

Llanfair Weir Fish Pass

Salmon for Tomorrow 2

Aquatic Ecological Appraisal

Natural Resources Wales

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Quality information

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1 Introduction

- 1.1 The Proposed Development aims to improve fish passage by full or partial weir removal in the Afon Elwy, including bank stabilisation works.
- 1.2 To assess the potential impacts from the Proposed Development on the aquatic environment, this Aquatic Ecological Appraisal report presents the baseline desk study and walkover survey results and includes the following information:
- Legislation and policy relevant to the aquatic environment (see Appendix B for more detail);
 - Methodologies for aquatic desk and field-based assessments;
 - Technical competencies of ecologists undertaking the surveys;
 - Limitations to the surveys undertaken and any assumptions made;
 - Survey results; and
 - The approach for determining the nature conservation importance of macrophytes, aquatic invertebrates and fish species recorded.

1.1 Legislation

- 1.3 The following legislation is considered relevant to the Proposed Development in relation to aquatic ecology interest features:
- The Water Framework Directive (WFD; EC Directive 2000/60/EC);
 - The Wildlife and Countryside Act (WCA) 1981 (as amended);
 - The Conservation of Habitat and Species Regulations 2017 (the Habitats Regulations);
 - Natural Environment and Rural Communities (NERC) Act 2006 (as amended);
 - The Bern Convention (1979);
 - The Salmon and Freshwater Fisheries Act (1975); and
 - The Eels (England and Wales) Regulations 2009.

2 Methodology

2.1 Desk Study

- 1.4 Records of protected and notable species, aquatic and riparian invasive and non-native species (INNS), WFD classifications and habitat surveys were obtained in September 2020 from a variety of sources documented below.
- 1.5 A 2 km radius from the Project boundary was considered appropriate to obtain an indication of aquatic habitats and species relevant within the wider landscape. Where returned, records from the last 5 years have been detailed in the assessment. Historic records (i.e. over 5 years old) are deemed too old to provide a reliable baseline as habitats and populations fluctuate in response to natural and human impacts. Nevertheless, in some instances, this information may be used for context where more recent records do not exist.
- 1.6 Sources of information:

- Cofnod - North Wales Environmental Information Service (Cofnod), for non-statutory site designations, priority habitats and protected and notable species records (Aderyn, 2020);
 - Local Biodiversity Action Plans (LBAPs) for species and habitats do not formally exist for the county of Conwy, rather the species and habitats listed on Section 7 of the Environment (Wales) Act 2016 which occur within the country are used in place of LBAPs. Therefore, for the purposes of this assessment, the terms Conwy Principal Species and Conwy Principal Habitats are used to refer to such species and habitats;
 - National Resource Wales (NRW) data requests for the area of the Afon Elwy;
 - Multi-Agency Geographic Information for the Countryside (MAGIC) <https://magic.defra.gov.uk/> was consulted in December 2019 to identify international statutory site designations within 10 km, national statutory site designations and priority habitats within 2 km of the Proposed Development;
 - Joint Nature Conservation Committee (JNCC) Website (UK Protected Sites) <http://jncc.defra.gov.uk/>, for citations for Internationally Designated Sites: Special Protection Areas (SPA), Special Area of Conservation (SAC) and Ramsar Sites;
 - Llanfair Project Brief, NRW CE0603-000 (13/05/2020); and
 - Llanfair Environmental Screening, NRW (31/03/2020).
- 1.7 WFD assessment of waterbodies is based on a six-year cycle of assessment, the last cycle (Cycle 2) being in 2015. WFD classifications of waterbodies within a 2 km radius of the Proposed Development are reported.
- 1.8 Under the WFD, surface water body status is classified based on chemical and ecological status or potential:
- Ecological status of waterbodies is classified according to relevant biological, physico-chemical, and hydromorphological parameters on a five-point scale as either 'High', 'Good', 'Moderate,' 'Poor' or 'Bad' Ecological Status. The classification system is based on a worst-case system 'one-out all-out' system, meaning that the overall ecological status is based on the lowest individual element score.
 - Chemical status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in accordance with the Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015). This is assigned on a scale of 'Good' or 'Fail'. Surface water bodies are only monitored for priority substances where there are known discharges of these pollutants; otherwise surface water bodies are reported as being at 'Good' chemical status.
 - Ecological Status is assigned to surface water bodies that are natural and considered by the Environment Agency not to have been significantly modified for anthropogenic purposes. The overall objective for natural surface waterbodies is to achieve 'Good' Ecological Status and 'Good' Chemical Status. Ecological Potential is assigned to artificial and man-made water bodies (such as canals), or natural water bodies that have undergone significant modification; these are termed Heavily Modified Water Bodies (HMWBs).
- 1.9 River Habitat Survey (RHS) data was sourced from <http://www.riverhabitatsurvey.org/home-page/>, however none was available for this site.

2.2 Assumptions and Limitations

- 1.10 The information collected from the desk study represents only those records returned from records centres and is therefore not considered to be a definitive list of aquatic habitats and species identified within the 2 km of the Proposed Development boundary. If records have not been provided, this does not confirm absence from the study area.
- 1.11 The following are inherent limitations of a desk study which includes obtaining data from a Biological Records Centre (BRC):

- recorder bias - biological records are not a representation of the distribution of species within the study area, only records of those species, so the dataset provided by a BRC may be biased towards the favoured locations / 'patches' of taxonomic preference of local recorders (and the locations / favoured 'patches' of those recorders) and the presence (or absence) of specialist recording groups within that county or vice county;
- incomplete data – the current dataset held by a BRC is the most accurate and most up-to-date representation of species within each BRC boundary although records are largely random. Where atlases which have systematically surveyed for taxonomic groups within a given area are available these records therein are a more accurate picture of species assemblage and distribution;
- data availability lag – there is inevitably a lag between the time that records are submitted by recorders and the time that they are verified and entered into the database for that county. Additionally, special interest recording groups (which often hold their own datasets) may only submit their records annually (if at all) which causes further lag in dataset accuracy; and
- changes in data due to the verification process – where new information or specialist knowledge sheds light on the validity of recent or historical submitted records, the verification process may add or remove records which may alter the results of a desk study over time; and
- data location accuracy – accuracy of locations from site walkovers and desk study data can vary depending on precision of GPS and grid references quoted.

3 Results

3.1 Desk Study & site visit

3.1.1 Site Overview

- 1.12 The Proposed Development aims to improve fish passage by full or partial weir removal including bank stabilisation works in the Afon Elwy, east on Llanfair Talhaiarn, Powys (NGR: SH 93055 70474, Appendix A). The existing weir requires repair and improvement as the existing fish pass function is known to be poor (Llanfair Project Brief, NRW CE0603-000 (13/05/2020); and Llanfair Environmental Screening, NRW (31/03/2020)).
- 1.13 The existing weir is eroding and is situated in low lying agricultural pasture, which forms part of the floodplain. At this site the average river width was 15 m and depth 0.5 m (Figure 1). Cobbles (> 6.5 cm) were the dominant (30 %) substrate type in the river downstream of the weir, while pebbles (> 1.6 cm), gravel (> 2 mm) and boulders (> 15 cm) were frequent, each representing 20 % cover, while silt covered only 10 %. Silt and cobbles (> 6.5 cm) were the dominant (> 60% collectively) substrate type upstream of the weir. The riverbed stability was loose underfoot and to be expected in the reach of river, there was a light layer of silt across the cobbles and pebbles and the water was slightly turbid. Deep glide (60 %) was the dominant flow characteristic in the river downstream of the weir, while shallow glide/pool (80 %) was the dominant flow characteristic upstream of the weir (Figure 1). There was extensive suitable spawning substrate for salmonid fish in the area.

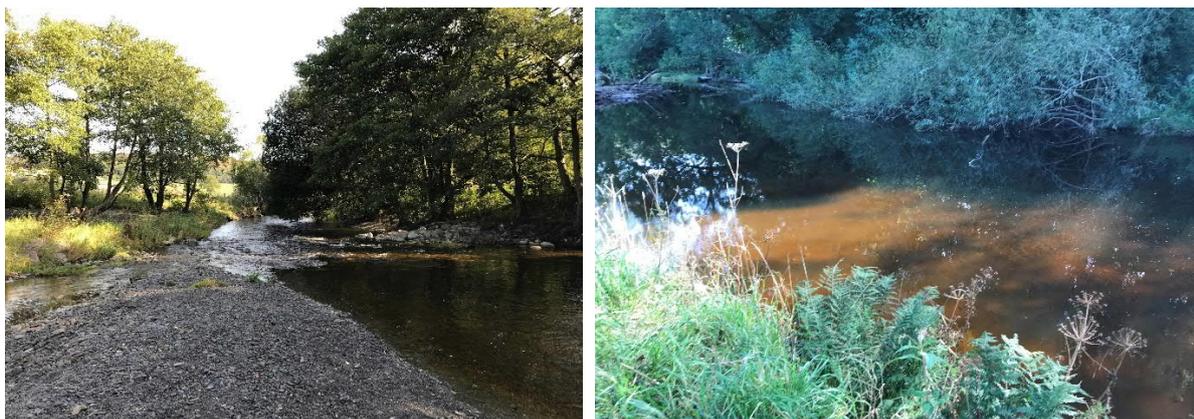


Figure 1. Downstream (left) and upstream (right) of Llanfair weir

3.1.2 Designated Sites

- 1.14 There are no internationally or nationally statutory designated sites located within the relevant 10km or 2km buffers whose reason for designation is due to aquatic habitats, species or their assemblage, similar to that at the location of the Proposed Development.
- 1.15 There are two non-statutory designated sites of relevance to the proposed scheme and of relevance to aquatic habitats. These are the Afon Elwy (N1) and Afon Elwy (N2) Local Wildlife Sites (LWS), which consist of sections of the River Elwy upstream and downstream of the weir, which itself acts as the boundary between the two sites. The sites are designated for running water habitat; no further detail for the reasons for their designation is available. The proposed scheme will serve to improve habitats locally for fish species and improve longitudinal connectivity of habitats between the two LWS, and therefore it is considered that there will be no adverse impacts to the two LWS.
- 1.16 Recommendations for mitigation in relation to the Afon Elwy LWS are made in the Preliminary Ecological Appraisal report, including the implementation of pollution prevention best practice during the works, and the avoidance of direct impacts to habitats within the LWS boundaries.

3.1.3 WFD Classifications

- 1.17 'Elwy - Clwyd to Melai' (WFD water body ID GB110066059960) is a WFD designated waterbody. Achieving an overall status of 'Good': Ecological status: 'Good'; Chemical status: 'Good'.

3.1.4 Fisheries Site Designations and Habitats

- 1.18 There are no statutory, local non-statutory or other non-statutory designated sites whose reason for designation is due to the presence of fish species or their assemblage, similar to that within the vicinity of the Proposed Development. It is likely that the Afon Elwy Local Wildlife Sites are designated in part for the presence of fish species or assemblage, however as described above the proposed scheme will only serve to improve habitat for these species.
- 1.19 Priority habitats and species listed on Section 7 of the Environment (Wales) Act 2016 which occur within the country are used in place of LBAPs. These are: "Rivers and streams" as priority habitats; and the priority fish species: Atlantic salmon (*Salmo salar*), brown/sea trout (*Salmo trutta*), Allis and Twaite shad (*Alosa alosa* and *Alosa fallax*, respectively), European eel (*Anguilla anguilla*) and river lamprey (*Lampetra fluviatilis*). White-clawed crayfish (*Austropotamobius pallipes*) is also listed as a priority species.

3.1.5 Fish Species

- 1.20 A total of 7 fish species were recorded in the desk top study of which 5 (bullhead [*Cottus gobio*] lamprey species, Atlantic salmon, brown/sea trout and European eel) are protected under various legislation – see Table 1. Stone loach (*Barbatula barbatula*) and minnow (*Phoxinus phoxinus*) were the non-protected/non-notable species recorded (Table 1).

Table 1. Fish species documented in existing data.

Common name	Scientific name	Date and distance of record	NGR	Protected (Y/N)	Legislation	Source
Stone loach	<i>Barbatula barbatula</i>	1997 record 1671 m from the Proposed Development	SH 915 697	N	-	Database for the Atlas of Freshwater Fishes
Bullhead	<i>Cottus gobio</i>	2009 record 379 m from Proposed Development	SH 927 702	Y	Appendix II Habitats Directive	Rare and Protected Species records across Wales 1975 to 2012 (Records from the Cofnod area)
Lamprey sp.	<i>Lampetra</i>	1997 record 373 m from Proposed Development	SH 928 702	Y	UK BAP priority species; Appendix II Habitats Directive; Environment (Wales) act species of principal importance	BRC (2020)
Minnow	<i>Phoxinus phoxinus</i>	1997 record 1671 m from Proposed Development	SH 915 697	N	-	Database for the Atlas of Freshwater Fishes
Atlantic salmon	<i>Salmo salar</i>	2009 record 379 m from Proposed Development	SH 927 702	Y	UK BAP priority species; Appendix II,V Habitats Directive; Environment (Wales) act species of principal importance	Rare and Protected Species records across Wales 1975 to 2012 (Records from the Cofnod area)
Brown/sea trout	<i>Salmo trutta</i>	2009 record 1402 m from Proposed Development	SH 941 713	Y	UK BAP priority species; Environment (Wales) act species of principal importance	Rare and Protected Species records across Wales 1975 to 2012 (Records from the Cofnod area)
European eel	<i>Anguilla anguilla</i>	2009 record 1402 m from the Proposed Development	SH 927 702	Y	Environment (Wales) act species of principal importance	Rare and Protected Species records across Wales 1975 to 2012 (Records from the Cofnod area)

3.1.6 Aquatic Macroinvertebrate

1.21 No protected, notable or invasive aquatic macroinvertebrate species were identified in the desk study results.

3.1.7 Macrophytes

1.22 A total of six notable aquatic macrophytes species were found in the desk study – see Table 2.

Table 2. Macrophytes records within 2 km radius from the Proposed Development.

Common names	Species	Date and distance of record	NGR	Designation
Fountain Feather Moss	<i>Hygroamblystegium fluviatile</i>	1978 record approximately 248 m from the Proposed Development	SH 929 702	LBAP
-	<i>Neckera pumila</i>	1988 record approximately 1835 m from the Proposed Development	SH 91 69	LBAP
-	<i>Riccardia latifrons</i>	1905 record approximately 1122 m from the Proposed Development	SH 92 69	LBAP
-	<i>Schistidium rivulare</i>	1978 record approximately 248 m from the Proposed Development	SH 929 702	LBAP
-	<i>Syntrichia papillosa</i>	2019 record approximately 240 m from the Proposed Development	SH 928 703	LBAP
-	<i>Thamnobryum alopecurum</i>	1978 record approximately 248 m from the Proposed Development	SH 929 702	LBAP

3.1.8 Invasive Non-Native Species

1.23 Japanese Knotweed, *Reynoutria* [formerly *Fallopia*] *japonica*, an Invasive Non-Native Species (INNS) was recorded at Llanfair. This is a Schedule 9 species listed in Schedule 9 of the Wildlife and Countryside Act 1981. Himalayan balsam, *Impatiens glandulifera*, another Schedule 9 species, was also recorded on the banks of the river in this area – see Table 3.

Table 3. Invasive Non-Native Species records within a 2 km radius from the Proposed Development

INNS species	Year recorded	Locality	National Grid Reference	Data provider
Japanese knotweed	2020	Llanfair Weir	SH 93055 70474	Site visit September 2020
Himalayan balsam	2020	Llanfair Weir	SH 93055 70474	Site visit September 2020

4 Summary

1.24 The Proposed Development aims to improve fish passage by full or partial weir removal.

1.25 The weir forms the boundary between the Afon Elwy (N1) and Afon Elwy (N2) Local Wildlife Sites (LWS), which consist of sections of the River Elwy upstream and downstream of the weir.

1.26 Elwy - Clwyd to Melai (GB110066059960) is a WFD designated waterbody. Achieving an overall status of 'Good'.

- 1.27 There was extensive suitable spawning substrate for salmonids upstream and downstream of the weir with large areas of suitable gravels (>75%).
- 1.28 A total of 7 fish species were recorded in the desk-based study of which 5 (bullhead, lamprey species, Atlantic salmon, brown/sea trout, European eel) are protected under various legislation. A total of six notable aquatic macrophytes species were identified in the desk study.
- 1.29 Two WCA Schedule 9 INNS plants were found at the area during the walkover survey, Himalayan balsam and Japanese knotweed.

5 Recommendations

- 1.30 Works should be undertaken in accordance with Guidance for Pollution Prevention – Working or Maintenance in or Near Water (withdrawn 2015), especially within the Afon Elwy LWS and in order to protect the extent of the LWS downstream of the weir. Works should otherwise avoid direct impacts to habitats within the boundaries of the Afon Elwy LWS.

Works should avoid key fish migration timings – see

- 1.31 Table 4. Fish surveys are not considered necessary due to the abundance of existing data records.

Table 4. Key fish migration timings (US = Upstream DS = Downstream)

Common name	Latin name	Life stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sea trout	<i>Salmo trutta</i>	Adult (US)												
Sea trout	<i>Salmo trutta</i>	Smolt (DS)												
Atlantic salmon	<i>Salmo salar</i>	Adult (US)												
Atlantic salmon	<i>Salmo salar</i>	Smolt (DS)												
River lamprey	<i>Lampetra fluviatilis</i>	Adult (US)												
River lamprey	<i>Lampetra fluviatilis</i>	Juvenile (DS)												
Sea lamprey	<i>Petromyzon marinus</i>	Adult (US)												
Sea lamprey	<i>Petromyzon marinus</i>	Juvenile (DS)												
European eel	<i>Anguilla anguilla</i>	Juvenile/ Yellow (US)												
European eel	<i>Anguilla anguilla</i>	Adult/ Silver (DS)												

- 1.32 Aquatic macroinvertebrate surveys both upstream and downstream of the weir should be completed to understand the potential impacts of the works on potential notable aquatic macroinvertebrate species, and potential constraints posed by macroinvertebrate INNS.
- 1.33 Aquatic macrophyte INNS surveys both upstream and downstream of the weir should be completed to understand the potential impacts of the works on the potential spread of INNS through construction.

- 1.34 Works should be conducted in accordance with recommendations made in the accompanying Preliminary Ecological Appraisal.

5.1 References

Aderyn (2020). LERC Wales' Biodiversity Information & Reporting Database. Accessed September 2020 <https://aderyn.lercwales.org.uk/>.

BRC (2020) Biological Records Centre. Accessed September 2020 <https://www.brc.ac.uk/>.

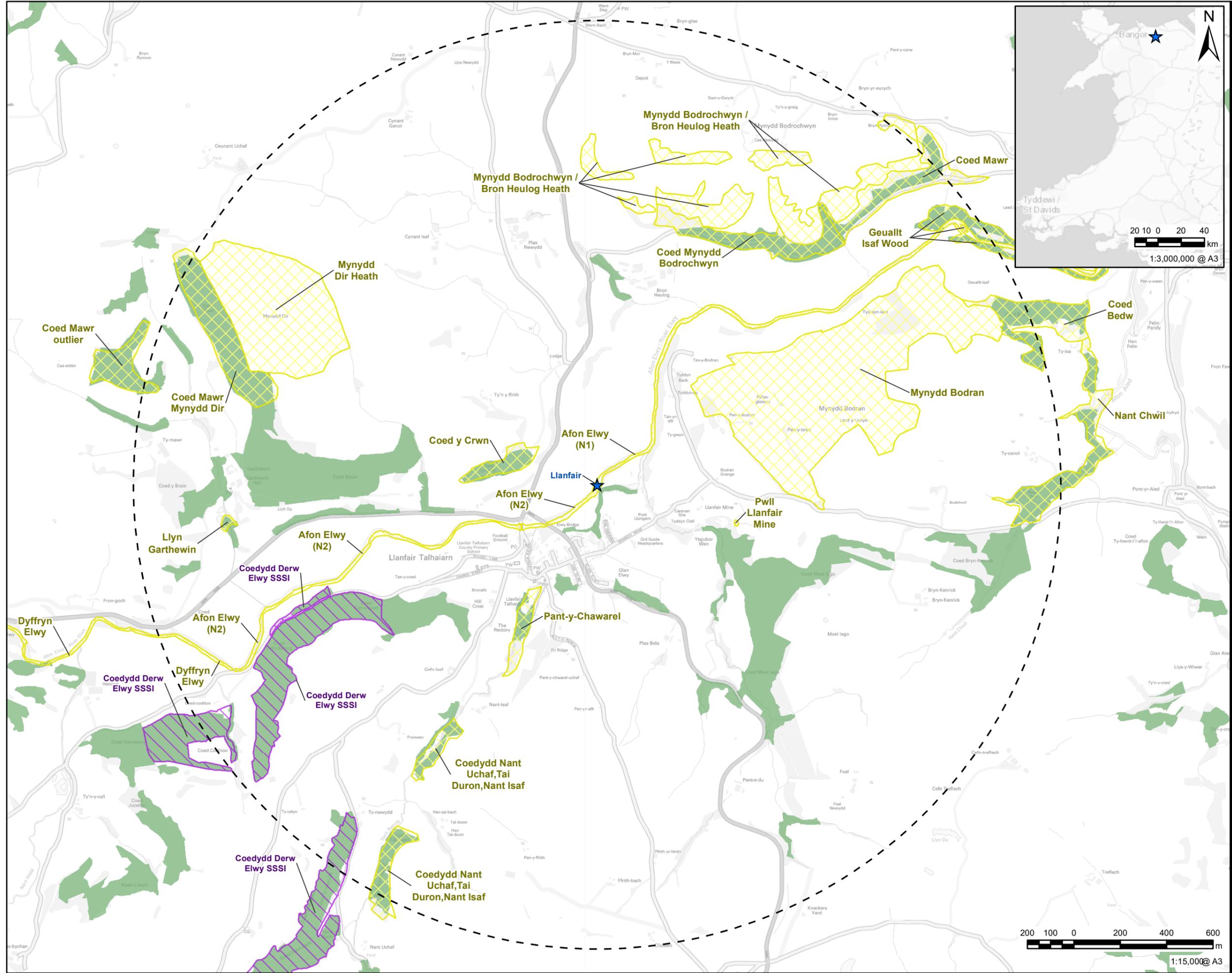
CIEEM (2017). Guidelines for Preliminary Ecological Appraisal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.

Environment Alliance (2007) Works in, near or over watercourses, PPG5: prevent pollution. Withdrawn 14/12/2015 <https://www.gov.uk/government/publications/works-in-near-or-over-watercourses-ppg5-prevent-pollution>.

Riverdene Consultancy (2018) River Habitat Surveys. Accessed 2020 <http://www.riverhabitatsurvey.org/home-page/>.

Species and Habitats of Principal Importance Section 7 of the Environment (Wales) Act 2016.

Appendix A – Site Location



NOTES

1: Wildlife Sites supplied by Cofnod.

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ISSUE PURPOSE

FINAL

PROJECT NUMBER

60638079

SHEET TITLE

Llanfair TH Site Designated Sites

SHEET NUMBER

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Appendix B – UK Wildlife Legislation

Water Framework Directive (England and Wales) Regulations 2017

- 1.36 The Water Framework Directive (WFD; EC Directive 2000/60/EC) came into force in 2000. The WFD introduced a comprehensive river basin management planning system to protect and improve the ecological and chemical health of our rivers, lakes, estuaries, coastal waters and groundwater. At the heart of the WFD is the philosophy to “make water bodies better” through sustainable development for the joint benefits of aquatic habitats and the human environment.
- 1.37 The WFD requires member states to achieve “Good status” for all groundwater and surface waters (rivers, lakes, transitional waters, and coastal waters) by certain target dates. For surface water, overall status comprises two elements: “Good ecological status” and “Good chemical status”. Ecological status is defined by the biological condition or health of a watercourse, in combination with water quality and physical conditions that underpin biological conditions. The classification of ecological status considers biological elements (the abundance of aquatic flora and fauna), physical habitat availability (hydromorphology), and water quality factors such as the availability of nutrients, salinity, temperature and pollution by key chemical pollutants. The biological elements used as indicators of ecological quality include fish, macroinvertebrates, macrophytes and diatoms.
- 1.38 Any proposed developments or activities that have the potential to affect the water environment require a WFD Assessment (WFA). Compliance with the WFD means attainment of Good ecological status, prevention of deterioration in status, and prevention of failure to achieve future attainment of good status where it is not already achieved within water bodies. However, WFD Article 4.7 provides legislation for exemption conditions that could allow implementation of schemes that cause deterioration in ecological status, for example for reasons of overriding public interest.
- 1.39 The WFD was originally transposed into UK law through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. The 2017 Regulations revoke and replace the 2003 Regulations. The 2017 Regulations serve the dual purpose of consolidating the 2003 Regulations, which had been amended a number of times, and making aspects of the Regulations more detailed and transparent.

The Wildlife and Countryside Act (WCA 1981 as amended)

- 1.40 This Act covers the protection of species and habitats including SSSI designated sites. The Act makes it an offence (subject to exceptions) to intentionally kill, injure or take any wild animal listed on Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places. Aquatic species protected that maybe relevant to the Proposed Development are white-clawed crayfish and some other aquatic invertebrate species.
- 1.41 The white-clawed crayfish is protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and it is illegal to harm, disturb and take white-clawed crayfish without a licence. This legislation means that crayfish are of a material consideration within the planning process.
- 1.42 Schedule 9 provides lists of non-native flora and fauna that it is an offence to release or cause to spread in the wild. Of primary relevance in the context of proposed developments are flora e.g. invasive non-native plant species.
- 1.43 Part 2 of the WCA details the law regarding SSSIs and other protected areas within Great Britain.

The Conservation of Habitat and Species Regulations 2010

- 1.44 These regulations enact the European Habitats Directive (92/43/EEC) in England and Wales, which affords special protection to designated habitats and species. The regulations introduce licensing requirements for developments that may have an impact on European species.

- 1.45 The Habitats Directive provides the protection of key habitats and species considered of European importance. Annex II and V of Habitats Directive states the preservation, protection and improvement of the quality of the environment, including the conservation of natural habitats, wild fauna and flora, are an essential objective of general interest pursued by the community. Specific to the Proposed Development are the freshwater habitats that include standing and running water that are of Principal Importance in England and several aquatic species such as fish, aquatic invertebrates and macrophytes.
- 1.46 The Regulations place a duty on the Secretary of State to propose a list of sites which are important for either habitats or species (listed in Annexes I and II of the Habitats Directive respectively) to the European Commission. Once the Commission and EU Member States have agreed that the sites submitted are worthy of designation, they are identified as Sites of Community Importance (SCIs). The EU Member States must then designate these sites as Special Areas of Conservation (SACs) within six years.
- 1.47 The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb animals listed in Schedule 2. However, these actions can be made lawful through the granting of licenses by the appropriate authorities. Licenses may be granted for several purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on wild population of the species concerned.

Natural Environment and Rural Communities (NERC) Act 2006

- 1.48 The NERC Act places a duty on Government Departments and public authorities to have regard for the conservation of biodiversity. Habitats and species of Principle Importance for nature conservation in England are listed pursuant to Section 41. This list is to be used by decision-makers, including local authorities, to guide the implementation of their duties under Section 40 of the NERC to have regard to the conservation of biodiversity in England, when carrying out their normal functions. This list includes several freshwater habitats and species.

The Bern Convention (1979)

- 1.49 The Bern Convention (1979) also known as the Convention on the Conservation of European Wildlife and Natural habitats aims to ensure conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species). Several species listed in Appendix II may be present within the Project red line boundary.

The Salmon and Freshwater Fisheries Act (1975)

- 1.50 The Salmon and Freshwater Fisheries Act ((1975), as amended under the Environment Act 1995) aims to protect all migratory and freshwater fish stocks, with a specific focus on salmon and trout, from activities that could result in direct mortality, barriers to migration and degradation of habitats. Migratory and freshwater species are expected to be present within the Project red line boundary.
- 1.51 This Act is the primary legislation in England and Wales that specifies a requirement to provide measures that will prevent the entry of biota into a water abstraction. Section 14 of this Act requires the fitting of screens or other devices that prevent the entry of salmonid smolts or adults into water intakes where the water is frequented by migratory salmonids (meaning salmon or sea trout).

The Eels (England and Wales) Regulations 2009

- 1.52 The Eels (England and Wales) Regulations 2009 (The Regulations) came into force on 15 January 2010 to support the UK in implementing EC Council Regulation (1100/2007) (the EC Eel Regulation). Under this European Regulation, the UK must take actions to halt and reverse the decline in the European eel stock,

aiming to meet a target set for the number of mature adult eels leaving each river basin to return to spawn at sea.

- 1.53 The EC Eel Regulation requires UK to consider eel passage. The EA have prepared Eel Management Plans for Defra/Welsh Government for each River Basin District in England and Wales. These outline the current situation and how we intend to achieve the EC target. The Regulations give us powers to help achieve this target. Part 4 of the Regulations provide the EA with new powers to ensure safe passage for eel and requires the provision of screening to be considered for eels.

