

CARDIGAN TIDAL FLOOD RISK MANAGEMENT SCHEME

Volume 1: Environmental Statement Chapter 6 -Biodiversity and Nature Conservation

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Cyfoeth Naturiol Cymru
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6. Biodiversity and Nature Conservation

6.1 Introduction

This chapter assesses the likely significant effects from construction and operation of the Scheme, with respect to Biodiversity and Nature Conservation. This chapter details the baseline environment, assessment of Likely Significant Effects (LSE), and where necessary, mitigation measures to avoid, reduce or minimise significant effects are proposed.

This chapter should be read in conjunction with the following topic chapters due to potential interactions between topics:

- Chapter 3: Alternatives & Design Evolution
- Chapter 8: Landscape and Visual
- Chapter 10: Water Environment
- Chapter 11: Land Use and Soils
- Chapter 12: Cumulative Effects

6.2 Competent expert evidence

The following Assessment was authored and reviewed by the following competent individuals.

Author - Jonathan Goodrick BSc MCIEEM

Review - Owen Peat MSc MCIEEM CEnv C.WEM MCIWEM

The sections of this report relating to fish were taken from Cardigan Tidal Flood Risk Management Scheme – Fish Ecology Technical Note (APEM Ltd, 2026a) Appendix 6.2 written by

Author - Edward Rickard - BSc. (Hons), MRes, MRSB

Review - Nick O'brien - BSc. (Hons), MSc., MCIEEM

6.3 Planning policy and legislative context

This section describes the relevant legislation, policy and guidance that has been considered in developing the Scheme design, and in the assessment of effects with respect to Biodiversity and Nature Conservation. This legislation, policy and guidance has been reviewed and where applicable has informed the assessment through the identification and categorisation of sensitive receptors, requirements for mitigation, and the scope and/or method of assessment.

6.3.1 International and national policy

- Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017;
- Marine Coastal Access Act (MCAA) 2009;
- The Conservation of Habitats and Species Regulations 2017 (as amended);

- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019;
- The Marine Strategy Regulations 2010;
- The Ramsar Convention;
- Convention on the Conservation of Migratory Species (CMS) of Wild Animals (Bonn Convention) 1979;
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1979;
- Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) 1992;
- The Wildlife and Countryside Act (WCA) 1981 (as amended);
- The Water Environment (WFD) (England and Wales) regulations 2017;
- The Environment Act 2021;
- Environment Act Wales 2016;
- Salmon and Freshwater Fisheries Act (SAFFA) 1975 (as amended);
- The Eels (England and Wales) Regulations 2009;
- Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) 1973;
- Invasive Alien Species (Enforcement and Permitting) Order 2019;
- Natural Resources Policy (Llywodraeth Cymru Welsh Government, 2019)
- Planning Policy Wales (Edition 12) (Llywodraeth Cymru Welsh Government, 2024);
- Planning Policy Wales Technical Advice Note 5: Nature Conservation and Planning (Llywodraeth Cymru Welsh Government, 2009)

6.3.2 Local policy

- NRW Mid Wales Area Statement (NRW, 2023); and
- The Ceredigion Local Development Plan (Ceredigion County Council, 2013).

6.4 Assessment guidance

The general guidance used in this assessment is described within Chapter 4: EIA Methodology.

Guidance utilised which is specific to the assessment of Biodiversity and Nature Conservation is listed below:

- Guidance for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2024).

6.5 Consultation

The EIA scoping opinion process is described in Section 4.5, this identified Biodiversity and Nature Conservation as a topic requiring consideration as part of the EIA.

A consultation and design presentation meeting was held on 18th November 2025 with representatives of NRW (including representatives of its regulatory functions) and Ceredigion County Council (regulatory/planning functions). In this meeting, the context and need for the

Scheme was presented, along with the design development and the decisions taking to balance the objectives of the Scheme with the sensitivity of the Scheme Area. The discussion and outcomes of this meeting identified the design solutions to be a pragmatic approach; that opportunities taken to integrate habitat development and opportunities for species were welcomed, and that marine site impacts were not anticipated. The route to predicting natural colonisation of specific habitat types – notably saltmarsh – was a point of discussion, noting the balance between working with natural processes and guaranteeing outcomes, however the discussion recognised the evidence available of habitats which have previously developed within and adjacent to the site, and relating to the predicted impacts of climate change, as being accounted for within the proposed approaches and range of acceptable outcomes.

The current version of this chapter was produced after pre-application consultation, and the following changes were made as a result of consultee comments:

- 6.5 Consultation. Added details of pre-application consultation
- 6.8.3 Species Otter. Added citation for 2014 survey report. Clarified over the status of the Scout hut boat shed and that it was inspected during the 2025 survey.
- 6.9 Assessment of effects Adaptation. Corrected reference chapter for seed mix information.
- 6.10 Mitigation measures Aquatic noise and vibration. Amended the recommendation text in line with consultee comments.
- 6.15 References. Updated references (and citations throughout document) to reflect any relevant version updates.

For full details of changes to the Environmental Statement in response to consultee comments, see the Pre-Application Consultation Report.

6.6 Scoped in receptors and potential effects

The Biodiversity and Nature Conservation topic was scoped into the EIA due to the potential for LSE during the construction and operational phases of the Scheme. Table 6-1 and Table 6-2 outline the LSE which are to be assessed within this Chapter.

Table 6-1 Scoped in Likely Significant Effects (construction)

Environmental Effect	Receptor
The site is partially within a sensitive location, with potential impacts on the following protected sites and associated features: Afon Teifi Special Area of Conservation (SAC) / Site of Special Scientific Interest (SSSI) Cardigan Bay and West Wales Marine SAC	Protected sites and their associated features
Potential impacts to protected habitats and species, both terrestrial and estuarine. Including direct impacts to intertidal habitats (e.g. habitat loss, impacts from vehicle movements on the foreshore), and potential impacts on migratory and non-migratory fish species.	Protected habitats and species including: Intertidal mudflats; Saltmarsh; Poor semi-improved neutral; grassland; Running water; Broadleaved scattered trees;

	Amenity grassland; Amphibians and reptiles; Bats; Birds; Fish; Invertebrates; Otter; and West European hedgehog.
Potential spread of Invasive Non-Native Species (INNS).	Habitats and species
Potential negative effect on trees in the Scheme Area due to potential removal/felling and construction works.	Trees and Root Protection Areas (RPAs)

Table 6-2 Scoped in Likely Significant Effects (operation)

Environmental Effect	Receptor
Reduced flood risk could result in reduced potential for environmental pollution during and following a flood event.	SAC and SSSI
Impacts to protected species from artificial lighting.	Nocturnal species

6.7 Methodology

The purpose of this section is to describe how Likely Significant Effects relating to Biodiversity and Nature Conservation have been assessed. A more general explanation of assessment methodology used throughout the EIA is provided in Chapter 4: EIA Methodology.

6.7.1 Definition of study area

The Zone of Influence (ZoI) is the area over which ecological features may be affected by biophysical changes as a result of the Scheme and associated activities. Zones of Influence vary for different ecological features depending on their sensitivity and connectivity to the Scheme Area. This approach is in line with good practice guidelines published by CIEEM (CIEEM, 2024).

The Zones of Influence for the Scheme were developed to include:

- Areas directly within the land take for the proposed permanent development including permanent access routes for future maintenance (not including adopted highways); this comprises the entire Scheme Area.
- Areas which could be temporarily affected during construction due to temporary access, working areas and noise and visual disturbance; this comprises the entire Scheme Area plus a 2km buffer for designated sites.
- Areas with potential to be impacted by potential hydrological disruption during construction and operation (e.g. within and downslope / downstream of the Scheme Area); this comprises the entire Scheme Area plus a 2km buffer.

When in operation, the Scheme would not generate any noise, vibration or air pollution apart from occasional maintenance visits.

6.7.2 Baseline information

Baseline data collection has been undertaken to obtain information over the study areas. This section provides the approach to collecting baseline data.

The following data sources have been accessed to inform the baseline with respect to Biodiversity and Nature Conservation:

- Natural Resources Wales Cardigan Tidal Flood Risk Management Scheme – Preliminary Ecological Appraisal Update (Binnies UK Ltd, 2025a) Appendix 6.1;
- Cardigan Tidal Flood Risk Management Scheme – Fish Ecology Technical Note (APEM Ltd, 2026a) Appendix 6.2;
- Afon Teifi Saltmarsh – niche Assessment (Park, 2025) Appendix 6.3;
- Bat Survey Report. Buildings and Structures at The Strand, Aberteifi. For Cyfoeth Naturiol Cymru/Natural Resources Wales (TerraAqua Ecological Services Ltd, 2025) Appendix 6.4;
- Cardigan flood risk management. Otter survey report. June 2nd 2025 (updated 20/6/2025) (The Otter Consultancy, 2025) Appendix 6.5;
- Cardigan Tidal Flood Risk Management Scheme - Habitats Regulation Assessment (Apem Ltd, 2026b);
- Cardigan TFRMS -Preliminary Ecological Appraisal (Binnies UK Ltd, 2023a);
- Wintering Bird Surveys Cardigan Tidal Flood Risk Management Scheme (Wyndrush Wild, 2023a) Appendix 6.6;
- Breeding Bird Surveys Cardigan Tidal Flood Risk Management Scheme (Wyndrush Wild, 2023b) Appendix 6.7;
- Afon Teifi / River Teifi Proposed Flood Defences Cardigan. A Preliminary Roost Assessment Report (Just Mammals Ltd, 2023) Appendix 6.8
- Cardigan Flood Consequence Assessment (Binnies Uk Ltd, 2026)
- Cardigan Tidal Flood Risk Management Scheme Noise and Vibration Impact Assessment (Ramboll UK Ltd, 2025) Appendix 5.1
- Arboricultural Method Statement Cardigan Tidal FRMS (RSK ADAS Ltd, 2026)
- Statutory designated site information from the Joint Nature Conservation Committee (JNCC, 2015);
- Data Map Wales Intertidal Phase 1 Habitat Survey (Llywodraeth Cymru Welsh Government, 2026);

- Habitat Regulations 9A Report for Wales 2019-2024: Habitats data (NRW, 2026)
- Light pollution mapping (Stare, 2025); and
- Publicly available Ordnance Survey maps and aerial imagery (2014-present).

Species records obtained from the various sources were limited to the last ten years to ensure validity.

Future baseline

The assessment has considered the likely evolution of the baseline without the implementation of the Scheme, presented in Section 6.8. The future baseline for the Terrestrial ecology assessment has been established in accordance with the Guidelines for Ecological Impact Assessment (CIEEM, 2024) and includes the following:

- Trends in species population and distribution;
- Rates of potential colonisation by new species and habitats;
- Ecological processes, such as succession;
- Likely changes in agricultural practice, including agri-environmental schemes;
- Expected outcomes from current and predicted management practices;
- Trends in habitat quality e.g. resulting from pollution or pollution control;
- Environmental trends e.g. climate change; and
- Management plans and conservation objectives for designated sites.

The following chapters will also be relevant to informing the future baseline with respect to Biodiversity and Nature Conservation:

- Refer to Chapter 8: Landscape and Visual assessment for additional description of the post construction landscape design;
- Refer to Chapter 10: Water environment for additional evaluation associated with the water environment and aquatic ecosystems; and
- Refer to Chapter 11: Land Use and Soils for additional information on Scheme Area soil composition.

6.7.3 Significance

The methodology for assessing effects is based on the principle that the environmental effects of the Scheme, in relation to a receptor, should be determined by identifying the receptor's sensitivity (importance), assessing the magnitude of impact the Scheme would have on the receptor and then combining these two elements to identify the significance of effect (using professional judgement where necessary). The Guidelines for Ecological Impact Assessment (CIEEM, 2024) uses the term 'importance' as opposed to 'sensitivity' in categorising ecological

features; however, for consistency with other chapters reference has also been provided below to the corresponding sensitivity of each receptor.

Sensitivity

The sensitivity of each identified terrestrial ecology receptor has been assigned for the assessment based on criteria set out in Table 6-3.

The CIEEM (2024) guidelines recommend that the importance of each ecological feature is considered within a defined geographic reference. To align with the sensitivity categories used within other Environmental Statement chapters in this assessment, regional and county importance have been combined within the moderate sensitivity category, and district and local importance have been combined within the low sensitivity category. Table 6-3 provides further detail on the initial criteria for establishing the importance of ecological receptors comprising designated sites, habitats and species with reference to this geographic context, and the sensitivity attributed to each of these receptors. The descriptions within the table are based on the general weight of protection and scarcity applied to receptors at a theoretical level. To determine the final sensitivity of the receptor utilised for this assessment this has been combined with the contextual information about distribution and abundance within the locality of the Scheme as determined by baseline ecology surveys. If a receptor is later identified in the assessment as being of lower sensitivity in the context of the Scheme and location, it does not mean that it has not been considered as an Important Ecological Feature, and by default all scoped-in receptors are acknowledged as having been identified as Important or potentially important in those terms.

Table 6-3 Criteria for establishing the sensitivity (value) of ecological receptors

Sensitivity of receptor	Importance of receptor	Typical descriptors
Very high	International and European	An internationally designated site or candidate site, i.e. a Special Protection Area (SPA), provisional SPA, SAC, candidate SAC, Ramsar site, or area which would meet the published selection criteria for designation (e.g. SACs and SPA: site condition, citations and conservation objectives (JNCC, 2001)) A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat that is essential to maintain the viability of a larger whole Sites supporting populations of internationally or European (including Annex II) important species
High	National (UK)	A nationally designated site, i.e. SSSI, NNR, or discrete area which would meet the published selection criteria for national designation (e.g. SSSI selection guidelines (JNCC, 2013). Viable populations of nationally important species that are of threatened or rare conservation status
Moderate	Regional / County	Regional: Sites that exceed the county-level designation but fall short of SSSI selection criteria Smaller areas of key habitat identified as a habitat of principal importance essential to maintain wider viability

Sensitivity of receptor	Importance of receptor	Typical descriptors
		Viable populations of nationally scarce species identified in the regional biodiversity plans or strategies and/or regularly occurring populations of a regionally important species. County: Wildlife/nature conservation sites designated at the county level, such as Local Wildlife Sites (LWS) and Local Nature Reserves (LNR). A viable area of habitat identified as a Habitat of Principal Importance or smaller areas of such habitat essential to maintain wider viability Areas of habitats and species identified in county or equivalent authority plans or strategies, such as areas of key habitat / Habitats of Principal Importance (HPI) identified in local plans and strategies. Viable populations of Species of Principle Importance Viable populations of species important at the county scale
Low	District / Local	District: Sites recognised by local authorities, e.g. sites of district importance or considered to meet published ecological selection criteria for such designation. Viable areas of habitat or populations/assemblages of species of district importance. Local: Areas of habitat or populations/assemblages of species that appreciably enrich the local habitat resource (e.g. ponds) Sites that retain other elements of semi-natural vegetation due to their size, quality or the wider distribution within the local area or identified in the local Biodiversity Action Plan (BAP). Viable populations of species identified in local plans and strategies and/or regularly occurring populations of species important at the local or district scale.
Negligible	Within the ZoI only	Sites that retain habitats and/or species of limited ecological importance due to their size, species composition or other factors.

Magnitude of impact

The approach used is based on professional judgment and experience with reference to defined criteria from the CIEEM Guidelines for Ecological Impact Assessment (CIEEM, 2024), with the starting point that all receptors scoped-in following the Scoping Opinion have been included for further assessment.

For this assessment the criteria for assessing magnitude of impact in Table 6-4 will be applied.

Table 6-4 Criteria for assessing the magnitude of impact

Magnitude of impact	Description and nature of impact
Large	The impact permanently (or over the long-term) negatively or positively affects the conservation status of a habitat/species, reducing or increasing the ability

	to sustain the habitat or the population level of the species within a given geographic area through environmental change. Relative to the wider habitat resource/species population, a large area of habitat or large proportion of the wider species population is affected. For designated sites, integrity is compromised.
Medium	The impact permanently (or over the long term) negatively or positively affects the conservation status of a habitat/species reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area through environmental change. Relative to the wider habitat resource/species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected.
Small	The quality or extent of designated sites or habitats or the sizes of species' populations, experience some small-scale reduction or increase. These impacts are likely to be within the range of natural variability and there is not expected to be any permanent change in the conservation status of the species/habitat or integrity of the designated site. The impact is unlikely to modify the evaluation of the ecological feature in terms of its importance.
Negligible	Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of species populations would experience little or no change. Any impacts are likely to be within the range of natural variability and there would be no short-term or long-term change to conservation status of habitats/species or the integrity of designated sites.
Neutral	An impact, the level of which is so low, it is not discernible on designated sites or habitats or the size of species' populations, or changes that balance each other out over the lifespan of a project.

Significance of effect

Categories of significance will be applied to effects, based on the combination of magnitude of impact and sensitivity of receptor as shown in Table 6-5. Effects that are moderate or major are deemed to be significant. The resultant effects may be either negative, positive or neutral, depending on the nature of the impact.

Table 6-5 Significance matrix

Receptor Sensitivity	Magnitude of impact				
	Neutral	Negligible	Small	Medium	Large
Very high	None	Minor	Moderate (significant)	Major (significant)	Major (significant)
High	None	Minor	Moderate (significant)	Moderate (significant)	Major (significant)
Moderate	None	Neutral	Minor	Moderate (significant)	Major (significant)
Low	None	Neutral	Neutral	Minor	Moderate (significant)
Negligible	None	Neutral	Neutral	Neutral	Minor

6.8 Baseline environment and likely future evolution

The section below describes the baseline environment and its likely future evolution. The current baseline environment scenario refers to the current state of environmental characteristics within the Scheme Area.

6.8.1 Designated sites

Statutory designated sites

Three statutory designated sites were recorded within 2 km of the Scheme Area. Site specific details including distance and direction from the Scheme Area and reason for notification and integral value can be found in Table 6-6.

The Teifi Estuary Woodlands & Marshes SSSI (including the Teifi Marshes Wildlife Trust of South and West Wales reserve) although hydrologically connected to the sites is upstream of the Scheme Area and therefore were scoped out of the EIA at scoping stage. The Teifi Estuary Woodlands & Marshes SSSI includes within its area the Coedmor National Nature Reserve (NNR) and this has also been scoped out as it is upstream of the proposed works.

Table 6-6 Designated statutory nature conservation sites within the Zone of Influence

Designated Site Name	Distance from Survey Area (approx.)	Reasons for Notification and Integral Value	Sensitivity of Receptor
Afon Teifi SSSI	Within the Scheme	The Afon Teifi is of special interest for a range of river types and associated riverside habitats; flowering plants; bryophytes; otter <i>Lutra lutra</i> ; Cetti's warbler <i>Cettia cetti</i> ; bottlenose dolphin <i>Tursiops truncatus</i> ; brown hairstreak <i>Thecla betulae</i> ; fish; dragonflies and a variety of other invertebrates as well as both breeding and wintering bird communities and for geomorphological features at Cenarth and Cors Caron. This includes the Teifi Marshes Nature Reserve (approx. 150m west of the Scheme Area east of the A487 road bridge)	High
Afon Teifi SAC	Within the Scheme	Designated for; Atlantic salmon <i>Salmo salar</i> ; bullhead <i>Cottus gobio</i> ; river lamprey <i>Lampetra planeri</i> ; floating water-plantain <i>Luronium natans</i> ; otter, clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels, rivers with floating vegetation often dominated by water crowfoots. This includes the Teifi Marshes Nature Reserve (Approx 150m west of the Scheme Area east of the A487 road bridge)	Very High
Cardigan Bay SAC	Immediately adjacent to	Designated for Bottlenose dolphin, Atlantic Grey Seal <i>Halichoerus grypus</i> , Sea Lamprey	Very High

and West Wales Marine SAC	the scheme (Downstream of Cardigan Bridge (Castle Street))	<i>Petromyzon marinus</i> , River Lamprey, Harbour porpoise <i>Phocoena Phocoena</i> . Designated habitats include Reefs, Sandbanks (slightly covered by seawater at all times) and Sea caves (submerged or partially submerged).	
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There are no other non-statutory sites within 2km of the Scheme area as such, no further consideration is given to non-statutory designated sites as part of this chapter.

6.8.2 Habitats

A Phase 1 Habitat map for the Survey Area is presented in Figure 6.1. The following habitats are considered within this Environmental Statement:

- Broadleaved scattered trees (A3.1)
- Running water (G2)
- Intertidal mudflats (H1.1)
- Saltmarsh (H2.6)
- Amenity grassland (J1.2)
- Poor semi-improved grassland (B6).

Where habitats were found likely to fit descriptions of those habitats included within The Conservation of Habitats and Species Regulations 2017 (as amended) (NRW, 2026) a description of their current national status is provided.

For information on other habitats recorded during the field surveys but scoped out at the EIA scoping stage please refer to Natural Resources Wales Cardigan Tidal Flood Risk Management Scheme – Preliminary Ecological Appraisal Update (Binnies UK Ltd, 2025a) Appendix 6.1. This report used the DAFOR scale as a semi quantitative means to define floral species abundance within habitats where required as shown within Table 6-7.

Table 6-7 DAFOR Scale

DAFOR Scale			
D	Dominant	76-100% cover	The most common species, covering most of the area.
A	Abundant	51-75% cover	Very common across most of the area.
F	Frequent	26-56% cover	Present in many places but not dominant
O	Occasional	11-25% cover	Found in scattered patches
R	Rare	1-10% cover	Very few individuals or very limited coverage. This is a descriptor of abundance within the individual habitat and not an indicator of wider conservation status or importance.
Lx	Locally	Prefix	Used a prefix to Dominant, Abundant or Frequent to indicate where coverage of an individual species varies within a habitat area

Broadleaved scattered trees

Broadleaved scattered trees occur infrequently in the Scheme Area and its immediate surrounds the Scheme. Where it is available, the arboricultural tree category from Arboricultural Method Statement Cardigan Tidal FRMS (RSK ADAS Ltd, 2026) is also provided.

Table 6-8 Key to Arboricultural categorisations adapted from (RSK ADAS Ltd, 2026)

Category	Description
A	Tree / groups of high quality: with an estimated remaining life expectancy of at least 40 years
B	Tree / groups of moderate quality: with an estimated remaining life expectancy of at least 20 years
C	Tree / groups of low quality: with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm
U	Tree / groups: in such a condition that they cannot realistically be retained as living trees in the context of current land use for longer than ten years.

Two pear trees *Malus* sp. (T3 Category B and T9 Category C (RSK ADAS Ltd, 2026)) and a sycamore *Acer pseudoplatanus* (T10 Category B (RSK ADAS Ltd, 2026)) are located within the former foundry site in the centre of the Scheme, several mature yew *Taxus baccata* (outside of Arboricultural survey boundary (RSK ADAS Ltd, 2026) trees are present within land at the churchyard/ cemetery to the east of the Scheme. There are two planted laburnum *Laburnum anagyroides* (T4 and T6 both Category C ADAS Ltd, 2026) trees in the carpark in the east of the Scheme. Additionally, two young sycamore trees (T2 Category B and tree too small for classification (RSK ADAS Ltd, 2026)) are present along the edge of the embankment adjacent to the hardstanding paving in the western section of the Scheme (near to Cardigan Bridge (Castle Steet)).

Due to its limited area, limited species, age and structural diversity, this receptor is considered to be of negligible sensitivity.

Running water

One watercourse (River Teifi (Afon Teifi)) is present within the Scheme and forms part of the Afon Teifi SAC/ SSSI. Within the Scheme Area the Afon Teifi is tidally influenced with exposed low tide mudflats and also saltmarsh habitat communities fringing the watercourse where habitat niches are available. Water flow varies with time of day, and no vegetation was observed growing within the watercourse below the intertidal range.

As the Afon Teifi forms the core component of the Afon Teifi SAC and SSSI this sensitivity and magnitude on this habitat type will be discussed in those sections and will not be assessed separately.

Intertidal mudflats and associated intertidal biotopes

The habitat is present within the Scheme Area on the Afon Teifi and forms the boundary between the watercourse and the saltmarsh habitats.

This broad habitat type is included within The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A report (NRW, 2026) under habitat type H1140 - Mudflats

and sandflats not covered by seawater at low tide. The habitat type is considered to be in overall Unfavourable-bad condition in Wales, with habitat area (Unfavourable-inadequate), Structure and function (Unfavourable bad), and future prospects (Unfavourable bad) contributing to this national trend. The total surface area for this habitat within Wales is considered to be 419.12km² of which the habitat within the impact area of the project would be 1946m² 0.0005% of the total area. The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A report (NRW, 2026) lists a number of main pressures as contributing factors towards the habitats types national status, of these the following are considered to be highly relevant to the project:

- PF15: Modification of coastline, estuary and coastal conditions for built-up areas (High impact considered to be ongoing and likely in future)
- PJ10: Change of Habitat Location, size and / or quality due to climate change (medium impact only in future)

PJ04: Sea-level rise due to climate change (medium impact only in future) Intertidal Mudflats is listed as a Habitat of Principal Importance (HPI) under Environment (Wales) Act (2016), Section 7. This inclusion cites the habitats high biodiversity value as a result of it supporting large numbers of predatory birds and fish and their associated prey (aquatic and terrestrial invertebrates). The habitat type can provide feeding and resting areas for internationally important populations of migrant and wintering waterfowl; and as nursery areas for flatfish. This habitat type is maintained by a constant fluctuation of tide level and limited disturbance.

The habitat at Cardigan is dynamic, reliant on silt deposition as a result of river and tidal flow. The habitat is transitional with drier areas supporting transition to saltmarsh, whilst new areas of mudflat will be created by river silt deposition and scouring of the saltmarsh habitat by river or tidal action. No targeted Marine Intertidal Phase 1 Biotope Mapping Survey has been undertaken in support of this Scheme to identify the sub-biotopes and invertebrate species and the mudflat habitat was recorded to have been impacted by anthropogenic activities due to its urban / waterfront location, most notably through the introduction of deposits of ballast stone understood to have come from vessels which were moored on the habitat. However, the Afon Teifi downstream from Cardigan Bridge (Castle Street) has been previously fully mapped as part of the Welsh Intertidal Phase 1 Habitat survey (Llywodraeth Cymru Welsh Government, 2026). This found that the comparable muds immediately at the downstream boundary of the Scheme were composed of *Hediste diversicolor* and oligochaetes in littoral mud (LS.LMu.UEst.Hed.OI) (JNCC, n.d.) where there is mud. Where there is a greater component of rock /other substrate *Fucus ceranoides* on reduced salinity eulittoral rock (LR.LLR.FVS.Fcer) (JNCC, n.d.) is consistently present. The Scheme Area is also likely to be a composition of LMU.MU.HedOI, LR.LLR.FVS.Fcer based upon observed composition of habitats immediately downstream. This assumption is further backed up by the results of the geomorphological survey (See Chapter 10: Water Environment) that found that the habitat within the Scheme Area is composed of muds mixed with occasional rock debris from the boat ballast.

Despite the coastal processes being heavily influenced by the artificial sea wall which prevents the natural movement of sediment and water, the habitat was assessed as being in good condition, because there was:

- No evidence of Non-Native Invasive Species within the habitat.
- No noticeable signs or sources of water pollution.

- No litter was present within the Scheme Area.

The habitat is subject to a high level of anthropogenic disturbance due to its urban location and the presence of multiple slipways and boat access.

As the exact biotopes present within the Scheme Area have not been determined, for the purposes of this assessment a precautionary approach will be used, and therefore the habitat will be considered as a qualifying HPI habitat. As a result of this for the purpose of this assessment the receptor will be considered as of moderate sensitivity.

Saltmarsh

Saltmarsh is present along the northern and southern shoreline of the Afon Teifi. The 2021 (Binnies UK Ltd, 2023a) survey found that the dominant species present along the shoreline is sea club-rush *Bolboschoenus maritimus*, which forms a colonising band along the foreshore. Other plants indicative of saltmarsh such as saltmarsh grass *Puccinella maritima*, sea purslane *Atriplex portulacoides*, and sea aster *Aster tripolium* are all frequent.

Within the project boundary (as shown within Figure 6.1) the habitat is fragmented and semi natural, having formed on top of rock gabions that form a flood defence to the Gloster Row car park and areas raised of imported stone (likely abandoned boat ballast) at the base of two slipways. This is likely typical for the habitat type within the estuary with salt tolerant plants exploiting niche's where the river gradient, tidal inundation, salt content and soil type are suitable. The saltmarsh strip is at its largest in the area east of the site adjacent to the Gloster Row car park where a strip of habitat on the gabions (approx. 10m wide) extends into the natural saltmarsh (outside of the project area). The saltmarsh habitat on the gabions varies likely as result of relative levels of inundation from pioneering saltmarsh to a grass dominant habitat by the existing retaining wall. This grass dominated strip contains saltmarsh species also, with sea aster being constant and other species such as sea couch *Elytrigia atherica* and sea milkwort *Lysimachia maritima* present but occasional. Tall fescue *Festuca arundinacea* and red fescue *Festuca rubra* are also present and frequent. The 2024 assessment (Binnies UK Ltd, 2025a) found that the habitat had increased in size, with the saltmarsh comprising a greater area than recorded in 2021 (Binnies UK Ltd, 2023a) primarily with additional small areas of habitat visible on the foreshore in Area 1 and further expansion along the foreshore adjacent to the western slip way. Due to the time of year, a comprehensive species list could not be prepared. However, the species composition present indicate that no shift in vegetation composition has occurred since 2021. In the newly mapped sections of the expanded habitat, creeping bent *Agrostis stolonifera* is the dominant species. Sea couch, saltmarsh grass and sea club-rush are also present occasionally. No specific National Vegetation Classification Survey has been undertaken in support of this Scheme and therefore it is not possible to identify the specific saltmarsh habitat type within the Scheme Area.

The habitat within the project area was assessed as being in moderate condition. Reasons for the habitat failing to achieve good status included:

- Coastal processes being heavily influenced by the artificial sea wall which prevents the natural movement of sediment and water.
- A lack of transitional habitats and variance in vegetation.

The habitat was assessed as moderate for the following reasons:

- No evidence of Non-Native Invasive Species within the habitat.
- No noticeable signs or sources of water pollution.
- No litter present within the habitat.

The habitat is subject to a high level of anthropogenic disturbance due to its urban location and the presence of multiple slipways and boat access. There was evidence of dog walkers and fisherman using the semi natural saltmarsh habitat on the gabions in Area 4 to access the river foreshore, passing through the natural saltmarsh habitats adjacent to the project area to the east.

Saltmarsh habitat is identified as an interest feature of the Afon Teifi SSSI with Teifi marshes being specifically cited in the biological description:

"The Teifi Marshes support extensive Phragmites australis reedbeds and a mosaic of flood-plain fen, swamp, grassland and saltmarsh communities displaying transitions between freshwater and brackish communities. Woodland, scrub and hedgerows add to the diversity of the marshes. Estuarine alder Alnus glutinosa carr at Rosehill is of particular interest.

In the upper reaches of the Teifi Estuary intertidal flats are predominantly muddy. In the lower reaches sand flats, shingle with associated vegetation and saltmarsh occur." (Countryside Council for Wales, 1997)

The Afon Teifi downstream from Cardigan bridge has been previously mapped (Llywodraeth Cymru Welsh Government, 2026) and the closest downstream saltmarsh habitat was at that time approximately 1.7km downstream (north of Old Castle Farm). The data was largely gathered in 2007 and as a result it is likely that the extent of habitats will have reduced in the interim as a result of wider pressures affecting the habitat nationally listed discussed below.

The Afon Teifi saltmarsh niche assessment (Park, 2025) Appendix 6.3 identified natural saltmarsh habitats immediately adjacent to the Scheme Area to the east of the Gloster Row car park and in an inlet immediately downstream of the A487 Pont Y Priordy Priory bridge, with more extensive saltmarsh recorded within the Teifi Marshes Nature reserve approximately 170m upstream of the Scheme Area.

Saltmarsh is designated as a HPI under Environment (Wales) Act (2016), Section 7. This designation cites the habitats high biodiversity value as a result of it supporting large numbers of predatory birds and fish and their associated prey (aquatic and terrestrial invertebrates). The habitat type can provide feeding and resting areas for internationally important populations of migrant and wintering waterfowl; and can be important nursery areas for flatfish. This habitat type is maintained by a constant fluctuation of tide level and limited disturbance.

As a result of its semi-natural status on a non-natural substrate the saltmarsh within the project area does not meet either description of saltmarsh habitats included within The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A report (NRW, 2026). Two saltmarsh habitats are included within this document H1310 *Salicornia* and other annuals colonizing mud and sand and H1330 Atlantic salt meadows.

Habitat type H1310 *Salicornia* and other annuals colonizing mud and sand is considered to be in overall Unfavourable-inadequate condition in Wales, with habitat area (Unfavourable-inadequate), Range status (Unknown), and future prospects (Unknown) contributing to this

national trend. The total surface area for this habitat within Wales is considered to be 1.67km². The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A report (NRW, 2026) lists a number of main pressures as contributing factors towards the habitats types national status, of these the following are considered to be highly relevant to the project:

- PF15: Modification of coastline, estuary and coastal conditions for built-up areas (High impact likely in future)
- PJ04: Sea-level rise due to climate change (medium impact considered to be ongoing and likely in future)

Habitat type H1330 Atlantic salt meadows is considered to be in overall Unfavourable-bad condition in Wales, with habitat area (Unfavourable-inadequate), Structure and function (Unfavourable-bad) and future prospects (Unfavourable-bad) contributing to this national trend. The total surface area for this habitat within Wales is considered to be 74.82km². The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A report (NRW, 2026) lists a number of main pressures as contributing factors towards the habitats types national status, of these the following are considered to be highly relevant to the project:

- PF15: Modification of coastline, estuary and coastal conditions for built-up areas (Medium impact likely in future)
- PJ04: Sea-level rise due to climate change (High impact likely in future)

The project area does not include any areas of existing natural saltmarsh habitats that have been included as part of strategic mapping exercises, associated with a particular Annex I habitat type and as such included in the overall 'status' of that habitat type in Wales.

Annex I Saltmarsh has been identified down-stream of the site by Llywodraeth Cymru Welsh Government, 2026, and upstream within Teifi Marshes Wildlife Trust of South and West Wales reserve. Surveyors also noted existing natural saltmarsh habitats between the eastern boundary for the project area and Priory bridge however these have not been surveyed.

The habitat within the site is confirmed as semi-natural (saltmarsh species on a non-natural substrate) and is outside areas where saltmarsh habitat forms extensive or continuous habitats. On a precautionary basis for the purposes of this assessment, these have been classed as HPI, however this is not the same as concluding they represent a specific Annex I habitat type or a feature of any designation, in the context of the specific site. For the purpose of this assessment the receptor will be considered as of moderate sensitivity.

Amenity grassland

Amenity grassland is common across the Scheme at the Scout's hut, residential gardens, and by the Gloster Row car park at the eastern end of the Scheme Area.

The 2024 assessment found that the amenity grasslands have not changed in composition, with the exception being the grassland surrounding Gloster Row car park which has become Poor Semi-improved grassland (and is discussed further below). Perennial ryegrass *Lolium perenne* is the dominant species in the amenity grassland sward, with other species including Yorkshire

fog *Holcus lanatus* F, red fescue F, dandelion sp *Taraxacum* sp O, creeping bent LO and common ragwort *Jacobaea vulgaris* R¹.

The habitat was assessed as being in poor condition. Reasons for the habitat failing to achieve good status included:

- Lack of species diversity.
- Intensive mowing which prevents variance in habitat structure.

Due to its limited area, limited species, age and structural diversity, this receptor is considered to be of negligible sensitivity.

Poor semi-improved neutral grassland

The grassland surrounding Gloster Row car park has changed in management since the 2021 Phase 1 habitat survey (Binnies UK Ltd, 2023a). Signs that have been placed in the grassland indicate that the grassland is being mowed infrequently to encourage wildflower growth. Species included perennial ryegrass A, cock's-foot *Dactylis glomerata* LA, red fescue F, ribwort plantain *Plantago lanceolata* R, common daisy *Bellis perennis* F, common mouse-ear *Cerastium fontanum* LF, thyme-leaved speedwell *Veronica serpyllifolia* O and common knapweed *Centaurea nigra* LO¹. Along the edges of the grassland, on the stone walls, other species present include navelwort *Umbilicus rupestris* LO, red valerian *Valeriana rubra* LO, biting stonecrop *Sedum acre* LR and Canadian fleabane *Erigeron canadensis* LR¹.

The habitat was assessed as being in moderate condition. Reasons for the habitat failing to achieve good status included:

- The habitat is an ecotone, transitioning from amenity grassland to semi-improved neutral grassland. As a result, the species composition is not varied enough to achieve good status.

Due to its limited area, limited species, age and structural diversity, this receptor is considered to be of negligible sensitivity.

6.8.3 Species and species groups

The following species or species groups are considered within this Environmental Statement.

- Amphibians and reptiles
- Bats
- Birds
- Fish
- Invertebrates (terrestrial and aquatic)

¹ See Table 6-7 for description of DAFOR scale

- Otters
- West European hedgehog.

For information on other species or species groups considered during the field survey but scoped out at the EIA scoping stage please refer to Natural Resources Wales Cardigan Tidal Flood Risk Management Scheme – Preliminary Ecological Appraisal Update (Binnies UK Ltd, 2025a).

Amphibian and reptiles

The desk study returned records for three species of reptile; grass snake *Natrix helvetica*, slow worm *Anguis fragilis*, common lizard *Zootoca vivipara* and one species of amphibian, common toad *Bufo bufo*. No records of notable reptiles or amphibians were returned from within the Scheme Area (Binnies UK Ltd, 2025a).

The Scheme Area and its immediate surrounds provides some potential suitable habitat for amphibians and reptiles. These are in the gardens of residential properties, especially where compost heaps are present. In addition, natural saltmarsh habitat can support amphibians and reptiles.

No desk study records within 2km of the Scheme identify great crested newt *Triturus cristatus* and, given the lack of suitable nearby standing water, it is considered unlikely that the species is present within the Scheme Area.

The Scheme Area would not support important breeding populations of reptiles or amphibians, instead it is more likely to be used as a foraging resource for small numbers of common amphibian and reptile species from local populations. As a result of this this receptor is considered to be of negligible sensitivity.

Bats

The desk study returned twenty-five records of bats (as shown in Table 6-9) from within 2km of the Scheme Area. The desk study identified a number of bat records pre 2014 from in and around the castle Grid Reference SN 17754 45924, approximately 0.06km north of the Scheme Area (Binnies UK Ltd, 2025a).

Table 6-9 Bat records within 2km of the Scheme Area

Scientific Name	Common name	Number of records	Date of most recent records	Distance and Direction
<i>Plecotus auritus</i>	Brown Long-eared Bat	3	30/07/2020	1.19km west
<i>Myotis</i>	Unidentified Bat	1	12/07/2014 - 18/07/2014	1.66km south
<i>Pipistrellus</i>	Pipistrelle	3	24/02/2019	0.3km north
<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle	5	30/07/2020	0.17km north
<i>Rhinolophus ferrumequinum</i>	Greater Horseshoe Bat	1	09/06/2015	1.21km west

<i>Myotis nattereri</i>	Natterer's Bat	1	12/07/2014 - 18/07/2014	1.67km south
<i>Nyctalus noctula</i>	Noctule Bat	4	09/09/2016	0.17km north
<i>Eptesicus serotinus</i>	Serotine	2	30/07/2020	1.31km west
<i>Myotis mystacinus/brandtii</i>	Whiskered/Brandt's Bat	1	12/07/2014 - 18/07/2014	1.66km south
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle	8	30/07/2020	0.16km north

Specific roost data was not provided during the desk study however where records included comments containing the words roost, roosting or emerging, it was presumed that these were areas of confirmed roosts (as shown in Table 6-10).

Table 6-10 Bat roosts within 2km of the Scheme Area

Species Roosting	Grid Reference	Date	Description	Distance and direction
Brown long-eared bat, soprano pipistrelle, common pipistrelle	SN164458	30/07/2020	Roosting under south pitch; west end; also signs in bat loft, roosting under raised slate, Roosting at wall tops; various locations	1.33km west
Brown long-eared bat, soprano pipistrelle, Natterer's, whiskered/Brandts, <i>Myotis</i> sp	SN1757444195	12/07/2014 - 18/07/2014	Possible maternity in barn; disperse along tree rich lanes and organic managed farmland	1.66km south
Common pipistrelle	SN1785646120	09/09/2016	Returned to roost beneath fascia of building	0.17km north
Common pipistrelle	SN1787146113	09/09/2016	Returned to roost beneath fascia of building	0.16km north

In addition to the records returned by the record search three other roosts are known to be in close proximity to the Scheme Area:

- Cardigan Castle (15m north of the Scheme Area) has been a long-term roost for greater horseshoe bats for at least the last 20 years as confirmed by the Cardigan Castle Estate Manager (Dellar, 2024). The site was subject of a NRW licence to modify the roost in 2010 (Crompton, Creation of underfloor link tunnel and vertical shaft for greater horseshoe bats at Cardigan Castle, 2016) and has been regularly monitored since. The roost regularly hosts hibernation for up to 5 bats within the winter (including winter 2024/25). The roost has also been known to be intermittently used by individual and small numbers of bats in the summer months, although this activity level had dropped in summer 2024. The lesser horseshoes roost within the basement of main castle building on its northern side (approx. 70m north of the Scheme Area). Limited survey

information is available for how the bats enter and leave the castle grounds but is suspected that the bats follow the main drive from the house (located to the east of the main house) using the hedgerows walls and large ash, before crossing Strand between Cardigan Bridge and Cardigan Bathroom centre and joining the Afon Teifi before moving out into the wider countryside (Crompton, Discussion on the NRW licence for development and subsequent monitoring of the Greater Horseshoe roost at Cardigan Castle, 2024). The street lighting on Strand has been recently (within the last couple of years) changed to white LED and there may have had a detrimental influence on summer activity levels. This effect is likely to be exacerbated by the upcoming felling of the large mature ash tree on the castle walls (required due to safety concerns) (Dellar, 2024).

- One of the outbuildings at Cardigan Castle is also suspected to be a pipistrelle maternity roost (Dellar, 2024). This building is located approximately 70m north of the Scheme Area.
- The former hospital building approximately 80m northeast of the Scheme Area is a confirmed roost for individual brown long eared bat and low numbers of soprano pipistrelle bats (Ceredigion County Council, 2021).

Potential roost habitats and features across the Scheme include broadleaved scattered trees and buildings (residential properties, commercial buildings) and the sides and underside of the west and east bridges that bound the survey area and the stone-built wall of the existing flood defence which forms part of the Scheme.

The roost suitability for trees, buildings, and groups of buildings determined by the surveys in 2021, 2023 and 2024 features with suitability and that were likely to be affected by works are summarised Table 6-11 and should be read in conjunction with Figure 6.2. For a complete list of structures and trees surveyed please refer to Natural Resources Wales Cardigan Tidal Flood Risk Management Scheme – Preliminary Ecological Appraisal Update (Binnies UK Ltd, 2025a) Appendix 6.1.

Table 6-11 Bat Roost Potential of Structures/ Trees

Building ref (G=Group; B=single building; T=Tree)	Description	Roost Potential in line with (Collins, 2023)
T3	Pear <i>Malus</i> sp. tree within amenity grassland with limited bat roosting potential. There is a shallow gap that is open to the elements at 1m in height from the base of the tree, but this is exposed and therefore of low bat roost potential.	PRF-I
T4	Mature laburnum <i>Laburnum anagyroides</i> tree with shallow, exposed cavity 1m from the ground.	PRF-I
Existing river wall	Wall is constructed in stone, which in places is degraded with visible cavities. These will have limited value in winter (due to flood risk), but are likely to offer suitability for roosting bats in summer. At the time of the surveys (2021 and 2024) access was not available to inspect the structure thoroughly so provisionally placed as Moderate suitability for roosting bats.	Moderate

Cardigan Bridge (Castle Street)	18 th Century stone-built road bridge, with multiple arches over the Afon Teifi. These will have limited value in winter (due to flood risk), but are likely to offer suitability for roosting bats in summer. At the time of the survey access was not available to inspect the structure thoroughly so provisionally placed as Moderate suitability for roosting bats. The bridge did show some potential cavities in the stonework of the bridge piers on the western side.	Moderate
B6	Outbuilding. Breeze blocks with wood cladding. Well-sealed. The structure was inaccessible at the time of the surveys. Pre-cautionary low as a result. The building is constructed above an areas of dilapidated river defense wall.	Low
B7	Scout hut, Strand. Gaps inside and on tiles outside. Concrete panel built with interlocking concrete ridge tiles.	Low
B8	The Smithy and Cardigan Bay Active. The Smithy is brick walls and tin roof (Moderate suitability). Cardigan Bay Active is a large corrugated metal shed (negligible). Some small gaps to underside of flashing and joins could allow summer roosting.	Moderate
B11:	Presbytery, Strand. detached, modern concrete blockwork structure with slate and composite tile roof.	Moderate
B12	Cardigan Bathroom Centre, Riverside Showrooms. Wood clad building with tight fitting soffits. Some loose flashing on seaward side but only in two places. Summer roosting potential.	Moderate

These structures were the subject of further survey (endoscopic inspections of T3 and T4, and Nocturnal emergence surveys of the structures) in summer 2025 by Terra Aqua Ecological Services. The surveys found no evidence of roosting bats, however the surveys did suggest the presence of roosts of soprano and common pipistrelle roosts in the general vicinity of Strand, St Mary Street and Church Street. For full details of the survey please refer to Bat Survey Report. Buildings and Structures at Strand, Aberteifi. For Cyfoeth Naturiol Cymru/Natural Resources Wales (Terra Aqua Ecological Services Ltd, 2025) Appendix 6.4.

The open habitats (such as running water, saltmarsh) were noted to provide suitable commuting and foraging opportunities for bats. The Afon Teifi is likely to provide an important connecting corridor of habitat into the wider area this assumption is demonstrated by the results of the nocturnal emergence surveys which found there to be high levels of activity in the vicinity of the river with seven species (Noctule, common pipistrelle, Daubenton's, soprano pipistrelle, brown long eared, lesser horseshoe, greater horseshoe) noted during the survey. This is a particularly diverse assemblage for what is a primarily urban site with rural/suburban transition levels of light pollution (Stare, 2025).

The Scheme Area does not support important breeding populations of bat and sufficient survey has been carried out to be reasonably confident of the absence of important summer non-breeding roosts. No hibernation surveys have been carried out, but the structures are not considered suitable for classic hibernation (they are unlikely to provide the stable cool and damp conditions required for this roost type) as the majority structures are occupied and likely to be heated during the winter period, whilst the crevices within flood defence wall and Cardigan Bridge (Castle Street) are likely to flood regularly during the winter period.

As a result of the importance of the Afon Teifi as a commuting and foraging corridor to local and district bat populations this receptor is considered to be of Low sensitivity.

Birds

Records for 41 species of protected and notable birds were returned from within the past 10 years within 2km of the Scheme Area during the desk study (Binnies UK Ltd, 2025a). Full details of species and designations can be found in Table 6-12. Records for 20 species protected under Schedule 1 of the Wildlife and Countryside Act were returned. These species, their nest and eggs are all provided legal protection and cannot be destroyed, damaged and/or disturbed.

Table 6-12 Protected and Notable Species of Birds within 2km of the Scheme Area

Scientific Name	Common Name	Number of records	Status ²
<i>Limosa lapponica</i>	Bar-tailed Godwit	2	BDir1, BDir22, S7, WBR(RSPB), LBAP, UKBAm(RSPB)
<i>Chroicocephalus ridibundus</i>	Black-headed Gull	82	BDir22, WCA 7, WBR(RSPB), UKBAm(RSPB)
<i>Limosa limosa</i>	Black-tailed Godwit	25	BDir22, WCA1.1, WBAm(RSPB), UKBR(RSPB)
<i>Luscinia svecica</i>	Bluethroat	1	BDir1, WCA1.1, Bern
<i>Cettia cetti</i>	Cetti's Warbler	62	WCA1.1,
<i>Regulus ignicapilla</i>	Common Firecrest	1	WCA1.1, Bern WBAm(RSPB)
<i>Emberiza schoeniclus</i>	Common Reed Bunting	49	WCA7, Bern, LBAP, WBAm(RSPB), UKBAm(RSPB)
<i>Cuculus canorus</i>	Cuckoo	1	S7, WBR(RSPB), UKBR(RSPB)
<i>Numenius arquata</i>	Curlew	83	BDir22, S7, WBR(RSPB), , UKBR(RSPB)
<i>Prunella modularis</i>	Dunnock	86	S7, Bern, , UKBAm(RSPB)
<i>Pyrrhula pyrrhula</i>	Eurasian Bullfinch	72	S7, WBR(RSPB), LBAP UKBAm(RSPB)

² Key to Status

BDir 1	- The Birds Directive Annex 1
BDir 22	- The Birds Directive Annex 22
WCA 1.1	- Wildlife and Countryside Act Schedule 1
WCA 9	- Wildlife and Countryside Act Schedule 9
S7	- Environment (Wales) Act Section 7
Bern	- Bern Convention
CITES	- Convention on International Trade in Endangered Species of Wild Fauna and Flora
LBAP	- Local Biodiversity Action Plan
UKBR(RSPB)	- UK Bird Red list Red
UKBAm (RSPB)	- UK Bird Red list Amber
WBR(RSPB)	- Welsh Bird Red list
WBAm(RSPB)	- Welsh Bird list Amber

<i>Alauda arvensis</i>	Eurasian Skylark	4	BDir22, S7, LBAP, WBAm(RSPB), UKBR(RSPB)
<i>Numenius phaeopus</i>	Eurasian Whimbrel	6	BDir22, WCA1.1, , WBAm(RSPB), UKBR(RSPB)
<i>Larus argentatus</i>	European Herring Gull	103	BDir22, S7, WBR(RSPB), , UKBR(RSPB)
<i>Ficedula hypoleuca</i>	European Pied Flycatcher	1	S7, WBR(RSPB), , UKBR(RSPB)
<i>Turdus pilaris</i>	Fieldfare	4	BDir22, WCA1.1, , WBAm(RSPB), UKBR(RSPB)
<i>Bucephala clangula</i>	Goldeneye	23	BDir22, WCA1.2, , UKBAm(RSPB)
<i>Locustella naevia</i>	Grasshopper Warbler	2	S7, WBR(RSPB),,, UKBR(RSPB)
<i>Tringa ochropus</i>	Green Sandpiper	4	WCA1.1, Bern, , WBAm(RSPB), UKBAm(RSPB)
<i>Tringa nebularia</i>	Greenshank	5	BDir22, WCA1.1, LBAP, UKBAm(RSPB)
<i>Falco subbuteo</i>	Hobby	1	WCA1.1, Bern, CITES,
<i>Passer domesticus</i>	House Sparrow	66	S7, , WBAm(RSPB), UKBR(RSPB)
<i>Alcedo atthis</i>	Kingfisher	57	BDir1, WCA1.1, Bern, , WBAm(RSPB), UKBAm(RSPB)
<i>Vanellus vanellus</i>	Lapwing	15	BDir22, S7, WBR(RSPB), UKBR(RSPB)
<i>Acanthis cabaret</i>	Lesser Redpoll	2	S7, LBAP (CON), , WBAm(RSPB), UKBR(RSPB)
<i>Linaria cannabina</i>	Linnet	4	S7, Bern, WBR(RSPB), LBAP UKBR(RSPB)
<i>Poecile palustris</i>	Marsh Tit	6	S7, Bern, WBR(RSPB), , UKBR(RSPB)
<i>Ichthyaetus melanocephalus</i>	Mediterranean Gull	2	BDir1, WCA1.1, Bern, WBAm(RSPB), UKBAm(RSPB)
<i>Falco peregrinus</i>	Peregrine	5	BDir1, WCA1.1, Bern, CITES, LI(VC43)
<i>Anas acuta</i>	Pintail	1	BDir21, WCA1.2, CITES, , WBAm(RSPB), UKBAm(RSPB)
<i>Milvus milvus</i>	Red Kite	18	BDir1, WCA1.1, WCA9, CITES, , WBAm(RSPB)
<i>Turdus iliacus</i>	Redwing	15	BDir22, WCA1.1, P, WBAm(RSPB), UKBR(RSPB)
<i>Aythya marila</i>	Scaup	1	BDir22, WCA1.1, , WBAm(RSPB), UKBR(RSPB)
<i>Turdus philomelos</i>	Song Thrush	63	BDir22, S7, Bern, LBAP, WBAm(RSPB), UKBR(RSPB)
<i>Porzana porzana</i>	Spotted Crake	2	BDir1, WCA1.1, Bern, , WBAm(RSPB), UKBAm(RSPB)

<i>Sturnus vulgaris</i>	Starling	35	BDir22, S7, Bern, WBR(RSPB), , UKBR(RSPB)
<i>Tyto alba</i>	Western Barn Owl	2	WCA1.1, WCA9, Bern, CITES,
<i>Circus aeruginosus</i>	Western Marsh Harrier	1	BDir1, WCA1.1, CITES, , WBAm(RSPB), UKBR(RSPB), UKBAm(RSPB)
<i>Cygnus cygnus</i>	Whooper Swan	1	BDir1, WCA1.1, Bern, UKBAm(RSPB)
<i>Poecile montanus</i>	Willow Tit	1	S7, Bern, WBR(RSPB), UKBR(RSPB)

No bird records were returned from within the Scheme Area. Although records came from all around the Scheme Area, most records were concentrated to the saltmarsh habitats affiliated with the Afon Teifi (SSSI, SAC) to the southeast of the Scheme Area.

The wintering bird surveys conducted in winter 2022/23 (Wyndrush Wild, 2023a) Appendix 6.6 covered a substantially larger study area than the Scheme Area and included habitats both downstream of Castle Street bridge (shore alongside Shampian restaurant and Lower Quay Street Car-Park) and upstream of the Pont y Priordy Priory Bridge (Wildlife Trust of South and West Wales WTSWW Reserve Teifi Marshes). These additional areas were included in order to provide contextual information for activity observed within the Scheme Area. The survey found the following:

"The section between the two bridges, and downstream to the Lower Quay car park, has limited exposed mud and this is reflected in the small number of birds recorded here. The muddy banks opposite and to the west of the (Gloster Row) car park are used by small numbers of ducks, waders and gulls."

"The site (Study Area) is used by a small number of waders, mostly at low tide. The muddy shore alongside the Shampian restaurant to the west of Lower Quay Street Car-park (downstream of Cardigan Bridge (Castle Street) and the Scheme Area) was occasionally used by one or two redshank and curlew, and a small flock of dunlin on one occasion. The opposite shore here was also used by one or two redshank and curlew, as was the exposed shore just to the west of Priory Bridge. The north shore opposite the WTSWW reserve (upstream of the Scheme Area) held one or two redshank, curlew, black-tailed godwit and bar-tailed godwit. Very few waders were present on high-tide counts, and no significant roosts were present."

"Teal was the most numerous duck from November onwards, with the most significant flocks in the eastern part of the site (study area). Smaller numbers were associated with the patch of reed just to the east of Cardigan Bridge (Castle Street) (on the opposite bank to the project), and the shore opposite Lower Quay Car-park. Mallard numbers were more constant, with flocks focussed on the northern shore at or beyond the eastern boundary of the survey site (Study Area), and on the southern shore opposite Lower Quay Car-park."

"Flocks of herring and lesser black-backed gull were encountered in or alongside the channel by the WTSWW reserve, and in the channel downstream of Lower Quay Car-park. A single greater black-backed gull was also recorded at the latter location on one occasion, whilst three common gulls were recorded once at the former location. Black-headed gulls were more widely distributed across the site (Study Area), but Lower Quay Car-park was a favoured location, as well as the channel to the east of Priory Bridge. A small number of Mediterranean gulls were associated with the black-headed gulls in the autumn months, but not later in the winter."

Other waterfowl seen included one or two kingfishers, grey herons, little egrets and a small number of cormorants."

The lower reaches of the Teifi hold larger numbers of waterfowl, but annual Welsh Bird Reports compiled by the Welsh Ornithological Society, and recent records posted on the Teifi Birding and Wildlife Blog, indicate that these are still well below significance thresholds. However, the site (Study Area) does support small numbers of 6 species on the UK red-list, and 12 on the amber-list. The site (Study Area) can therefore be considered to be of local significance for its wintering bird populations. The eastern part of the site (Study Area), alongside the Teifi Marshes reserve (Afon Teifi SAC and SSSI), holds the greatest diversity and number of birds."

The Breeding bird survey conducted in 2023 (Wyndrush Wild, 2023b) Appendix 6.7 found:

"There is very little potential for breeding birds in the constrained intertidal area between the bridges (the Scheme Area)"

"The section between the two bridges, and downstream to the Lower Quay (Gloster Row) car park, has limited exposed mud and this is reflected in the small number of birds recorded here. The muddy banks opposite and to the west of the (Gloster Row) car park are used by small numbers of ducks, waders and gulls."

"A single singing reed warbler was heard in the small reed area immediately west of Priory Bridge. Family parties of Canada goose, mute swan, mallard and blackbird with fledged young were noted here. Adjoining bushes or trees such as those to the south of the churchyard had territories of species such as greenfinch, goldfinch, song thrush and wren. House sparrow was associated with buildings here. Swifts and hirundines fed over the site (Study Area)."

In summary breeding and wintering birds surveys carried out within the Scheme Area found that although the Scheme Area contains HPI habitats of interest for birds, the suitability is limited by their size and proximity to human disturbance and therefore it is unlikely to provide suitable conditions or supporting habitat of any significance for numbers of rare or notable birds.

For the purposes of this ES, the birds receptor will be split into two separate types as the sensitivity is considered to be different.

The species list of wintering birds found in close proximity to the Scheme Area is considered to be of local importance and therefore the receptor is considered to be of low sensitivity.

The species list of breeding birds found within and in close proximity to the Scheme Area is considered to be of site importance only and therefore the receptor is considered to be of negligible sensitivity.

Fish

Apem Ltd carried out a desk study of available information regarding fish in the Afon Teifi including the Scheme Area, immediately adjacent to the Scheme Area and extending to within 5 km of the Scheme. The full results of this study can be found in Cardigan Tidal Flood Risk Management Scheme – Fish Ecology Technical Note (APEM Ltd, 2026a) Appendix 6.2. The reports states:

“Given the close locality to the marine environment, the areas adjacent to the Scheme are likely to experience variations in salinity levels. The width (wetted width) of the river at this location is approximately 50 to 100 m, likely varying based on tidal state and rainfall levels.

Fish communities, within estuarine environments, can broadly be categorised into the following functional groups

- *Diadromous species – Species which move between marine and freshwater environments at different stages of their life cycle;*
- *Marine species – Those typically found within marine environments, but may occur in estuarine environments in low numbers (marine stragglers) or high numbers during specific life stages (marine migrants);*
- *Estuarine species – Species well adapted to live their entire life cycle or large portions of within estuarine environments; and*
- *Freshwater species - Those typically found within freshwater environments, but may occur in estuarine environments in low numbers (freshwater migrants) or may be limited to the upper reaches of the estuary (freshwater stragglers).*

*Given the location of the Scheme, the fish assemblage is likely to be characterised by marine migrants (i.e. herring *Clupea harengus* and European seabass *Dicentrarchus labrax*), estuarine species (i.e. common goby *Pomatoschistus microps* and sand goby *Pomatoschistus minutus*) and diadromous species (i.e. Atlantic salmon *Salmo salar*). (APEM Ltd, 2026a)”.*

Of these species type the report identifies the key species as shown in Table 6-13. These have been grouped into two functional groups; Diadromous species and Marine and Estuarine species receptors for the purposes of this assessment.

- Diadromous species are considered to be a high sensitivity receptor due to their status as qualifying species for the River Teifi SAC and the key migratory route function that the river provides at this location.
- Marine and estuarine species are considered to be a low sensitivity receptor due to their lower conservation importance when compared against national and international targets.

Table 6-13 Key Fish species receptors taken forward for assessment adapted from (APEM Ltd, 2026a)

Receptor Grouping	Species	Justification
Diadromous Fish	Atlantic salmon	Likely to migrate through the Study Area. Globally Near Threatened on IUCN Red list. Listed on Annex II and V of the Habitats Directive. Protected by Appendix III of the Bern Convention. Listed in Section 7 of the Environment (Wales) Act 2016. Protected under the Salmon and Freshwater Fisheries Act.
	Brown / sea trout	Likely to migrate through the Study Area. Listed in Section 42 of the NERC Act (Wales). Protected under the Salmon and Freshwater Fisheries Act.
	European eel	Likely to migrate through Study Area. Protected by the Eels regulations.

Receptor Grouping	Species	Justification
		Listed in Section 7 of the Environment (Wales) Act 2016. Protected under The Salmon and Freshwater Fisheries Act.
	River lamprey	Likely to migrate through Study Area. Listed on Annex II and V of the Habitats Directive. Protected by Appendix III of the Bern Convention. Listed in Section 7 of the Environment (Wales) Act 2016. Protected under the Salmon and Freshwater Fisheries Act.
	Sea lamprey	Likely to migrate through Study Area. Listed on Annex II and V of the Habitats Directive. Protected by Appendix III of the Bern Convention. Listed in Section 7 of the Environment (Wales) Act 2016. Protected under the Salmon and Freshwater Fisheries Act.
Marine and Estuarine Fish	Thick-lipped grey mullet	Likely to inhabit Study Area.
	Thin-lipped grey mullet	Likely to inhabit Study Area.
	European seabass	Likely to inhabit Study Area. Species of commercial value within UK waters.
	Common Goby	Likely to inhabit Study Area. Important prey species.
	Sand Goby	Likely to inhabit Study Area. Important prey species.
	Atlantic herring	Likely to inhabit Study Area. Listed in Section 7 of the Environment (Wales) Act 2016. Species of commercial value within UK waters.
	Sprat	Likely to inhabit Study Area. Species of commercial value within UK waters.
	Lesser sand-eel	Likely to inhabit Study Area. Important prey species.
	Greater sand-eel	Likely to inhabit Study Area. Important prey species.
	Flounder	Likely to inhabit Study Area. Species of commercial value within UK waters.
	Plaice	Likely to inhabit Study Area. Listed in Section 7 of the Environment (Wales) Act 2016. Species of commercial value within UK waters.

Invertebrates

No specific field surveys have been undertaken to determine the invertebrate assemblage present within the Scheme Area. The desk study returned records for 23 species of protected

and notable species of moths and butterflies as shown in Table 6-14 (Binnies UK Ltd, 2025a). No other records protected, or notable species of invertebrates were returned. No records were returned from within the Scheme Area.

Of the species returned by the records search only large wainscot has a larval foodplant likely to be associated with river/tidal margin habitat common reed *Phragmites australis*. Common reed was not recorded within the Scheme Area and therefore the large wainscot is not considered likely to have a viable breeding population within the Scheme Area.

Table 6-14 Protected and notable species of Butterfly and Moth with 2km of the Scheme Area

Scientific Name	Common Name	No. of Records	Designations ³
<i>Eugnorisma glareosa</i>	Autumnal Rustic	3	S7
<i>Timandra comae</i>	Blood-vein	2	S7
<i>Thecla betulae</i>	Brown Hairstreak	23	WCA5, S7, RDB1 (UK) - VU
<i>Agrochola litura</i>	Brown-spot Pinion	6	S7
<i>Spilosoma lutea</i>	Buff Ermine	3	S7
<i>Atethmia centrargo</i>	Centre-barred Sallow	2	S7
<i>Tyria jacobaeae</i>	Cinnabar	9	S7
<i>Melanchra persicariae</i>	Dot Moth	1	S7
<i>Apamea remissa</i>	Dusky Brocade	1	S7
<i>Ennomos fuscantaria</i>	Dusky Thorn	4	S7
<i>Agrochola helvola</i>	Flounced Chestnut	6	S7
<i>Arctia caja</i>	Garden Tiger	4	S7
<i>Acronicta rumicis</i>	Knot Grass	1	S7
<i>Malacosoma neustria</i>	Lackey	4	S7
<i>Rhizedra lutosa</i>	Large Wainscot	3	S7
<i>Hydraecia micacea</i>	Rosy Rustic	7	S7
<i>Cirrhia icteritia</i>	Sallow	2	S7
<i>Scotopteryx chenopodiata</i>	Shaded Broad-bar	3	S7
<i>Coenonympha pamphilus</i>	Small Heath	3	S7, RDB1 (UK) - NT
<i>Ecliptopera silaceata</i>	Small Phoenix	1	S7
<i>Lasiommata megera</i>	Wall	7	S7, RDB1 (UK) - NT
<i>Spilosoma lubricipeda</i>	White Ermine	6	S7
<i>Diarsia rubi</i>	Small Square-spot	2	S7

³ Key to Status

S7 - Environment (Wales) Act Section 7

RDB1 (UK) – VU - British Red Data Book 1 -Vulnerable

RDB1 (UK) – NT - British Red Data Book 1 – Near Threatened

In addition to the above, the following species are all features associated with the Afon Teifi SSSI:

- Freshwater Pearl mussel *Margaritifera margaritifera*;
- Whorl snail *Vertigo lilljeborgi*;
- A caddis fly *Oecetis notata*;
- A caddis fly *Ylodes simulans*;
- Toadflax leaf beetle *Chrysolina sanguinolenta*;
- Club-tailed dragonfly *Gomphus vulgatissimus*;
- A blackfly: *Simulium morsitans*; and
- Brown hairstreak *Thecla betulae*.

These species are all species that are associated with freshwater, or non-salt tolerant foodplants as a result it is highly unlikely that viable breeding populations would be found within the Scheme Area. The populations of aquatic-dependent species on the Afon Teifi are all likely to be above the tidal influence.

The running water, saltmarsh and intertidal mudflats within the Scheme Area and wider landscape are considered to provide suitable habitat for terrestrial and aquatic invertebrates and in the absence of a field survey, consideration has been given to the habitats present within the Scheme Area and the precautionary principle has been used to assess the receptor value as low sensitivity.

Otter

Seven records of otter were returned from within the 2km search radius of the Scheme Area with the most recent record occurring in 2018 0.94km southeast of the Scheme Area (Binnies UK Ltd, 2025a). No information regarding holts or resting places were provided with the records. All returned records occurred within the Afon Teifi and affiliated salt marshes. The SAC, which is located within the Scheme Area, is designated for otter. There is a regular otter breeding site within the Teifi Marshes upstream of the Scheme

During an inspection of the scout's boat shed in 2014 by NRW (Jenkins, 2014), repeated spraints were observed on a pile of old canvas. A camera trap was set for a period of 9 weeks from 25th July through to 2nd October 2014 to determine if there was still otter usage, but only cats were observed (JBA Consulting, 2020). It was considered that due to regular disturbance it is highly unlikely the scout's boat shed supports breeding otter, but it is possible that the shed provides an occasional temporary resting place.

The 2025 Otter survey of the Scheme Area carried out as an update of the 2014 inspection (The Otter Consultancy, 2025) Appendix 6.5 and found no new holts within the Scheme Area. The survey carried out covered all areas originally assessed by the 2014 survey. The 2025 survey identified one potential rest site approximately 140m east of the Scheme Area described as,

"A large area of trees and scrub with a small stream outlet close to the bypass bridge.

A well-used human path runs through the cover but there are also areas of dense cover created by a fallen tree with possible mammal paths leading into it from the water." (The Otter Consultancy, 2025).

The 2025 survey also found multiple field signs within the vegetation (spraints and pathways) within the Scheme Area suggesting that the location is in regular use by this species.

The running water and associated bank habitats within the Scheme and wider landscape were considered to provide suitable habitat for commuting, foraging and resting otter. However, no suitable holt sites were identified during the survey. The scout's boat shed was re-inspected, and no otter field signs were noted suggesting this feature was no longer in use. The intertidal mudflats and saltmarsh are prone to regular changes in water height and as such do not provide suitable holt locations. In addition, the housing properties set back from the existing flood wall are regularly disturbed with limited cover opportunities for the species. The Scheme Area and immediate surrounds is unlikely to support natal holts for otter due to it being on the main river.

In conclusion the Scheme Area provides suitable habitat for commuting, foraging and resting otter, but is unlikely to be used as a holt or resting site location. As a result of this this receptor is considered to be of low sensitivity.

West European hedgehog

Habitats present within the Scheme Area and immediate surrounds that could be utilised by hedgehog include the gardens of residential properties and grassland habitats. However, no continuous native dominated hedge lines or habitat lines were noted, which are preferred by hedgehog.

The Scheme Area would not support important breeding populations of hedgehog, instead it is more likely to be used as a foraging resource for individuals from local populations. As a result of this this receptor is considered to be of negligible sensitivity.

6.8.4 Future baseline

This section of effects considers the likely evolution of the baseline without the implementation of the Scheme.

Changes to the ecological baseline, in the absence of the Scheme, have been considered in terms of pressures and trends as well as anticipated plan-driven overall improvements in biodiversity led by legislation and policies. In terms of surrounding land uses it is considered that the urban conurbation will remain static, if not expand in the future, whilst beyond that the proportion of agricultural land use is likely to remain similar.

As stated within Chapter 1: Introduction, Cardigan has a history of flood events which have had social, economic and environmental impacts upon the town. Major flood events have occurred between 2000–2020. In 2007, flood depths exceeded 0.5m, and further tidal floods occurred in 2008, 2012, and twice in 2014. One 2014 event was caused by surface water during low tide, while the most severe tidal flood on 3 January 2014 inundated 29 properties on St Mary's Street. The lower quayside, including Strand and Cattle Market, also flooded in 2007.

Low-lying residential and commercial properties, particularly on Strand, are highly vulnerable, with thresholds below 3.1m Above Ordnance Datum (AOD) and exposure to annual tidal flooding. The projected 0.5% Annual Exceedance Probability (AEP) (1 in 200) tidal level, including 100 years of climate change, is 4.75m AOD, which is well above current ground levels and therefore poses a risk of significant flooding. This corresponding increase in flood risk and associated sea level raise will fundamentally change the composition of the estuarine habitats

within the Scheme Area over time reducing the area and diversity of the marginal habitats as the level of inundation increases. Estimating the effects of sea level rise on tidal range and therefore intertidal habitat is impacted by more factors than sea level rise alone, however for the purposes of habitat extent and functionality, sea level rise is expected to reduce the range of intertidal volume of the estuary, experienced under both neap and spring tidal conditions (Environment Agency, 2026) with corresponding effects on reduced intertidal habitat extents.

Within the Study Area, statutory designated sites are afforded protection provisioned through the framework of nature conservation legislation. Whilst this legal protection remains in place, the future baseline for these sites is likely to be safeguarded, additionally benefiting in future from landscape-scale policies and initiatives led by strategic planning processes. Non statutory designated sites, such as LWS, are afforded protection through local planning policies and are likely to also benefit from plan-led strategies for nature conservation introduced by the Environment Wales Act 2016 and likely to be continued by the forthcoming Environment (Principles, Governance and Biodiversity Targets) Bill. As such, changes to the future baseline of these sites are likely to be positive.

A combination of legal protection, local planning policy and local catchment plans are likely to safeguard important habitats, with the important contribution made by the statutory requirement for BNG applicable to the future baseline in ensuring that habitats are not lost to development where planning permission is required and are prioritised for replacement at a Local Authority geographical scale wherever possible. Along with the potential for implementation of agri-environmental schemes, changes to the future baseline of habitats support a long-term trend towards a more mosaic-like, ecologically rich and visually diverse rural landscape. That said, urbanising influences from possible future housing development and highway improvements linked to national and local policy drivers, and attendant potential for negative effects, may act to counterbalance some of these habitat improvements.

Protected species are afforded varying levels of legal protection from killing, injury, loss of shelter and resting places, and disturbance. Species groups are variously safeguarded through the requirement for derogation licences, permits and consents for works which could affect the species or their habitat. In the absence of the Scheme, it is likely these species would continue to be present within suitable supporting habitats and would react to larger-scale population trends, potentially expanding their range and territories to maintain a favourable conservation status. However, this is not necessarily the case, the latest population data for Otter within Wales shows a decline in the species population for the first time since the 1970s for the period 2010 to 2015-2018 (NRW, 2021) with the reason for this decline unclear. Similarly, the population trends for bats within Wales as reported by the National Bat Monitoring (BCT, 2025) program suggests that while overall bat populations are considered stable, there is distinct variation in trends for individual species. Greater and lesser horseshoe populations have increased in Wales over the past five years whereas brown long eared populations are declining.

Rare and notable species risk being overlooked in terms of legal protection and consequently any loss of habitat, failure in the control of INNS leading to increased distribution or abundance and human disturbance and urbanisation have potential to negatively affect the success of these taxa in the future. As a result, in the absence of the Scheme, balanced against the potential supporting habitat benefits of Nature Recovery Action Plans and Net Benefit for Biodiversity and the implementation of the upcoming Environment (Principles, Governance and Biodiversity Targets) Bill, declines and localised loss of some other species is possible.

The other developments which will form part of the future baseline identified in Chapter 12: Cumulative Effects have been reviewed, and do not materially alter the future baseline assessed for this aspect.

6.8.5 Summary of sensitivity by receptor

Table 6-15 contains a summary of sensitivity for each Biodiversity and Nature receptor.

Table 6-15 Summary of Sensitivity by Receptor

Receptor name	Sensitivity of Receptor
Afon Teifi SSSI	High
Afon Teifi SAC	Very High
Cardigan Bay SAC and West Wales Marine SAC	Very High
Broadleaved Scattered Trees	Negligible
Running Water	N/A Assessed within Afon Teifi SSSI and SAC
Intertidal Mudflats and Associated Intertidal Biotopes	Moderate
Saltmarsh	Moderate
Amenity Grassland	Negligible
Poor Semi-Improved Neutral Grassland	Negligible
Amphibians and Reptiles	Negligible
Bats	Low
Birds – Breeding	Negligible
Birds - Wintering	Low
Fish – Diadromous Fish	High
Fish – Marine and Estuarine Fish	Low
Invertebrates	Low
Otter	Low
West European Hedgehog	Negligible

6.9 Assessment of effects

This section describes the outcomes of the assessment, identifying the Likely Significant Effects on Biodiversity and Nature Conservation. Where Likely Significant Effects are reported, additional mitigation is described in section 6.10 with the residual effects described in section 6.11. For further information on embedded mitigation see Chapter 2: Project Description and Chapter 10: Water Environment and Chapter 11: Land use and Soils.

6.9.1 Likely impacts and embedded mitigation

The following is a description of likely Biodiversity and Nature Conservation Impacts likely to occur as a result of the Scheme as it is described in Chapter 3: Project Description. This includes

an assessment of Impact Magnitude by Receptor. Where an impact is considered to be not applicable it is included in the summary table only.

Habitat loss

Construction phase

The construction of the flood defence wall in Areas 1-3 will lead to the permanent loss of approximately 489m² of intertidal habitat. The construction of the flood defence and creation of intertidal set back habitat in Area 4 will lead to the permanent loss of approximately 586m² of terrestrial habitat. The works will also lead to the loss of three trees identified by the bat Ground Level Tree assessment. T4 (T4 Category C (RSK ADAS Ltd, 2026)) is identified as having PRF-I suitability and subsequent endoscopic inspections found no evidence of roosting activity. T1 and T2 (T1 Category B, and a tree too small for classification (RSK ADAS Ltd, 2026)) were both identified as having negligible suitability for bats.

Habitat loss in the construction phase considered to be a negative impact for a number of receptors.

- For poor semi-improved grassland there will be a permanent loss of 356m² habitat of negligible sensitivity to the new defence and new backwater where habitat creation is proposed in Area 4. In addition, to this there will be a temporary loss of 196m² poor semi improved- grassland of negligible sensitivity to construction within Area 4 for the duration of construction and reestablishment period (estimated 3 years). This temporary loss is offset by the reinstatement of grassland habitat through reseeded (See habitat creation below). This habitat in its current condition (moderate) is considered to be common at the district level and therefore this impact is of small negative magnitude.
- For amenity grassland there will be a permanent loss of 34.36m² habitat to the new defence and new backwater where habitat enhancement is proposed in Area 4 in the garden of Tiefs House. In addition, to this there will be a temporary loss of 113m² amenity grassland to construction within Foundry field for the duration of construction and reestablishment period (estimated 3 years). This temporary loss is offset by the reinstatement of grassland habitat through reseeded (See habitat creation below). This habitat in its current condition (poor) is considered to be common at the local level and therefore this impact is of negligible negative magnitude.
- For amphibians, reptiles and west European hedgehog the magnitude of impact is considered to be negligible negative as whilst the grassland habitat loss does remove suitable foraging habitat for these species the likely local populations are small and therefore this impact is unlikely to measurably affect the conservation status of the species at the district level.

The impact is considered to be neutral for the following receptors.

- For the Afon Teifi SSSI, Afon Teifi SAC and Cardigan Bay SAC and West Wales Marine SAC (and Running water habitat type), the habitats being lost are not notified/qualifying features. The small scale of these losses when compared to the size of the Teifi estuary mean that it is that they will not affect the overall favourable

conservation status of those sites. As a result, the magnitude of the impact is considered to be neutral.

- For broadleaved scattered trees this habitat due to its limited species, age and structural diversity is considered to be of site value only and as a result when combined with the limited area of total loss the magnitude of impact is considered to be neutral.
- For saltmarsh there will be temporary loss (for duration of construction and until establishment of Area 4 estimated at 5 years) of 34m² semi-natural saltmarsh intertidal habitat within the Scheme Area to the footprint of the new flood wall. The establishment of new saltmarsh habitat within Area 4 will be left to the natural expansion of the existing retained semi-natural and natural saltmarsh habitat within the project area and immediate surrounds. The habitat within the project area in its current condition (moderate) is considered to be common within the Afon Teifi estuary and therefore this impact of this temporary loss is of neutral magnitude.
- For intertidal mudflats and associated intertidal biotopes the encroachment of the new wall defence into the estuary will result in the temporary (for duration of construction and until establishment of Area 4 estimated at 3 years) approximate loss of 489m² of intertidal muds. However, this impact is offset by the creation of the new backwater habitat in Area 4 (see Habitat Creation section below) and design approach with habitat niches targeted to replicate natural estuarine features. This will mean that the Scheme results in a no net loss of intertidal habitat overall. The exact composition of the intertidal habitat will be down to natural river processes after creation.
- For bats no roosts were identified as present within the features to be lost, the habitats affected are suboptimal foraging areas for the species present in the locality, and the majority of the replacement habitat (see Habitat Creation below) will be of a similar value for likely prey species. As a result the magnitude of impact is considered to be neutral.
- For birds (breeding and wintering), invertebrates and otter the magnitude of impact is considered to be neutral as whilst the intertidal habitat loss does remove suitable habitat for these species the likely local populations are small and therefore this impact is unlikely to measurably affect the conservation status of the species at the district level.
- The saltmarsh habitat is high in the tidal range and is therefore of limited value for fish (diadromous and marine and estuarine) species. As there is no net loss of intertidal habitat overall for the Scheme as a result the magnitude for all fish receptors of habitat loss is deemed neutral.

Operational phase

No impact is predicted as a result of the project via this impact pathway during the operational phase.

Habitat adaptation

Construction and operational phase

Habitat adaptation is an impact that spans both the construction and operational phase of development with no easy definition between the two and as a result they are discussed together in this section.

The installation of sheet piling and construction of the sea defence wall will result in the permanent adaptation of 1947m² of intertidal mud habitat through the creation of the engineered river bank for the flood defence and to address the future baseline impacts of coastal squeeze. Due to the alteration in bank slope profile the total surface area of the intertidal habitat within the project area will increase marginally to 2147m².

The engineered river bank (and need for the Scheme) has been developed around providing an adaptable pathway for habitats to avoid the impacts of coastal squeeze in this location. Current intertidal areas within the Scheme area (with the exception of slipways) are backed by vertical walls associated with existing structures; sea level rise with the Scheme will, in a future baseline scenario, see the total loss of intertidal habitats as there is no realistic expectation for the removal of present-day levels of coastal protection in Cardigan.

An embanked structure with designed opportunities for accretion of sediment and establishing of habitat niches within the constructed form, using materials that can support those objectives, provides an opportunity for habitats to adapt to rising tidal levels. The habitats that can then develop on the structure would provide a greater functionality (access by faunal species, variation in habitats, opportunities for fish, invertebrate and prey species) than would otherwise be maintained by existing wall structures.

The habitats present on the structure will represent the estuarine habitat context, with riparian and brackish-tolerant planting growing down from above mean high water springs to create a mixed habitat in this upper zone. This interface area is also considered suitable for saltmarsh species to take hold, as has occurred on gabion basket structures within the Study Area baseline, along with sheltered suitable areas within the wider Scheme design such as slipways and Area 4.

The top third 599m² of the engineered riverbank in Areas 1-4 will be seeded with a native coastal estuarine grassland mix (see Chapter 3: Project Description). Initially this area will be cut annually to prevent the establishment of woody vegetation however, over time with the increase of frequency of tidal inundation the natural salt levels should impede the growth of these species. This seeded area of the engineered river bank area will change over time as tidal range increases as a result of climate change, with suitable conditions to likely result in the long term transition from salt tolerant grassland, to upper saltmarsh, to reedbed and finally to mud as the frequency of tidal inundation increases throughout the 100 year lifetime of the defence.

Below present-day MHWS on the engineered river bank (and noting the lifespan of the Scheme and changes to tidal levels over time) habitat prediction can be understood based on those habitats recorded in similar setting adjacent to the Scheme. On the left bank, opposite Cambrian Quay at the downstream extent of the Scheme, habitats recorded based on sheltered bedrock and stable boulders in the eulittoral zone are subject to reduced salinity and characterised by the wrack *Fucus ceranoides*. In these habitats, green seaweeds *Ulva intestinalis* and *Ulva lactuca* may be present together with shore crab *Carcinus maenas* and the occasional barnacle *Austrominius modestus* and *Semibalanus balanoides*. Proposed engineered river bank habitats

within the same intertidal zone and on replica substrate surfaces would reasonably be predicted to develop similarly, with the additional benefit of the specific habitat design features integrated into the engineered river bank surface.

Habitat adaptation is an impact of positive magnitude for the following receptors.

- For saltmarsh the creation of additional suitable areas within this habitats niche tidal range (Park, 2025) should offer additional opportunity for natural movement up the tidal range in response to climate change. The existing locations this habitat is present on within the Scheme Area are distinct shelves (on top of the first layer of flood defence gabions or dumped ballast piles), with no obvious areas for expansion up the bank gradient in response to raised tidal levels. The existing height of this feature at approximately 1.9m AOD is below the average minimum saltmarsh limit present within the Teifi marshes nature reserve upstream (Park, 2025). Modelling undertaken as part of the flood consequence assessment for the project predicts that MHWS will rise on average by 1cm per year for the 100-year lifespan of the defence (Binnies Uk Ltd, 2026). Estimating the effects of sea level rise on tidal range and therefore intertidal habitat is impacted by more factors than sea level rise alone. Understanding the resulting effects on intertidal habitats extent from these impacts is however more generally predictable and this is assumed reduced intertidal areas for the purposes of climate change impacts on estuaries. This is because sea level rise is expected to reduce the range of intertidal volume of the estuary, experienced under neap and spring tidal conditions (Environment Agency, 2026). The proposed design for the engineered river bank will ensure that the tidal range habitat niche for saltmarsh is retained longer into the future (although the current water level predictions do suggest that the new saltmarsh habitat on the upper reaches of the engineered riverbank will be largely due to coastal squeeze by the end of the 100 year design life of the defence). As a result of this the magnitude of impact is considered to be negligible positive.

Habitat adaptation is considered to be an impact of neutral magnitude for the following receptors

- For the Afon Teifi SSSI, Afon Teifi SAC and Cardigan Bay SAC and West Wales Marine SAC (and running water habitat type), the habitats being modified are not qualifying features or key habitats of species of the designations. The small scale of this modification when compared to the size of the Teifi estuary mean that it is that they will not affect the functioning or integrity of those sites. As a result, the magnitude of the impact is considered to be neutral, however benefits to mobile species like otter are expected to be realised over time as coastal squeeze in the future baseline scenario would have impaired opportunities for linear movement, concealment and foraging.
- For Intertidal Mudflats and Associated Intertidal Biotopes the engineered river bank represents the necessary adaption to coastal squeeze and coastal protection which is the underlying strategic driver for the Scheme. The engineered river bank seeks to minimise the short-term impact and maximise longer-term beneficial effects by adapting the soft sediment habitat type common within the estuary, for another (littoral rock-based) estuarine habitat; as a result and despite the prevention of total loss over time of intertidal mudflat habitat due to coastal squeeze, this is considered to be an impact of neutral magnitude.
- The salt tolerant grassland creation will overall have a neutral magnitude impact. The habitat on river side of the wall although likely to be of better quality due to the lack of

public access, will over time become affected by the increased tidal range of the Teifi and therefore Naturally transition into estuarine habitat (likely Salt marsh, reed bed and mud). The creation on the shore side of the defence wall in Area 4 is permanent. This will be seeded with a more diverse mixture of species that present in the existing habitat present within the Scheme Area. However, the smaller size and likely poorer habitat condition assessment (as a result of higher anthropogenic impact) will reduce its biodiversity value.

- For bats the magnitude of impact is neutral as the habitats affected are suboptimal foraging areas.
- For birds (breeding and wintering), and otter the magnitude of impact is considered to be neutral as whilst the intertidal habitat adaptation does affect theoretically suitable habitat for these species, the assessed value of the Scheme Area local populations is low and therefore this loss is unlikely to measurably affect the favourable conservation status of the species at the district level.
- For fish (diadromous and marine and estuarine) the choice to use rock rolls (engineered river bank) and rip rap (Engineered river bank toe) and a shallower gradient where possible should ensure that the engineered river bank incorporates sheltered niches for fish and their prey species as well as areas of deeper sediments for invertebrates. The risk to fish species is minimised further by the fact all of the fish receptors identified are highly mobile and none of the receptors are constrained to specific habitat types or areas. They are therefore likely to be able to use other areas of available habitat, either further upstream or downstream, for foraging and spawning. As a result, the magnitude for all fish receptors of habitat adaptation is deemed neutral.
- For invertebrates the habitats proposed are typical for estuarine shore environments and will offer niches for both mud dwelling species such as flat worms and rock shore dwelling species such as crabs. As a result, the magnitude for all fish receptors of habitat adaptation is deemed neutral.

Habitat creation

Construction and operational phase

Habitat creation is an impact that spans both the construction and operational phase of development with no easy definition between the two and as a result they are discussed together in this section.

The Scheme includes 489m² of intertidal habitat creation in Area 4, between the retained saltmarsh on top of the existing rock gabions and new flood defence. This area will be landscaped to include a natural channel, pools and raised bank all within the expected natural tidal range in order to create semi natural niches for the establishment of intertidal habitats, similar to a natural backwater or cove. Once created the habitats will be left to naturally recolonise with plants and the river allowed to naturally dump and regrade the silt with tidal action. The design proposed will allow conditions for natural deposition of river silt immediately and it is likely that local native estuarine species and habitats will have colonised the area within five years. This area is connected to the natural saltmarsh habitats to the east of the site via the retained area of semi-natural saltmarsh on gabions and the Afon Teifi Saltmarsh – niche Assessment (Park, 2025) Appendix 6.3 identified this area as suitable for saltmarsh expansion

should suitable topography be provided as a result it is highly likely that these species will be among the early colonisers of areas where the tidal inundation conditions are suitable. The habitats within area 4 when established will likely be a mixture of intertidal muds, saltmarsh and reedbed. The design will allow the habitats to change and adjust over time driven by the tidal processes of the River Teifi, with ratio of mud to vegetated habitats likely changing in response to larger flood events.

The poor semi-improved grassland within the construction area in the region of Gloster Row car park will be reseeded with a suitable biodiverse native grassland seed mix (see Chapter 8: Landscape and Visual). Whilst this area will not be subject to the same tidal influence, this area will likely be subject to increased, anthropogenic disturbance as a result of its location as a result it is assumed that the condition of this habitat when established will likely be poor.

The landscaping for Strand within Area 1 includes the provision of a new band of native tree screening as well as planted beds including species of wildlife value (see Chapter 8: Landscape and Visual).

Habitat creation is an impact of positive magnitude for the following receptors.

- For saltmarsh the creation of additional suitable areas within this habitats niche tidal range (Park, 2025) should offer additional opportunity for natural movement up the tidal range in response to climate change. The existing locations this habitat is present on within the Scheme Area are distinct shelves (on top of the first layer of flood defence gabions or dumped ballast piles), with no obvious areas for expansion up the bank gradient in response to raised tidal levels. The existing height of this feature at approximately 1.9m AOD is below the average minimum saltmarsh limit present within the Teifi marshes nature reserve upstream (Park, 2025). Modelling undertaken as part of the flood consequence assessment for the project predicts that MHWS will rise on average by 1cm per year for the 100-year lifespan of the defence (Binnies UK Ltd, 2026). Estimating the effects of sea level rise on tidal range and therefore intertidal habitat is impacted by more factors than sea level rise alone. Understanding the resulting effects on intertidal habitats extent from these impacts is however more generally predictable and this is assumed reduced intertidal areas for the purposes of climate change impacts on estuaries. This is because sea level rise is expected to reduce the range of intertidal volume of the estuary, experienced under neap and spring tidal conditions (Environment Agency, 2026). The proposed design for the Area 4 will ensure that the tidal range habitat niche for saltmarsh is retained much longer into the life span of the defence (although the current water level predictions do suggest that the habitat will still be lost from the Scheme Area by the end of the 100 year lifespan of the defence). However, suitable conditions for this habitat will be retained for longer on the engineered river bank within Areas 1-3 as a result of its greater height at the base of the defensive wall. As a result of this the magnitude of impact is considered to be negligible positive.

The impact is considered to be neutral for the following receptors.

- For the Afon Teifi SSSI, Afon Teifi SAC and Cardigan Bay SAC and West Wales Marine SAC (and running water habitat type) the small scale of these created habitats when compared to the size of the Teifi estuary mean that it is that they will not affect the overall integrity or function of those sites. As a result, the magnitude of the impact is considered to be neutral.

- For broadleaved scattered trees the positive impact of the habitat creation is offset by the loss of habitat to the new defence structure footprint. This will mean that the Scheme results in a no net loss of habitat overall. As a result, the magnitude of the impact is neutral.
- For intertidal mudflats and associated intertidal biotopes the positive impact of the habitat creation offsets the loss of habitat to the new defence structure footprint. This will mean that the Scheme results in a no net loss of intertidal habitat overall. As a result, the magnitude of the impact is neutral.
- For bats the magnitude of impact is considered to be neutral as although the habitats created are suitable their scale is insufficient to affect significantly core sustenance zones of local roost populations and therefore this creation is unlikely to measurably affect the favourable conservation status of the species at the district level.
- For birds (breeding and wintering), invertebrates and west European hedgehog the magnitude of impact is considered to be neutral. The habitat creation does create suitable habitat for these species, however the scale of change is small and is within a very urban location, so this creation is unlikely to measurably affect the favourable conservation status of the species at the district level.
- For fish (diadromous and marine and estuarine) the creation of the new backwater habitat in Area 4 will result in a no net loss of intertidal habitat overall for the Scheme although the exact composition of the habitat will be down to natural river processes after creation. As a result, magnitude for all fish receptors of habitat creation is deemed neutral.

Terrestrial pollution and dust

Construction phase

There is potential that excavation and ground works may expose pollutants within the ground/soil, however, effects related to ground/soil borne pollution have been assessed in full within ES Chapter 11: Land and Soil.

Mitigation measures to be employed during the Scheme development are as follows:

- The use of silt curtains (correctly installed to manufacturer's recommendations) to minimise sediments entering Teifi Estuary (standard practice).
- If trenches are to be excavated in Made Ground to remove obstructions ahead of sheet piling they should be backfilled with suitable clean fill.
- Formal monitoring of Made Ground and natural soils, and groundwater for potential contamination. Monitoring should include the use of Rapid Screening Methods using field test kits or portable instruments (eg Photo-Ionisation Detector (PID) for volatile organic compounds and X-Ray Fluorescence (XRF) for heavy metals), and formal sampling of soils and groundwater for laboratory testing should indications of contamination be observed.
- Any visual or olfactory evidence of contamination encountered during construction works should be further investigated to determine spatial extents and concentrations

(it is likely that works will need to be stopped during this investigation into unexpected contamination).

- Standard practices for protecting the water environment should be adhered to (e.g. bunded fuel storage, use of plant nappies, suitable spill kits with trained personnel, silt fencing) in accordance with current good practice guidance including NRW Guidance for Pollution Prevention 5: Works and maintenance in or near water (version 1.2 February 2018), and CIRIA C741: Environmental Good Practice on Site Guide (4th edition, 2015).
- Where desiccated soils are disturbed during construction such that dust could be created, then mitigation to control dust (e.g. damping down soils) should be in place.
- Appropriate management strategies should be in place to deal with potentially contaminated soils if they are encountered during construction. These should include measures to ensure the safety of construction workers, to prevent further contamination of the environment, and an appropriate storage, testing and disposal strategy if contaminated soils are to be removed from the Scheme Area.
- Should any of the above encounter significant contamination in soil or groundwater, a remediation strategy should be developed, agreed with Ceredigion Council and NRW, and implemented with a verification plan to confirm that remediation objectives have been achieved.
- The above should be included in the Pollution Prevention Plan for the construction phase of the Scheme.

The embedded mitigation measures are sufficient to manage any impact and therefore the magnitude of impact is considered neutral for all receptors likely to be affected.

Operational phase

No impact is predicted as a result of the project via this impact pathway during the operational phase.

Water flow (Tidal current) changes

Construction phase

The installation of the flood defence Scheme would reduce the cross-sectional area of the river in the Scheme Area. This has the potential to increase water velocities in the area of the Scheme. Hydraulic modelling of the Scheme has been undertaken to investigate the effect of the reduction in cross sectional area on water velocities (see Chapter 10: Water Environment). The modelling concluded that the Scheme would have negligible impact on local water velocities.

The embedded mitigation measures are sufficient to manage any impact and therefore the magnitude of impact is considered negligible negative for all receptors likely to be affected.

Operational phase

No impact is predicted as a result of the project via this impact pathway during the operational phase.

Aquatic pollution and accidental spills

Construction phase

The works will require an excavator/piling rig in the intertidal zone. To minimise the possibility of a pollution incident, best practice guidance will be implemented when working near water (GPP5: Works and maintenance in or near water) and a Pollution Prevention Plan will be required to be in place. Best practice measures will be in place to prevent accidental spills. Biodegradable hydraulic oil will be used when possible and no refuelling will be undertaken at the work site. Concrete pours pose a risk of water pollution through leaching of uncured material and accidental spillage. Concrete pours will be scheduled during low tide periods to minimise direct contact with water during curing. Marine grade concrete will be used to ensure quick curing, enhance durability and reduce the potential for washout and leaching.

With these best practice measures in place along with the implementation of a Pollution Prevention Plan, potential for effects from a pollution event is considered negligible and therefore the magnitude of impact is considered neutral for all receptors likely to be affected.

Operational phase

No impact is predicted as a result of the project via this impact pathway during the operational phase.

Terrestrial noise and vibration

Construction phase

Effects in relation to noise and vibration comprise the following:

- Disturbance that can lead to the abandonment of areas of shelter at times when the disturbed species would not usually be active, leading to increased stress and predation risk.
- High noise levels that can lead to the abandonment of core resting sites, commuting or foraging areas by mobile species.
- Disturbance of mobile species at sensitive periods of their yearly life cycle e.g. disturbance during breeding period, when raising young or hibernation.

Calculations for vibratory piling were carried out in accordance with BS 5228 Part 2 to predict PPV levels at various distances (Ramboll UK Ltd, 2025) Appendix 5.1. The sheet piling activity is expected to last for approximately nine weeks.

The predictions establish key screening distances for human perception:

- Receptors within 30m of piling may experience vibration levels above the 1.0 mm/s moderate impact threshold.
- Receptors within 5m of piling may experience levels above the 10 mm/s 'intolerable' threshold.

Throughout the construction programme, the primary strategy for managing noise and vibration will be the application of Best Practicable Means (BPM) as set out within Appendix 6.9. BPM involves minimising site noise levels at all times, whilst having due regard to the practicability and economic implications of any embedded mitigation measure.

As part of the works, a Construction Environmental Management Plan (CEMP) will be developed to ensure that environmental impacts are avoided and minimised during construction. BPM mitigation measures for noise and vibration will be included in the CEMP.

Where significant negative effects are still predicted after the application of standard BPM or at particularly sensitive receptors, measures will be adopted to reduce effects as far as practicable. Potential additional mitigation measures are outlined within section 9 of the Noise and Vibration Assessment (Appendix 5.1). The specific details of these measures will be finalised by the Principal Contractor and approved via the CEMP, or a specific Noise and Vibration Management Plan prior to works commencing.

Terrestrial noise and vibration within the construction phase is an impact of negative magnitude for the following receptors.

- For breeding birds in addition to the disturbance, the impact could result in bird species, abandoning habitual nesting sites within the Scheme Area for the season, with a corresponding impact on breeding success. However, as previously stated the species list of breeding birds found within and in close proximity to the Scheme Area is considered to be of site importance only and this effect will be temporary and will revert to normal as soon as the works are completed as a result the magnitude has been assessed as small negative.
- Any bats roosting within properties adjacent to the Scheme would be subject to additional noise and vibration disturbance. The baseline surveys found no evidence of roosts of high conservation status in these properties and as a result of this and the temporary nature of the works the impact magnitude is set at negligible negative.
- For amphibian and reptiles, wintering birds, otter, west European hedgehog, the primary effect will be disturbance resulting in likely avoidance of the area during the piling works. This effect will be temporary and will revert to normal as soon as the works are completed as a result the magnitude has been assessed as negligible negative.

Operational phase

No impact is predicted as a result of the project via this impact pathway during the operational phase.

Aquatic noise and vibration

Construction phase

Vibropiling, augering and other in channel works associated with the construction of the flood defence (including the construction of the piling platform) have the potential to generate and propagate underwater noise (as sound pressure motion) and vibration (as particle motion). Underwater noise and vibration can cause several effects on aquatic species including:

- Behavioural effects (e.g. reduced detection of predators/prey, inhibited communication between conspecifics, alteration in swimming behaviour);
- Masking effects (i.e. the reduced detectability of a given sound owing to the simultaneous occurrence of another sound);
- Temporary Threshold Shift (TTS) in hearing (short or long-term changes in hearing sensitivity that may or may not reduce fitness);
- Recoverable tissue injury (not resulting in mortality e.g. minor internal or external hematoma); and
- Mortality or potential mortal injury (immediate or delayed death).

The following text is taken from the Cardigan Tidal Flood Risk Management Scheme – Fish Ecology Technical Note (APEM Ltd, 2026a) Appendix 6.2 with minor revisions for clarity within this Environmental Statement.

The most recent and relevant guidelines for the purposes of the assessment of the impacts of underwater noise associated on fish are the Acoustical Society of America (ASA) Sound Exposure Guidelines for Fishes and Sea Turtles (Popper, et al., 2014). These guidelines provide directions and recommendations for setting criteria (including injury and behavioural criteria) for fish.

The guidelines broadly group fish into the following categories based on their anatomy and the available information on hearing of other fish species with comparable anatomies:

- Group 1: Fish lacking swim bladders that are sensitive only to sound particle motion and show sensitivity to a narrow band of frequencies (e.g. lampreys, gobies);
- Group 2: Fish with a swim bladder where the organ does not appear to play a role in hearing. These fish are sensitive only to particle motion and show sensitivity to a narrow band of frequencies (e.g. Atlantic salmon); and
- Group 3: Fish that have special structures mechanically linking the swim bladder to the ear. These fishes are sensitive primarily to sound pressure, although they also detect particle motion (e.g. European eel). These species have a wider frequency range, and generally show higher sensitivity to sound pressure than fishes in Groups 1 and 2.

Species scoped into this assessment are categorised into the following hearing groups outlined in Table 6-16.

Table 6-16: Hearing abilities of fish species scoped into this assessment.

Hearing group	Receptor / Species
Group 1 (no swim bladder)	River lamprey, sea lamprey, flounder, plaice, common goby, sand goby, lesser sand-eel, greater sand-eel
Group 2 (swim bladder is not involved with hearing)	Atlantic salmon, brown/sea trout, thick-lipped grey mullet, thin-lipped grey mullet, golden grey mullet
Group 3 (swim bladder involved with hearing)	European eel, Atlantic herring, European seabass, sprat

(Popper, et al., 2014) sets out criteria for effects arising from different sources of noise. The criteria used within this assessment are associated with continuous noise (i.e. vibro-piling and augering). Where insufficient data exists to determine a quantitative value, (Popper, et al., 2014) categorised in relative terms as high, moderate or low risk at three distances from the source: near (i.e. in the tens of metres), intermediate (i.e. in the hundreds of metres) or far (i.e. in the thousands of metres) (Table 6-17).

Table 6-17: Risk of effects arising from noise exposure to categorised fish groups (Popper, et al., 2014)

Hearing group	Mortality and potential mortal injury	Recoverable injury	TTS	Masking	Behavioural
Group 1	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Group 2	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Group 3	(N) Low (I) Low (F) Low	170 dBrms 1µPa for 48hrs	158 dBrms 1µPa for 12hrs	(N) High (I) High (F) High	(N) High (I) Moderate (F) Low
Peak and rms sound pressure levels dB re 1 µPa; SEL dB re 1 µPa ² -s. All criteria are presented as sound pressure even for fish without swim bladders since no data for particle motion exist.					

Those fish with an absence of a swim bladder (Group 1) or that have a swim bladder which is not involved in hearing (Group 2), are understood to be insensitive to sound pressure and are most likely to detect particle motion. Group 3 fish (those fish with a swim bladder that is involved in hearing) are understood to be able to detect both particle motion and sound pressure, and are more sensitive to sound than Group 1 and 2 fish species.

Most Group 1, 2 and 3 fish species are expected to be able to avoid noise sources before mortality and potential mortal injuries could occur. However, there might be some temporary physiological effects and behavioural responses. In relation to underwater noise produced during vibro-piling and augering, Popper et al. (2014) indicates that there is a low risk of mortality and potential mortal injuries and recoverable injuries within the near (tens of metres), intermediate (hundred of metres) and far (thousands of metres) fields for Groups 1, 2 and 3. For behavioural effects there is a moderate risk in the near and intermediate fields, and low risk in the far fields for Group 1 and 2, and a high risk in near fields, moderate risk in intermediate fields and low risk in the far fields for Group 3.

Aquatic noise and vibration within the construction phase is an impact of negative magnitude for the following receptors, in the absence of mitigation.

- The diadromous fish; Atlantic salmon, sea trout, European eels, river lampreys and sea lampreys, are likely to migrate passed the Scheme and therefore underwater noise may impede upon or delay their migration. The piling and augering works are scheduled to have a duration of approximately 2 months and there is potential for a temporal overlap with key migratory periods for these species, within the Afon Teifi. The magnitude has therefore been set as small negative.

- Afon Teifi SAC, Afon Teifi SAC and Cardigan Bay SAC and West Wales Marine SAC highlight diadromous fish species Atlantic salmon, river lamprey and sea lamprey as key features within their citations. As a result of this any significant impact on these species would result in a change to the favourable conservation status the designated sites. Therefore, the magnitude of impact has been set as small negative.
- All other marine and estuarine fish receptors are expected to be able to avoid the impact before potential mortal injuries could occur, occupy nearby suitable habitats of the estuary or adjacent coastal waters and return upon cessation of the activities. They have been deemed to be of low vulnerability (reasonable capacity to avoid), high recoverability (return upon cessation of activities). The magnitude has therefore been assessed as negligible negative.
- Birds (wintering and breeding), otter have potential to be directly disturbed by the impact of noise of and vibration but also by a wider reduction of prey availability as fish species avoid the area surrounding the Scheme Area during the piling and augering works. The effect will be temporary and will revert to normal as soon as the works are completed as a result the magnitude has been assessed as negligible negative.

Operational phase

No impact is predicted as a result of the project via this impact pathway during the operational phase.

Changes in suspended solids (water clarity)

Construction phase

When undertaken in water including the installation of the piling platform piling and augering activities and the placement of rip rap and rock rolls have the potential to cause sediment resuspension and increase suspended sediment concentrations causing a decrease in water clarity. With appropriate standard pollution prevention measures as described in Chapter 10: Water environment in place, this would be expected to be a very localised, short term and temporary increase in suspended sediment concentrations, and given the nature of the local environment, would be unlikely to be detectable above background levels and would quickly disperse with tidal movements.

With these best practice measures in place, potential for effects from a change in water clarity is considered negligible and therefore the magnitude of impact is considered neutral for all receptors likely to be affected.

Operational phase

No impact is predicted as a result of the project via this impact pathway during the operational phase.

Artificial lighting at night

Construction phase

Artificial lighting at night has been demonstrated to be a major constraint on nocturnal species such as bats, otter and birds. Impacts can vary by species but include:

- Increased predation risk;
- Disruption/barrier effect on foraging and commuting routes; and
- Disruption of usual activity schedule (daytime species becoming active at night when prey availability maybe lower so increasing stress).

The proposed construction working hours would be governed by Ceredigion County Council and are typically expected to be limited to daytime on weekdays between 0730 and 1300. If weekend working is permitted, this would likely take place on Saturdays between 0730 and 1300. Activities within the site compounds (Northern and Southern Compound) may continue outside of the main construction activity hours. Out of hours works, if required, would be agreed in advance with the Local Authority Environmental Health Officer. Increased levels of artificial lighting at night. As a result, construction lighting is unlikely to be a significant issue.

In addition, to construction lighting the Scheme is likely to require additional security lighting for key equipment and or risk areas. This will be designed in a manner to minimise the impact on nocturnal wildlife, through management of light spill onto the river corridor, timers and the use of motion activated lighting. As a result, security lighting is unlikely to be a significant issue.

As part of the works, a Construction Environmental Management Plan (CEMP) will be developed to ensure that environmental impacts are avoided and minimised during construction, through the implementation of BPM mitigation measures. The CEMP would detail mitigation measures specific to the construction phase and help to demonstrate the Scheme's commitment to environmental protection and sustainability.

With these best practice measures in place the potential for effects from additional artificial lighting during construction is considered negligible and therefore the magnitude of impact is considered neutral for all receptors likely to be affected.

Operational phase

The proposals for Area 1 include the moving of two existing streetlamps closer to the river as a result of the creation of the new pedestrian area behind the defence wall. This will potentially result in an increase in light spill onto the intertidal habitats and river in this location.

This impact will be reduced partially by the height of the new flood defence wall.

If designed appropriately through the use of light cowlings and light spectrum used the light spill could be reduced to below levels currently present within the Scheme Area. However this minimal level would need to respect the minimums required for public health and safety.

In addition to the above the tree planting including in the landscape proposal for Area 1 will provide additional screening of light from the street lighting on the opposite side of Strand from the defence.

These proposals have been designed with the concept of improving the connectivity between the river and Cardigan Castle driveway for the greater horseshoe roost present there. However, they will also provide a benefit for other bat species and nocturnal species such as otter using the river at this location.

The reduction in lighting impact in the operational phase is considered to be a positive effect for a number of receptors.

- For otter and bats this is considered to be a small positive impact due to the reduction in disturbance, improvement in habitat connectivity and reduction in predation risk.
- For wintering birds and breeding birds, this is considered to be a small positive due to the reduction in disturbance and reduced predation risk.
- For invertebrates this is considered to be a negligible positive to a reduction in the level of disruption of natural lifecycle of night emerging insects. However, the effect will be limited due to the already high levels of artificial lighting in this area.
- For diadromous fish and marine and estuarine fish receptors, this will affect the ambient light levels within the river but this is unlikely to result in a measurable difference in behaviour. As a result, the magnitude of impact is considered to be neutral.
- For west European hedgehog, amphibians and reptiles, whilst lighting presents an issue for this species the habitats in Area 1 are generally unsuitable for the species and therefore the magnitude of impact is considered to be neutral.
- For the statutory designated sites Afon Teifi SSSI, Afon Teifi SAC this is considered to be a neutral impact as these both include otter within their citation and the ability of this species through the Scheme Area would be enhanced by this change but this is unlikely to measurably affect the favourable conservation status of the species within areas of the designated sites.

For the remaining receptors the magnitude of impact is considered to be neutral as they are primarily terrestrial habitats and species and therefore would have limited exposure to a flood related pollution incident.

Anthropogenic disturbance

Construction Phase

The majority of the retained habitats of biodiversity value will be subject to disturbance during the construction period. Although all areas of the scheme are currently subject to anthropogenic disturbance to some degree currently, via the slipways or unofficial dog walking paths or fishing locations, the presence of the construction team will represent a significant increase in activity for the duration of the construction. This will increase the risk of:

- Behavioural disruption of mobile species;
- Disturbance of mobile species that can lead to the abandonment of areas of shelter at times when the disturbed species would not usually be active, leading to increased stress and predation risk; and

- Trampling / compaction damage to plant species and sensitive habitats.

Throughout the construction programme, the primary strategy for managing anthropogenic disturbance will be the application of Best Practicable Means (BPM). BPM involves minimising site disturbance levels at all times, whilst having due regard to the practicability and economic implications of any embedded mitigation measure. Embedded Measures will include:

- Toolbox talks for all contractors prior to entering the site to make them aware of ecologically sensitive areas of the site and of all stop procedures should certain sensitive species be found during the works;
- Ecological Clerk of Works (ECoW) supervision during works near to or within ecologically sensitive areas; and
- Restricting access to retained habitats via the use of signage and fencing and clearly demarked areas on drawings (e.g: root protection areas).

As part of the works, a Construction Environmental Management Plan (CEMP) will be developed to ensure that environmental impacts are avoided and minimised during construction, through the implementation of BPM mitigation measures. The CEMP would detail mitigation measures specific to the construction phase and help to demonstrate the Scheme's commitment to environmental protection and sustainability.

During the construction phase the amount of anthropogenic disturbance of the foreshore will be increased significantly above the usual levels expected of this area regardless of the embedded mitigation as a result this is considered to be negative effect of negligible magnitude for all receptors.

Operational phase

During the operational phase the impact of anthropogenic disturbance will be reduced when compared to the existing baseline this will be as a result of the following elements built into the Scheme design:

- The number of slipways reduced from two publicly accessible boat ramps to one controlled access foot ramp for canoes and kayaks from foundry field; and
- Access to habitats in front of the flood defence will be restricted to maintenance access only.

This restriction in access will block the existing access to the informal footpaths through the intertidal habitats reducing the disturbance impact from dog walkers and fisherman.

The reduction in lighting impact in the operational phase is considered to be a positive effect for a number of receptors.

- For otter, wintering birds and breeding birds this is considered to be a small positive impact due to the reduction in disturbance.
- For the saltmarsh and intertidal habitats this is considered to be a small positive due to the reduction in; associated trampling and damaging of vegetation, litter and nutrient enrichment (from dog urine and faeces).

- For amphibians and reptiles and west European hedgehog this is considered the magnitude of impact is considered to be neutral as the habitats affected are suboptimal for these species and the likely populations numbers are small.
- For the statutory designated sites Afon Teifi SSSI, Afon Teifi SAC this is considered to be a neutral impact as these both include otter within their citation and the ability of this species to move through the Scheme Area would be enhanced by this change but this is unlikely to measurably affect the favourable conservation status of the species within areas of the designated sites.

Invasive Non-Native Species

Invasive Non-Native Species (INNS) have been recorded within the Scheme Area during the surveys undertaken to support this Environmental Statement. A stand of Japanese Knotweed has been identified adjacent to the entrance of a proposed work compound SN 18235 46093 (not located within the construction zone).

All activities will follow best practice guidance for the prevention of spread of Invasive Non-Native Species including:

- Responsible sourcing of soils and plants used for landscaping; and
- Cleaning and maintenance of equipment and introduced of construction material (e.g. rip rap) (e.g. Check, Clean, Dry Protocol) to reduce the risk of spread or introduction of INNS.

As part of the works, a Construction Environmental Management Plan (CEMP) will be developed to ensure that environmental impacts are avoided and minimised during construction, through the implementation of BPM mitigation measures. The CEMP would detail mitigation measures specific to the construction phase and help to demonstrate the Scheme's commitment to environmental protection and sustainability.

With these best practice measures in place the risk of spread of Invasive Non-Native Species construction is considered negligible and therefore the magnitude of impact is considered neutral for all receptors likely to be affected.

Operational phase

No impact is predicted as a result of the project via this impact pathway during the operational phase.

Reduced flood risk could result in reduced potential for environmental pollution during and following a flood event

Construction phase

No impact is predicted as a result of the project via this impact pathway during the construction phase.

Operational phase

As stated within Chapter 1: Introduction Cardigan has a history of flood events which have had social, economic and environmental impacts upon the town. Major flood events have occurred between 2000–2020. In 2007, flood depths exceeded 0.5m, and further tidal floods occurred in 2008, 2012, and twice in 2014. One 2014 event was caused by surface water during low tide, while the most severe tidal flood on 3 January 2014 inundated 29 properties on St Mary's Street. The lower quayside, including Strand and Cattle Market, also flooded in 2007. Within the time frame of the scheme (100 years) without further intervention the frequency and severity of these flood events will increase. Each flood event will result in an uncontrolled pollution event as materials from the urban terrestrial environment are drawn back into the river including road dust (including car exhaust brake and tyre wear waste) and litter.

The flood defences have been designed to 4.95m AOD to meet the 1 in 200 design standard with climate change and allow for 0.2m of freeboard to account for uncertainty in long range forecasting of the effects of climate change. This will result in a reduction in frequency of flood pollution events improving water quality of the Afon Teifi in the long term.

The improvement in water quality in the operational phase is considered to be a positive effect for a number of receptors.

- For the statutory designated sites Afon Teifi SSSI, Afon Teifi SAC and Cardigan Bay SAC and West Wales Marine SAC this is considered to be a negligible positive impact as these are all directly hydrologically connected to the Scheme Area and therefore, would be exposed to any pollution incident. However, due to the scale of these sites their conservation status is unlikely to be affected by any changes in the Scheme Area.
- For intertidal habitats and saltmarsh this is considered a small positive impact as these marginal habitats would be most likely to be affected immediately by any flood deposited litter and other detritus.
- For diadromous fish and wintering birds this effect will be limited to their migration periods through the Scheme Area and so the magnitude is considered to be negligible positive.
- For breeding birds and otter this is considered to be a negligible positive impact due to the small population likely to be present within the Scheme Area at any one time.
- For marine and estuarine fish receptors and invertebrates this will affect all resident species and therefore the magnitude is considered to be small positive.

For the remaining receptors the magnitude of impact is considered to be neutral as they are primarily terrestrial habitats and species and therefore would have limited exposure to a flood related pollution incident.

6.9.2 Summary of impact Magnitude by Receptor

Table 6-18 contains a summary of impact magnitude for each Biodiversity and Nature receptor during the construction phase.

Table 6-18 Summary of Magnitude by Receptor during the Construction Phase

Receptor	Impact and Magnitude											
	Habitat Loss	Habitat Adaptation	Habitat Creation	Terrestrial Pollution and Dust	Water flow (tidal current) changes	Aquatic Pollution and accidental spills	Terrestrial Noise and Vibration	Aquatic Noise and Vibration	Changes in suspended solids (water clarity)	Artificial Lighting at Night	Anthropogenic disturbance	Invasive Non-Native Species
Afon Teifi SSSI	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	N/A	Small -	Neutral	Neutral	Negligible -	Neutral
Afon Teifi SAC	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	N/A	Small -	Neutral	Neutral	Negligible -	Neutral
Cardigan Bay SAC and West Wales Marine SAC	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	N/A	Small -	Neutral	N/A	Negligible -	Neutral
Broadleaved Scattered Trees	Neutral	N/A	Neutral	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	Negligible -	Neutral
Intertidal Mudflats and Associated Intertidal Biotopes	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	N/A	N/A	Neutral	N/A	Negligible -	Neutral
Saltmarsh	Neutral	Negligible +	Negligible +	Neutral	Neutral	Neutral	N/A	N/A	Neutral	N/A	Negligible -	Neutral
Amenity Grassland	Negligible -	N/A	N/A	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	Negligible -	Neutral
Poor Semi-Improved Neutral Grassland	Small -	N/A	Neutral	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	Negligible -	Neutral
Amphibians and Reptiles	Negligible -	N/A	Neutral	Neutral	N/A	Neutral	Negligible -	N/A	Neutral	Neutral	Negligible -	Neutral
Bats	Neutral	Neutral	Neutral	Neutral	N/A	Neutral	Negligible -	N/A	Neutral	Neutral	Negligible -	N/A
Birds – Breeding	Neutral	Neutral	Neutral	Neutral	N/A	Neutral	Small -	Negligible -	Neutral	Neutral	Negligible -	N/A
Birds - Wintering	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Negligible -	Negligible -	Neutral	Neutral	Negligible -	N/A
Fish – Diadromous Fish	Neutral	Neutral	Neutral	N/A	Negligible -	Neutral	N/A	Small -	Neutral	Neutral	Negligible -	Neutral
Fish – Marine and Estuarine Fish	Neutral	Neutral	Neutral	N/A	Negligible -	Neutral	N/A	Negligible -	Neutral	Neutral	Negligible -	Neutral
Invertebrates	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	N/A	N/A	Neutral	Neutral	Negligible -	Neutral
Otter	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Negligible -	Negligible -	Neutral	Neutral	Negligible -	N/A
West European Hedgehog	Negligible -	N/A	Neutral	Neutral	N/A	N/A	Negligible -	N/A	N/A	Neutral	Negligible -	N/A

Table 6-19 contains a summary of impact magnitude for each Biodiversity and Nature receptor during the operational phase.

Table 6-19 Summary of Magnitude by Receptor during the Operational Phase

Receptor	Magnitude of Impact				
	Habitat Adaptation	Habitat Creation	Artificial Lighting at Night	Anthropogenic disturbance	Reduced flood risk could result in reduced potential for environmental pollution during and following a flood event.
Afon Teifi SSSI	Neutral	Neutral	Neutral	Neutral	Negligible +
Afon Teifi SAC	Neutral	Neutral	Neutral	Neutral	Negligible +
Cardigan Bay SAC and West Wales Marine SAC	Neutral	Neutral	N/A	N/A	Negligible +
Broadleaved Scattered Trees	N/A	Neutral	N/A	N/A	Neutral
Intertidal Mudflats and Associated Intertidal Biotopes	Neutral	Neutral	N/A	Small +	Small +
Saltmarsh	Negligible +	Negligible +	N/A	Small +	Small +
Amenity Grassland	N/A	N/A	N/A	N/A	Neutral
Poor Semi-Improved Neutral Grassland	N/A	Neutral	N/A	N/A	Neutral
Amphibians and Reptiles	N/A	Neutral	Neutral	Neutral	Neutral
Bats	Neutral	Neutral	Small +	N/A	Neutral
Birds – Breeding	Neutral	Neutral	Small +	Small +	Negligible +
Birds - Wintering	Neutral	Neutral	Small +	Small +	Negligible +
Fish – Diadromous Fish	Neutral	Neutral	Neutral	N/A	Negligible +
Fish – Marine and Estuarine Fish	Neutral	Neutral	Neutral	N/A	Small +
Invertebrates	Neutral	Neutral	Negligible +	N/A	Small +
Otter	Neutral	Neutral	Small +	Small +	Negligible +
West European Hedgehog	N/A	Neutral	Neutral	Neutral	Neutral

6.9.3 Significance of effect

Table 6-20 contains the significance of effect for each Biodiversity and Nature receptor during the construction phase after assessment against the significance matrix included within Table 6-5.

Table 6-20 Significance of effect by Receptor during the Construction Phase

Receptor	Sensitivity	Impact and Magnitude											
		Habitat Loss	Habitat Adaptation	Habitat Creation	Terrestrial Pollution and Dust	Water flow (tidal current) changes	Aquatic Pollution and accidental spills	Terrestrial Noise and Vibration	Aquatic Noise and Vibration	Changes in suspended solids (water clarity)	Artificial Lighting at Night	Anthropogenic disturbance	Invasive Non-Native Species
Afon Teifi SSSI	High	None	None	None	None	None	None	None	Moderate Significant -	None	None	Minor -	None
Afon Teifi SAC	Very High	None	None	None	None	None	None	None	Moderate Significant -	None	None	Minor -	None
Cardigan Bay SAC and West Wales Marine SAC	Very High	None	None	None	None	None	None	None	Moderate Significant -	None	None	Minor -	None
Broadleaved Scattered Trees	Negligible	None	None	None	None	None	None	None	None	None	None	Neutral	None
Intertidal Mudflats and Associated Intertidal Biotopes	Moderate	None	None	None	None	None	None	None	None	None	None	Neutral	None
Saltmarsh	Moderate	Neutral	Neutral	Neutral	None	None	None	None	None	None	None	Neutral	None
Amenity Grassland	Negligible	Neutral	None	None	None	None	None	None	None	None	None	Neutral	None
Poor Semi-Improved Neutral Grassland	Negligible	Neutral	None	None	None	None	None	None	None	None	None	Neutral	None
Amphibians and Reptiles	Negligible	Neutral	None	None	None	None	None	Neutral	None	None	None	Neutral	None
Bats	Low	None	None	None	None	None	None	Neutral	None	None	None	Neutral	None
Birds – Breeding	Negligible	None	None	None	None	None	None	Neutral	Neutral	None	None	Neutral	None
Birds - Wintering	Low	None	None	None	None	None	None	Neutral	Neutral	None	None	Neutral	None
Fish – Diadromous Fish	High	None	None	None	None	Neutral	None	None	Moderate Significant -	None	None	Minor -	None
Fish – Marine and Estuarine Fish	Low	None	None	None	None	Neutral	None	None	Neutral	None	None	Neutral	None
Invertebrates	Low	None	None	None	None	None	None	None	None	None	None	Neutral	None
Otter	Low	None	None	None	None	None	None	Neutral	Neutral	None	None	Neutral	None
West European Hedgehog	Negligible	Neutral	None	None	None	None	None	Neutral	None	None	None	Neutral	None

Table 6-21 contains the significance of effect for each Biodiversity and Nature receptor during the construction phase after assessment against the significance matrix included within Table 6-5.

Table 6-21 Significance of effect by Receptor during the Operational Phase

Receptor	Sensitivity	Magnitude of Impact				
		Habitat Adaptation	Habitat Creation	Artificial Lighting at Night	Anthropogenic disturbance	Reduced flood risk could result in reduced potential for environmental pollution during and following a flood event.
Afon Teifi SSSI	High	None	None	None	None	Minor +
Afon Teifi SAC	Very High	None	None	None	None	Minor +
Cardigan Bay SAC and West Wales Marine SAC	Very High	None	None	None	None	Minor +
Broadleaved Scattered Trees	Negligible	None	None	None	None	None
Intertidal Biotopes	Moderate	None	None	None	Minor +	Minor +
Saltmarsh	Moderate	Neutral	Neutral	None	Minor +	Minor +
Amenity Grassland	Negligible	None	None	None	None	None
Poor Semi-Improved Neutral Grassland	Negligible	None	None	None	None	None
Amphibians and Reptiles	Negligible	None	None	None	None	None
Bats	Low	None	None	Neutral	None	None
Birds – Breeding	Negligible	None	None	Neutral	Neutral	Neutral
Birds - Wintering	Low	None	None	Neutral	Neutral	Neutral
Fish – Diadromous Fish	High	None	None	None	None	Minor +
Fish – Marine and Estuarine Fish	Low	None	None	Neutral	None	Neutral
Invertebrates	Low	None	None	Neutral	None	Neutral
Otter	Low	None	None	Neutral	Neutral	Neutral
West European Hedgehog	Negligible	None	None	None	None	None

6.10 Mitigation measures

Aquatic noise and vibration

No in-water augering or piling activities shall be undertaken between 1 March and 31 December (inclusive), except where such activities are undertaken from a dry working platform in dry conditions, such that no augering or piling plant or equipment operates within the water column. For the avoidance of doubt, incidental contact between installed piles and groundwater or tidal water within the substrate shall not constitute in-water working.

Between 1 January and 28 February (inclusive), when these seasonal restrictions do not apply, any in-water augering or piling activities shall be limited to daylight hours (defined as the period between sunrise and sunset minus any specific working time restrictions as specified within the project Environmental Action Plan). In addition to the seasonal in water restrictions above, it is recommended that soft starts are used for piling activities. This involves the gradual and incremental increase in piling power until full operational power is reached and provides fish the opportunity to move away from the noise source before the onset of full power.

6.11 Significance and duration of residual effects

If the Mitigation measures as listed within section 6.10 are applied the Magnitude of Impact on Diadromous Fish and by proxy Afon Teifi SSSI, Afon Teifi SAC, Cardigan Bay SAC and West Wales Marine SAC is reduced to Negligible negative. This impact is restricted to the duration of the piling works only. As a result of this change to the Impact Magnitude the effect is reduced to a non-significant minor negative.

No significant residual effects are predicted for Biodiversity and Nature conservation.

6.12 Monitoring

As stated within the Chapter 2: Project Description, post operational monitoring will be undertaken in the form of an annual inspection of the flood defence wall and lower toe berm (engineered river bank) from the wet side of the defences. In addition, vegetation strimming will take place on the lower toe berm (engineered river bank) 2-3 times a year.

6.13 Difficulties and uncertainties

Difficulties and uncertainties on the individual baseline assessments and sensitivity assessment are included within section 6.8. There are no identified difficulties or uncertainties on the Assessment of Effects or Assessment of Significance.

6.14 Summary of assessment

Only one significant impact was identified during the assessment, in the absence of targeted mitigation. The impact of aquatic noise and vibration on Afon Teifi SSSI, Afon Teifi SAC and Cardigan Bay SAC and West Wales Marine SAC and diadromous fish was found to be a small negative impact on receptors of High and Very High sensitivity. Additional mitigation measures in the form of timing and working methodologies will mitigate this risk and result in no negative significant residual effect.

6.15 References

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