^2 of moderate semi-improved grassland being created. While this is a loss in extent of habitat the quality of the habitat will be greater; and
- 2,586m^2 of reedbed filtration space.

This increase in higher value habitats is considered a biodiversity net benefit, however, the realised value of these habitats is dependent on the management and monitoring of the habitats through the long-term management plan, which is described in Section 12. Nevertheless, the operational effects of habitats are considered to be permanent and of moderate net benefit to biodiversity and are of **beneficial significance at a local level**.

9.2.4 Dormouse

Should dormice be present on site, the primary operational impact is unlikely to change from the current operational impact of the site as the site is currently used for recreation and grazing. The creation and enhancement of dormouse habitats (woodland, scrub and hedgerow) within the site, with a net increase of 1,694m^2 habitat in terms of extent and would provide a greater diversity, including the introduction of hazel, and enhanced structure for dormouse foraging and nesting within the site.

As such, the operational effect for the dormouse population is considered to be permanent and moderately beneficial, maintaining the favourable conservation status of the hazel dormouse within its natural range, and are of **beneficial significance at a local level**.

9.2.5 Bats

No permanent habitat loss or severance of bat habitat would occur as a result of the development, and as the landscape planting matures bats will benefit from increased foraging resource through provision of more diverse planting and increased features for navigation. Twenty trees will be removed for arboricultural reasons, these trees will be assessed for the suitability for roosting bats prior to removal.

Lighting for the operational site will be designed to minimise impacts on bats whilst adhering to required levels for human security and safety.

As such, the operational effect for bats is considered to be permanent and beneficial but **not significant at a local level.**

9.2.6 Otter

No permanent habitat loss or severance of otter habitat would occur as a result of the development, and as the landscape planting matures these species are afforded increased foraging and shelter opportunities.

The primary operational impact is likely to be due to increased disturbance, as a result of increased recreation areas, which may deter foraging and commuting otter, and prevent them from commuting through and resting within the site. A vegetation buffer exists between the proposed development and both the Afon Lwyd, and the tributary to the south of the site, which will protect otters from the increased human use of the site.

As such, the operational effects of the development on otter are considered to be **not significant at a local level**.

9.2.7 Breeding Birds

The potential breeding habitat for the bird assemblage recorded within the proposed development site would remain largely similar with the proposed planting. The introduction of reedbeds, wetland meadows and more species-rich grassland is likely to increase the invertebrate prey diversity of the site and increase the diversity of nesting opportunities for a range of bird species.

As such, the operational effects are considered to be a permanent and **beneficial significance at a local level**.

9.2.8 Amphibians and Reptiles

While the site is currently of less than local value to amphibians and reptiles, the habitats being created (reedbeds, wetland meadows and tall species-rich grassland) are likely to provide suitable habitat for a range of common amphibians and reptiles.

As such, the operational effects on amphibians and reptiles are considered to be permanent and of moderate benefit, resulting in **beneficial significance at a local level**.

9.2.9 Invertebrates (Aquatic and Terrestrial)

The habitat creation and enhancement of the proposed development is considered to provide a net increase in extent, diversity, adaptability (though diversification) and condition of habitats for terrestrial invertebrates.

The establishment of 13,107m^2 of grassland/meadow, 2,586m^2 of reedbed and 1,694m^2 of scrub habitats will benefit a range of invertebrates within the local area, including the brown-banded carder bee.

This increase in higher valued habitats for terrestrial invertebrates is considered a net benefit, however, the realised value of these habitats is dependent on the monitoring and management of the habitats which is described in Section 12. As such, the operational effects on terrestrial invertebrates are considered to be permanent and of moderate benefit resulting in **beneficial significance at a local level**.

9.2.10 Fish

No fish habitat is anticipated to be lost, as the Afon Lwyd to the west of the site, and tributary running along the southern border will not be permanently altered by the development. Given the scheme is aiming to improve the river quality of the Afon Lwyd, by reducing input of pollution from the CSO into the river, the operational effect for fish is considered to be permanent and moderately **beneficial at the national level**.

9.2.11 Invasive Species

No operational impacts on invasive species are expected as a result of the operation of the site. Section 12 provides management prescriptions which will be developed into a Landscape and Environmental Management Plan (LEMP) for the site. The INNS present within the application boundary will be removed prior to construction commencing. As such the effects on invasive species during **operation are not significant**.

9.3 Ecosystem Resilience

A separate assessment of ecosystem resilience has been undertaken, which considers the existing ecosystem resilience of the Future Baseline and how likely this is to change as a result of the implementation of the scheme.

The assessment considers the key attributes of resilience: diversity, extent, condition and connectivity, for each broad ecosystem type.

Table 9.1 shows the resilience assessment along with an indication of how the scheme will change this resilience (increase + / decrease -).

Table 9.1. Resilience assessment of the existing ecosystems along with indication of how the scheme may change this resilience (increase +/ decrease -).

Ecosystem	Diversity	Extent / size	Condition	Connectivity
Grassland	All grassland on site is poor, semi-improved. The grassland provides potential habitat for grasssnake, mustelid mammals, and invertebrates including the brown-banded carder bee and glow worms. The majority of the grassland will be lost as part of the development but will be replaced, in part, by a higher quality semi-improved grassland, and insect hotels to be placed within an area of grassland to the west of the site to support invertebrates. The shortfall in grassland habitat lost, will be replaced by the reedbed filtration space and buffer scrub planting. This will diversify the grasslands within the site and provide greater resource for a diversity of invertebrates. All created and enhanced grasslands will be managed and monitored to provide species-rich diverse grasslands under long-term management plan for specific local species assemblages and rare species of invertebrates (brown-banded carder bee) as well as more common species of reptiles, birds and foraging bats. **Expected increase (+) subject to long term management.**	20,830m of poor semi-improved grassland will be lost. A total of 13,107m^2 will be created.	The existing grassland on site is in poor condition, largely a result of grazing and recreational use. Newly created, species-rich grassland will be managed and monitored to ensure newly created habitats achieve a maximal grassland condition. **Expected increase (+) subject to long term management.**	The grassland within the site is well connected to other areas of grassland, with fields of similar grassland immediately to the north and south of the site. The created and enhanced species rich grasslands proposed will have similar connectivity to the existing situation. **No change anticipated (0).**
Semi-natural broadleaved woodland, hedgerows, scrub	Semi-natural broadleaved woodland is present to the southeast and north of the site. The ecosystem provides landscape and amenity services (screening value), carbon sequestration, flood prevention, and air quality services. One oak tree will be lost and 8m of two hedgerows either side of the watercourse on the southern boundary of the site will be	No scrub will be lost. The scheme will result in the loss of 20 trees. The scheme will deliver a total of 1,694m^2 of additional scrub 49 new trees.	The current condition of woodlands and scrub are low to moderate, and largely unmanaged. Enhanced and created habitats to be managed and monitored to enhance condition through a long-term management plan. New tree and scrub planting to increase local	The woodland and scrub on the site is well connected to other areas of woodland along the Afon Lwyd. The created habitats will have similar connectivity to the existing. **No change anticipated (0).**

Ecosystem	Diversity	Extent / size	Condition	Connectivity
	temporarily lost to the construction access. This will be reinstated on completion of construction. A total of 49 broad leaved woodland trees are to be planted throughout the site.		diversity of woodland, scrub and hedgerow habitats. **Expected increase (+) subject to long-term management.**	
Wetland (waterbodies – stream, wetland meadows and reedbed)	There is a stream, a tributary of the Afon Lwyd, running along the south of the site. The stream is approximately 1.5m wide, and the banks are comprised of broadleaved woodland and mature tree hedgerow. The stream is not being permanently impacted by the proposed development. Two new wetland meadows and a reedbed filtration space, totalling 5,085m^2 will be created. **Expected increase (+) subject to long-term management.**	The existing waterbody within the site is being retained. The wetland meadows and reedbed provide additional wetland resource and marginal habitats within the site, totalling 5,085m^2. **Expected increase (+) subject to long-term management.**	The condition of the stream will remain unchanged. The condition of the wetland meadows and reedbed features will be managed through a long-term management plan and are expected to provide a low to moderate condition wetland ecosystem with diverse species. **Expected increase (+) subject to long-term management.**	The new wetland meadow and reedbed will be isolated from other watercourses and water bodies, due to their function as a NBS for the treatment of sewer overflow water. **No change anticipated (0).**

10. Further Mitigation and Enhancements

10.1 Construction Enhancements

Following the assessment of effects from construction in Section 9.1, no further construction mitigation has been identified or proposed, above what has already been detailed within the assumed best practice construction methods and licence requirements (see Section 7).

10.2 Operational Enhancements

The additional enhancements proposed here, over and above all the embedded biodiversity designs described in Section 8 above, would be secured through planning conditions. The maintenance of the below enhancements will be detailed with the LEMP.

10.2.1 Bats

Veteranisation of young trees will be undertaken to create potential roost features on suitable trees within the site. The location and number of trees to be veteranised will be determined by the ECoW. At least three woodcrete bat boxes will also be installed on retained mature trees. These boxes will be positioned at least 4m above the ground.

10.2.2 Breeding Birds

At least three bird boxes, suitable for a variety of species will be installed on mature trees within the site boundary. The number and exact locations will be selected by the ECoW but will be in areas of dense tree/scrub cover. The bird boxes will be construction of woodcrete to maximise their lifespan.

10.2.3 Amphibians and Reptiles

Reptile and amphibian enhancement features such as stone or log hibernacula (no less than three) will be provided in the suitable habitats away from disturbances (i.e. at hedgerow bases). The number and location will be selected by the ECoW and will be informed by the amount of suitable habitat within the proposed development.

10.2.4 Invertebrates

Insect hotels (no less than three) will be provided in the grassland to the west of the site. The number and exact location will be selected by the ECoW. These insect hotels will be of a pallet design and will generally be sited in habitats away from disturbances.

11. Residual Effects

The residual effects reported here are the effects of the development, positive and negative, on the ecological receptors after taking account of standard construction practices and protected licences (Section 7), embedded biodiversity design (Section 8), plus the additional mitigation and enhancement measures described above (Section 10).

Therefore, only those ecological receptors that have had additional enhancement described in Section 10 are described below. All other ecological receptors effects remain the same as described within Section 9 and summarised in Table 13.1 and Table 13.2.

All residual effects from construction remain as detailed within Section 9.1 above. Operational residual effects are described below.

11.1.1 Bats

The veteranisation of trees throughout the proposed development would enhance the bat roosting habitat within the site. Therefore, the residual effects are considered to be permanent and of minor to moderate benefit and of **beneficial significance at a local level**.

11.1.2 Breeding Birds

The provision of a least three bird boxes within the site will enhance the bird nesting features available to breeding birds. Therefore, the residual effects are considered to be semi-permanent and of minor to moderate benefit and of **beneficial significance at a local level.**

11.1.3 Amphibians and Reptiles

The provision of at least three hibernacula within the site would enhance the quality and capacity for reptiles and amphibians. Therefore, the residual effects are considered to be permanent and moderate benefit and of **beneficial significance at a local level.**

11.1.4 Invertebrates

The provision of at least three insect hotels within the site would enhance the quality and capacity invertebrates. Therefore, the residual effects are considered to be permanent and moderate benefit and of **beneficial significance at a local level.**

12. Monitoring and Management

A programme of monitoring and management will be undertaken for a minimum of 25 years, to be agreed with Torfaen County Borough Council as the local planning authority. The subsequent sections set out the general principles of the management and monitoring proposals for created habitats and other ecological receptors within the planning boundary. The full details of any management and monitoring plans would be developed and finalised in the Landscape and Ecological Management Plan (LEMP) to be prepared and secured through planning conditions.

12.1 Habitats

12.1.1 Woodland, Trees and Hedgerows

The management and monitoring of woody habitats would ensure that the continuity of arboreal cover is maintained, for example, any breaks in hedgerows and woodland would be replaced, and will be managed for the diversity of wooded plants, to benefit wildlife, including invertebrates.

Management and monitoring of woody habitats would be finalised in agreement with Torfaen County Borough Council, and NRW in relation to dormouse through the dormouse development licence, but would follow these general prescriptions:

- Carry out regular inspections of the planting, quarterly up to year 5.
- Ensure a 1m diameter circle around the base of each tree and shrub is kept weed free to guarantee a high success rate of establishment of the hedgerow plants. Weed control either by use of contact weed killer (by agreement with NRW) or by manual control.
- Water as necessary to maintain healthy growth, particularly in times of low rainfall in summer, at least the first 3 years.
- All vandalised, damaged, dead, dying or diseased plants to be replaced after each growing season following planting for a period of 5 years.
- Yearly for the first 5 years, assess stakes and guards, replace any missing or damaged. Remove guards if they are beginning to restrict the development of the plants; removal all by year 5.

- Hedgerow shall be trimmed in winter on a cycle as appropriate to manage its height and spread, encourage a thick bushy habitat and benefit wildlife. Frequency to be determined by monitoring and desired height and size of hedgerows.
- Where possible, hedgerows should be allowed to grow tall and thick so that there are natural overhangs (these concentrate the invertebrates and also provide overhanging branches for the bats to rest on).
- Woodlands shall be thinned /coppiced, by tree removal, as necessary to reduce competition for space, removing an even mix of species to restore a healthy woodland. Frequency to be determined by monitoring.
- All trees will be formative pruned, every 5 years (if required) for the period of the management plan, to maintain their shape and remove any dead wood, crossing branches and suckers. Pruning operations must not affect the vertical growth or spread of the establishing trees.
- All hedgerow and woodland management should only be conducted between September and February to ensure no impacts to breeding birds.
- Pile dead wood in habitat piles scattered throughout the woodland.

Monitoring would be undertaken under the following framework:

- New planting would be monitored until established. Monitoring frequencies would be agreed with the local planning authority, but are likely to in Years 1, 2, 3, 5, 10 and 15 and every 5 years thereafter until year 25 (or as necessary if remedial actions are required).
- Monitoring of woodland and trees should be carried out using Common Standards Monitoring Guidance for Woodland Habitats[54] by a suitably qualified ecologist. Remedial actions based on monitoring may be required, these will be determined by the ecologist in consultation with NRW and/or Torfaen County Borough Council (if required).
- Monitoring should of hedgerows be carried out using Hedgerow Survey Handbook[55] to achieve a species-rich hedgerow under the Hedgerow Regulations by a suitably qualified ecologist. Remedial actions based on monitoring may be required, these will be determined by the ecologist in consultation with NRW and/or Torfaen County Borough Council (if required).

12.1.2 Grassland

The management and monitoring of species-rich grassland habitats would ensure that the habitat's extent, diversity and conditions are achieved, and will be of benefit to wildlife, including brown-banded carder bee and other invertebrates.

Management and monitoring of grassland habitats would be finalised in agreement with Torfaen County Borough Council and NRW (if required) but would follow these general prescriptions:

- Areas identified within the grassland as having good assemblage of foraging species, and/or nesting potential for brown-banded carder bee will cut at the end of September or into October, with all arisings removed, and over a 2-3 year cycle, so that the grassland remains viable for late foraging brown-banded carder bee and that some of grassland remains undisturbed in any single year.
- No fertilisers or pesticides will be used in the grasslands. Should herbicide use be necessary (e.g. to deal with invasive species or other undesirable species), the remedial actions would be limited to spot treatment.
- Areas identified for brown-banded carder bee nesting and hibernation potential will be managed on a 3 – 4 year rotation.

[54] JNCC (2004) Common Standards Monitoring Guidance for Woodland Habitats

[55] Defra (2007) Hedgerow Survey Handbook. 2nd ed.

Monitoring would be undertaken under the following framework:

- Monitoring of the grassland habitat will be carried out using Common Standards Monitoring Guidance for Lowland Grassland Habitats[56] by a suitably qualified ecologist in June/July in order to help determine the level of success of establishment and the potential need for additional seed or changes to management. Indicators of success would be agreed with Torfaen County Borough Council and/or NRW (if required) and captured within a Habitat Management Plan (HMP).
- Frequency and duration of grassland monitoring would also be agreed within the HMP, but is likely to be in Years 1, 2, 3, 5, 10 and 15 and every 5 years thereafter until year 25 (or as necessary if remedial actions are required).
- Potential remedial actions will be determined by the ecologist in consultation with Torfaen County Borough Council and/or NRW (if required).
- In accordance with the NRW guidance, results will be presented in an end of monitoring year report, for a period agreed with NRW. Reports will include:
    - a list of all plant species and abundances of plants recorded at each monitoring location;
    - the conservation status of plants recorded;
    - a comparison of results with previous results from the same monitoring location and, where relevant, from other monitoring locations elsewhere within the same mitigation area;
    - an evaluation of mitigation measures/management practices with regard to their impact on plant species; and
    - recommendations for ongoing management and further monitoring if required.

12.1.3 Reedbeds and Other Landscape Planting

The management and monitoring of the reedbed habitat would ensure that the habitat's extent, diversity and conditions are achieved, and will be to benefit wildlife, as well as ensuring the management and treatment function of the reedbed is maintained through collaboration with DCWW.

The management and monitoring of the reedbed and other landscape planting will be detailed within the LEMP and/or site maintenance plan; general prescription, however, would include:

- Routine/regular maintenance to litter pick and inspection of inlets and outlets.
- Annual (as required) de-weeding and reducing down plants that have taken over the feature, while ensuring function is maintained.
- Annual monitoring until plants have established, re-plating where necessary.

12.2 Species

Pre-construction surveys will be undertaken in accordance with the scheme to be submitted to the local planning authority to discharge relevant conditions and inform relevant protected species licence requirements from NRW. These surveys are anticipated to include:

1. **Badger surveys**: to determine whether any badger setts have been created in the period between the surveys and construction commencing.
2. **Bat roost surveys**: to determine whether any of the trees to be directly or indirectly impacted by the work have roosting bats, to inform the requirement for a bat development license from NRW.
3. **Breeding bird surveys/checks**: these will only be required if vegetation clearance is to occur during the breeding bird season (March to September).

[56] JNCC (2004) Common Standards Monitoring Guidance for Lowland Grassland Habitats

4. **Otter surveys:** to determine otter presence within the site and within suitable habitat up to 100m from the site, with focus on resting and breeding sites, to inform the requirement for an otter development licence from NRW.
5. **Water vole surveys:** to determine water vole presence within the site and within suitable habitat up to 50m from the site, to inform the requirement for a water vole conservation licence from NRW.

12.2.1 Brown-banded carder bee

Monitoring surveys will study the establishment and distribution of brown-banded carder bee and of the new brown-banded carder bee habitats.

The grassland habitats being created for brown-banded carder bee foraging would be monitored for brown-banded carder bee and would follow national standardised bumblebee monitoring protocol (also known as 'BeeWalk'[57]).

Results of monitoring should be reported to NRW and the Bumblebee Conservation Trust in a report, post each monitoring period/year. Reports will include:

- a list of all bumblebee species and abundances of species recorded at each monitoring location/transect;
- the conservation status of species recorded;
- a comparison of results with previous results from the same monitoring location and, where relevant, from other monitoring locations elsewhere within the same mitigation area;
- an evaluation of mitigation measures/management practices with regard to their impact on bumblebee species; and
- recommendations for ongoing management and further monitoring if required.

12.2.2 Other Species

Additional monitoring and maintenance (if required) in Year 2, 3 and 5 will also be required for the enhancement features provided for protected species as follows:

- Bat boxes and roost features on veteranized trees;
- Bird boxes;
- Insect hotels; and
- Reptile and amphibian hibernacula.

[57] https://beewalk.org.uk/ [Accessed 27th May 2021]

13. Assessment Summary Matrix

Table 13.1. Summary of assessment of residual construction effects for ecological receptors of local and above value and/or legal protection.

Ecological receptor	Potential impact	Embedded design, assumed construction practices and mitigation	Value of receptor	Residual significance of effect during construction
Designated Sites				
River Usk/ Afon Wysg SAC	Indirect effects on the River Usk/ Afon Wysg SAC and habitats which support the feature species relating to dust deposition, pollution events or sediment run-off.	Construction will be carried out following best practice guidance and pollution prevention measures to avoid and reduce dust deposition, pollution events and sediment run-off, which will be detailed within the CEMP and compliance will be secured through planning conditions.	International	Not significant
Llandegfedd Reservoir SSSI	No hydrological connection to the site and 1.4km from the site.	N/A	National	Not significant
Ten SINCs	All but the Afon Lywd greater than 200m from site or separated by physical barriers with no pathway for effect.	Construction will be carried out following best practice guidance and pollution prevention measures to avoid and reduce dust deposition, pollution events and sediment run-off, which will be detailed within the CEMP and compliance will be secured through planning conditions.	County	Not significant
Ancient semi-natural woodland	Located 28m west of the site, impacts possible from disturbance, dust deposition, pollution events or sediment run-off.	Construction will be carried out following best practice guidance and pollution prevention measures to avoid and reduce dust deposition, pollution events and sediment run-off, which will be detailed within the CEMP and compliance will be secured through planning conditions.	County	Not significant
Habitats				
Waterbodies	Pollution and loss of supporting habitats through discharge of construction run-off into watercourse on southern boundary. Temporary direct impact	Construction will be carried out following best practice guidance and pollution prevention measures to avoid and reduce dust deposition, pollution events and sediment run-off, which will be detailed within the CEMP and compliance will be secured through planning conditions.	County	Not significant

Ecological receptor	Potential impact	Embedded design, assumed construction practices and mitigation	Value of receptor	Residual significance of effect during construction
	through installation of an 8m culvert crossing for construction access.	Culvert crossing will be removed on completion of proposed development and the banks reinstated.		
Trees, woodland, hedgerow and scrub	No woodland or scrub will be lost to the development. One individual tree will be permanently lost due to the proposed development. 8m of two hedgerows, either side of the watercourse on the southern boundary will be removed for construction access. Root damage to retained trees, and damage to trees, woodland, hedgerow and scrub through pollution events, dust and sediment run-off.	Embedded compensatory planting will provide an additional 1,694m^2 of scrub adjacent to the reedbed filtration space. 49 individual and grouped trees will be planted throughout the site, providing greater diversity than those lost. There will be a temporary minor impact for trees until the planted trees and shrubs establish. Following completion of the proposed development, the construction access will be removed, and the hedgerows replanted like-for-like. Standard best practice construction measures to avoid and reduce damage to trees, woodland, hedgerow and scrub, pollution events and sediment run-off, which will be detailed within the CEMP and compliance will be secured through planning conditions.	County	Not significant
Protected Species				
Dormice	To be fully assessed on completion of surveys in 2023			
Roosting bats	Habitat loss, severance and fragmentation, habitat damage, disturbance and species mortality due to site clearance	Two roosts identified within site boundary. These trees will be retained. Pre-construction surveys will be carried out to identify whether any trees with bat roosting potential have become roosts in the time between the surveys and construction.	Local	Not significant
Foraging and commuting bats	Temporary loss of 16m of habitat suitable for bat commuting and foraging due to construction, and severance and fragmentation	The design of the proposed development has aimed to maintain important bat habitats (e.g. hedgerows and woodland) where possible and provide new habitats and connectivity through the development. The temporary loss of 16m of hedgerow will be reinstated on completion of construction.	Local	Not significant

Ecological receptor	Potential impact	Embedded design, assumed construction practices and mitigation	Value of receptor	Residual significance of effect during construction
	of foraging and commuting habitat. Disturbance to foraging and commuting bats through noise, vibration, plant and personnel movement and lighting.	Avoided and/or reduced disturbance by sensitive timing of works, keeping works within the bat activity period to a minimum. Temporary construction lighting required within bat activity periods would be directional lighting and designed to ensure no light spill over 0.5 Lux on to any identified commuting and foraging areas.		
Otter and water vole	Habitat loss, severance and fragmentation, habitat damage, disturbance and species mortality during site clearance. Habitat damaged due to pollution run-off, dust or sedimentation during operation of construction vehicles or during the transportation of potentially polluting materials or substances. This pollution could negatively impact forage species thus reducing foraging opportunities. Injury or mortality through trapping in excavations or other construction activities.	No otter resting sites or water vole burrows were identified within the site boundary. Pre-construction surveys will be carried out to identify whether any otter resting sites and/or water vole burrows have established in the time between the surveys and construction. None of the existing watercourses within the site boundary will be lost to the development. There is also extensive alternative habitat available within the adjacent areas, which any displaced otter and water vole could utilise. Temporal restrictions to working and exclusion zones, such as avoiding works in certain areas at certain times, and control of noise or light spill may be implemented and would be detailed within the final CEMP. Night-time lighting will be designed to ensure no light spill over 0.5Lux onto identified otter habitats. Implementation of best practice construction techniques for pollution prevention and control. Any open excavations to be covered at night or a means of escape provided. Speed limits and work timings, which will be detailed in the final CEMP, would be implemented to reduce the risk of mammal collisions with construction vehicles.	Local	Not significant
Breeding birds	Two 8m sections of hedgerow will be lost along with 19 trees which may provide suitability for breeding birds. Disturbance and displacement associated with construction activities. Nest destruction could also occur in the	The design also provides 1,694m^2 of new habitats that would be suitable for breeding birds, with planting of 49 trees which will provide suitable habitat in the long-term. Pollution control measures and timing of vegetation clearance to avoid impacts on nesting birds.	Local	Not significant

Ecological receptor	Potential impact	Embedded design, assumed construction practices and mitigation	Value of receptor	Residual significance of effect during construction
	absence of mitigation measures.			
Terrestrial invertebrates	Loss of 20,830m^2 of grassland habitat suitable for terrestrial invertebrates. Habitat severance and direct mortality (during site clearance). No legally protected or Red Data Book species were found at the site other than the brown-banded carder bee.	A total of 13,107m^2 of flower-rich semi-improved neutral grasslands will be created, as well as 2,586m^2 of reedbed and 1,694m^2 of scrub. This will provide a total of 17,387m^2 of suitable habitats for a range of invertebrate species, including brown-banded carder bee within the site. While this is a reduced habitat area, the quality of the habitats being created will be greater than those lost.	Local (except brown-banded carder bee – National)	Not significant
Fish	Pollution of the adjacent Afon Lwyd has the potential to impact fish directly.	All works will be undertaken in accordance with a CEMP. The CEMP will include site-specific methods to ensure that all site activities in proximity to watercourses and waterbodies are controlled and are in accordance with relevant legislation and undertaken in compliance with the relevant guidance and industry best practice Additional measures such as silt fencing, silt busters or bales may be necessary to prevent silt or contaminants from being released into connecting watercourses.	National	Not significant
INNS	Spread of the invasive species Japanese knotweed, three cornered garlic, cotoneaster and potential montbretia from the site during construction.	Standard good practice measures will be implemented which will avoid the potential spread of these species.	N/A	Not significant

Table 13.2. Summary of assessment of residual operational effects for ecological receptors of local and above value and/or legal protection.

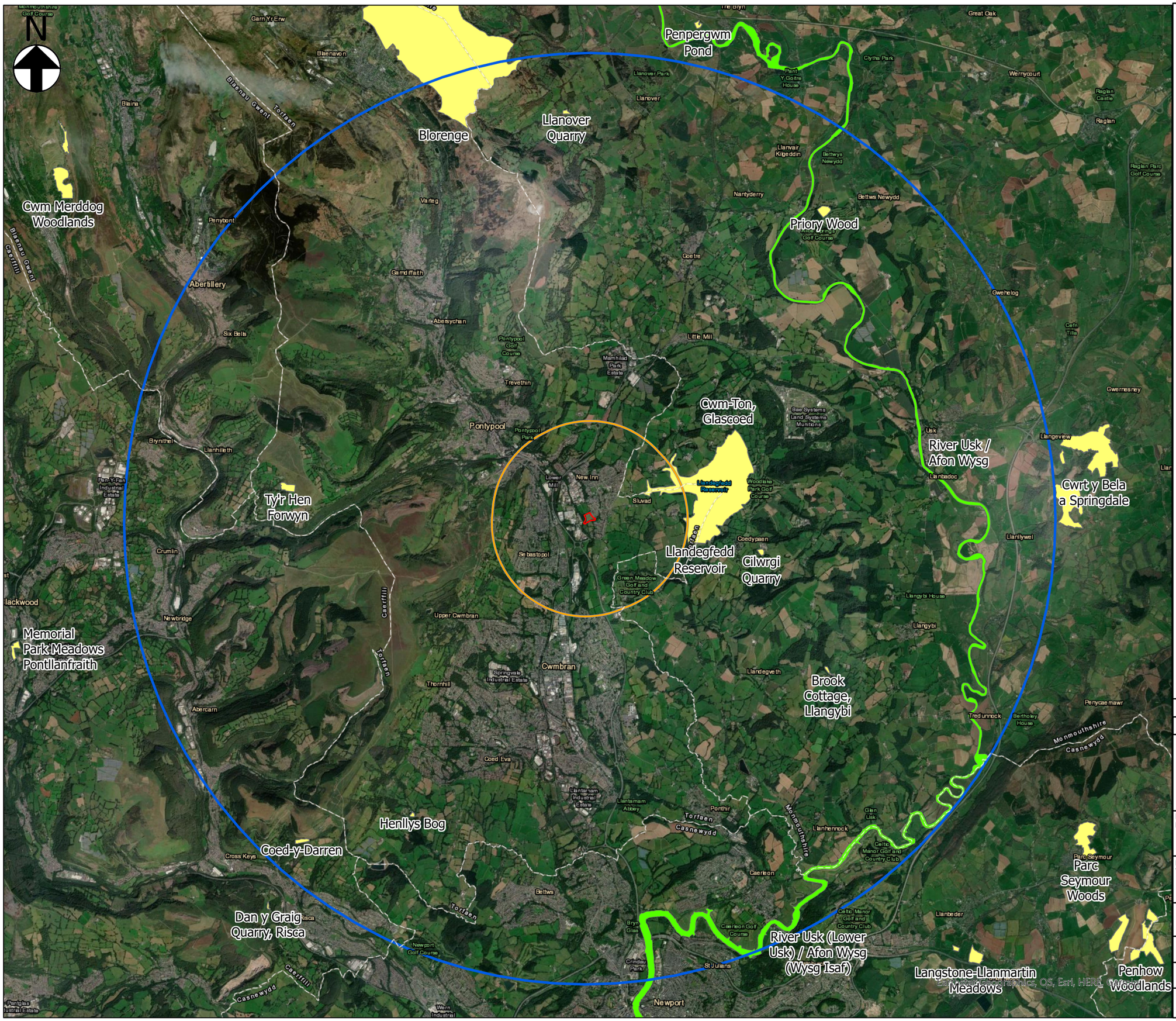
Ecological receptor	Potential impact	Embedded design, assumed construction practices and mitigation	Value of receptor	Residual significance of effect during construction
Designated Sites				
River Usk/ Afon Wysg SAC	Indirect beneficial effects on the River Usk/Afon Wysg SAC as a result of being hydrological connected to the proposed development outfall.	The proposed scheme's aim is to reduce pollution entering the Afon Lwyd and therefore improve water quality flowing into the River Usk/ Afon Wysg SAC. Impacts on the SAC have been assessed in an HRA[33].	International	Significant Beneficial
Llandegfedd Reservoir SSSI	No hydrological connection to the site and 1.4km from the site.	N/A	National	Not significant
Ten SINCs	All but the Afon Lywd greater than 200m from site or separated by physical barriers with no pathway for effect.	The proposed scheme's aim is to reduce pollution entering the Afon Lwyd and therefore water quality of this SINC should be improved.	County	Not Significant / Significant Beneficial
Ancient semi-natural woodland	Located 28m west of the site, impacts possible from disturbance, dust deposition, pollution events or sediment run-off.	The ancient semi-natural woodland has potential to be impacted by increased recreation within the developed site, resulting in increased disturbance to species using the woodland. However, given the location of the woodland within an urban area, any increase in disturbance is unlikely to be significant	County	Not significant
Habitats				
Waterbodies				
Trees, woodland, hedgerow and scrub	Mismanagement of new habitats resulting in failure to establish and reduction in biodiversity net benefit	The habitats being created represent a minor gain in the extent of scrubby woodland habitat. This will provide a net gain in terms of extent. With appropriate management and monitoring this will also provide enhanced diversity, adaptability (through diversification), connectivity and condition. A long-term management plan will be in place to ensure that the		Significant Beneficial

Ecological receptor	Potential impact	Embedded design, assumed construction practices and mitigation	Value of receptor	Residual significance of effect during construction
		operational effects of habitats are permanent and of moderate net benefit to biodiversity.		
Grassland	Mismanagement of new habitats resulting in failure to establish and reduction in biodiversity net benefit	13,107m^2 of flower-rich grassland being created and enhanced which will provide net benefits in terms of grassland diversity and condition (with associated long-term management)		Significant Beneficial
Protected Species				
Dormice	To be fully assessed on completion of surveys in 2023			
Roosting, foraging and commuting bats	Lighting causing disturbance to foraging and commuting bats	No permanent habitat loss or severance of bat habitat would occur as a result of the development, and as the landscape planting matures, bats will benefit from increased foraging resource through provision of more diverse planting and increased features for navigation. Lighting for the operational site will be designed to minimise impacts on bats whilst adhering to required levels for human security and safety. Veteranisation of trees within the site.	Local	Significant Beneficial
Otter and water vole	Increased disturbance, as a result of increased recreation areas, which may deter foraging and commuting otter, and prevent them from commuting through and resting within the site	No permanent habitat loss or severance of otter habitat would occur as a result of the development, and as the landscape planting matures these species are afforded increased foraging and shelter opportunities. A vegetation buffer exists between the proposed development and both the Afon Lwyd, and the tributary to the south of the site, which will protect otters from the increased human use of the site.	Local	Not significant
Breeding birds	Mismanagement of new habitats resulting in failure to establish and lack of suitability for breeding birds	The introduction of reedbeds, wetland meadows and more species-rich grassland is likely to increase the invertebrate prey diversity of the site and increase the diversity of nesting opportunities for a range of bird species. Provision of at least three bird boxes.	Local	Significant Beneficial

Ecological receptor	Potential impact	Embedded design, assumed construction practices and mitigation	Value of receptor	Residual significance of effect during construction
Amphibians and reptiles	Mismanagement of new habitats resulting in failure to establish and lack of suitability for amphibians and reptiles	The introduction of reedbeds, wetland meadows and more species-rich grassland is likely to increase the prey diversity of the site and increase the diversity shelter opportunities for a range of amphibians and reptiles species. Provision of at least three hibernacula for sheltering and/or hibernation amphibians and reptiles	Local	Significant Beneficial
Terrestrial invertebrates	Mismanagement of new habitats resulting in failure to establish and lack of suitability for invertebrates	The habitat creation and enhancement of the proposed development is considered to provide a net increase in extent, diversity, adaptability (though diversification) and condition of habitats for terrestrial invertebrates. The establishment of grassland/meadow habitat will benefit a range of invertebrates within the local area, including the brown-banded carder bee. This increase in higher valued habitats for terrestrial invertebrates is considered a net benefit. Provision of at least three insect hotels. A long-term management plan will be in place to ensure that the operational effects of habitats are permanent and remain of moderate net benefit to biodiversity.	Local (except brown-banded carder bee – National)	Significant Beneficial
INNS	Spread of the invasive species Japanese knotweed from the site during operation	No operational impacts on invasive species are expected as a result of the operation of the site. A Landscape and Environmental Management Plan (LEMP) will be developed for the site to ensure no further spread of these species. There are no proposals to eradicate these species from the entire site.	N/A	Not significant

Figures

Figure 1. Site location plan and proximity to designated sites



REV	DATE	DR	DESCR	CHK	APP	Date
P01	18/05/22	RSJ	FOR INFORMATION	CE	PW	18/05/22

Capital Delivery Alliance
Cynghrair Cyflawni Cyfalaf
Ty Awen, Spooner Close, Coed Kernew, Newport, NP108FZ

Project Name.
Pont-y-Felin CSO

Drawing Title.
Statutory designated sites

Suitability.	Suitability Code.
Issue	S4

Originator	Designer	Date.
RSJ	PW	18/05/22

Internal Project Number	Scale	Rev.
275294-00	1:78,000	P01

Drawing Number.
Figure 2a

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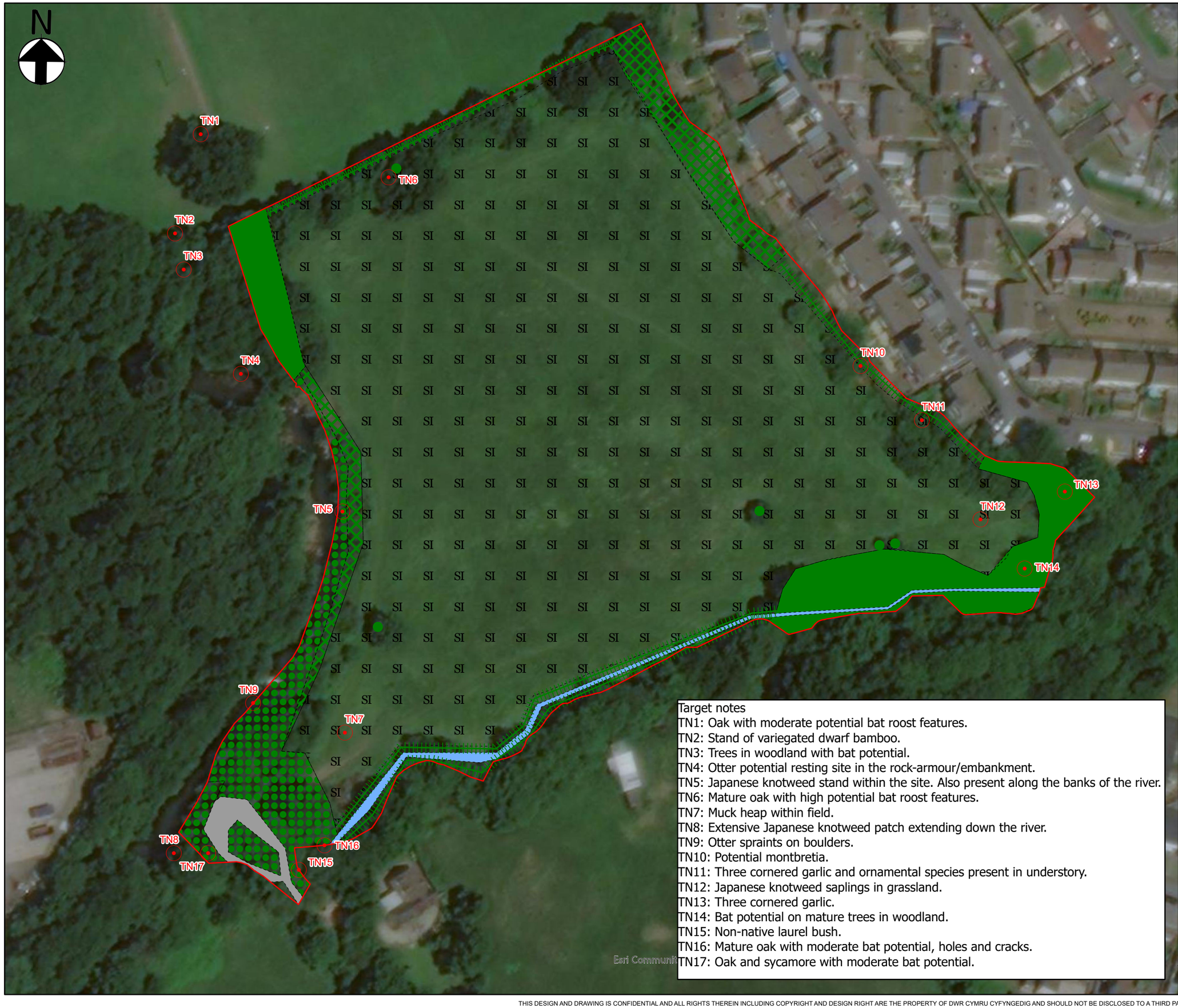
Figure 2. Phase 1 habitat map



Target notes
TN1: Oak with moderate potential bat roost features.
TN2: Stand of variegated dwarf bamboo.
TN3: Trees in woodland with bat potential.
TN4: Otter potential resting site in the rock-armour/embankment.
TN5: Japanese knotweed stand within the site. Also present along the banks of the river.
TN6: Mature oak with high potential bat roost features.
TN7: Muck heap within field.
TN8: Extensive Japanese knotweed patch extending down the river.
TN9: Otter spraints on boulders.
TN10: Potential montbretia.
TN11: Three cornered garlic and ornamental species present in understory.
TN12: Japanese knotweed saplings in grassland.
TN13: Three cornered garlic.
TN14: Bat potential on mature trees in woodland.
TN15: Non-native laurel bush.
TN16: Mature oak with moderate bat potential, holes and cracks.
TN17: Oak and sycamore with moderate bat potential.

- Site boundary
- A3.1 - Broad-leaved parkland/scattered trees
- J2.3.2 - Hedge with trees - species-poor
- J2.3.1 - Hedge with trees - native species-rich
- A1.1.1 - Broadleaved woodland - semi-natural
- A2.1 - Scrub - dense/continuous
- A3.1 - Broadleaved parkland/scattered trees
- B6 - Poor semi-improved grassland
- G2 - Running water
- J5 - Gravel/hard standing
- TN - Target note

0 5 10 20 30 40 50 Metres

REV	DATE	DR	DESCR	CHK	APP	Date
P01	05/05/22	RSJ	FOR INFORMATION	CE	PW	05/05/2022

Capital Delivery Alliance
Cynghrair Cyflawni Cyfalaf
Ty Awen, Spooner Close, Coed Kernew, Newport, NP108FZ

Project Name.
Pont-y-Felin CSO

Drawing Title.
Phase 1 Habitat Survey Results

Suitability.	Suitability Code.
Issue	S4

Originator	Designer	Date.
RSJ	CE	05/06/22

Internal Project Number	Scale	Rev.
275294-00	1:1,000	P01

Drawing Number.
Figure 3