ARUP

Cardiff City Council

Cardiff International Sport Village & Cardiff Peninsula

Ecological Appraisal

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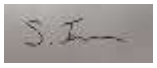
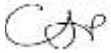
		Signature			

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1. Introduction

1.1 Background

Ove Arup and Partners Limited (henceforth referred to as Arup) have been commissioned by Cardiff Council to undertake a range of design and consultancy services, including environmental, to inform the proposed development/redevelopment of land at Cardiff International Sport Village & Cardiff Peninsula (henceforth referred to as the 'Site'). This includes the completion of an Extended Phase 1 Habitat survey and production of an Ecological Appraisal report. This report provides an update to the Preliminary Ecological Appraisal (PEA) produced last year for Cardiff Sport Village, due to an extension in the site boundary to include Cardiff Peninsula. This Ecological Appraisal also includes results of further target surveys that were recommended within the PEA.

This report presents the findings of the ecological desk study and survey results and provides an ecological appraisal of the site. The purpose of the report is to identify the habitats within the site and to assess the potential for, or presence of, any legally protected or notable species. It determines the likely ecological impacts of the proposed works during construction and operation and specifies mitigation, compensation and enhancement measures as appropriate.

1.2 The Site

The site is located in Cardiff Bay, Cardiff. The site area equates to 16ha with a central National Grid Reference of ST 18070 73031.

The site is within an urban setting and comprises of existing International Sport Village (ISV) facilities, former retail premises, car parking facilities associated with residential premises, brownfield parcels of land to the east and west of Olympian Drive, and amenity areas associated with commercial and residential facilities within and surrounding the site. The existing ISV infrastructure includes Cardiff International Pool & Gym and Ice Arena Wales on the east of Olympian Drive, and commercial development in form of the former Toys R Us building to the west. The peninsula part of the site includes land north and south of Empire Way, located in between Cardiff International Pool & Gym and Cardiff Bay Yacht Club. Large areas of hardstanding in the form of roads and car parking for the existing infrastructure are present within the site. Areas of amenity grassland and introduced shrub are associated with the existing developed land. The brownfield parcels east and west of Olympian Drive and north and south of Empire Way, consist of a mosaic of habitats including short perennial vegetation, neutral grassland, tall ruderal, reedbed and scrub with areas of bare ground. One land parcel north of Empire Way contains bunds of contaminated land covered in polythene. An area of semi-natural broadleaved woodland borders the northwest of the site located between the site and the A4055 road.

1.3 The Proposed Development

The proposed development would likely come forward in the form of a hybrid planning application to include:

- Full details in relation to the proposed closed road cycling circuit, activity zones, highway changes and public realm works (hard and soft landscaping);
- Change of use of the former Toys R Us building; and
- Outline details for a future Multi-Storey Car Park (MSCP).

These works form the final stages of the proposed 'Sport Zone' as part of the wider vision for the ISV and following permission which was granted in 2022 for the proposed outdoor velodrome.

The Cardiff Peninsula area of the site would also be developed although specific details of this development are not yet available.

Each of the known application elements is described further below.

1.3.1 Full Application

The full element of the application would include several proposals which seek to add to the sporting offer within this part of the ISV, or bring together existing and proposed uses, creating a high-quality public space at the centre of the sports zone. The proposals include:

- Closed Road Circuit – proposed around the perimeter of the sports zone, this facility would provide a traffic-free cycling circuit for training and race events;
- Off-road bike track – providing opportunities for mountain bike and BMX style riding within a safe, designed environment; and
- Public Realm works – including soft and hard landscaping, biodiversity enhancements and the installation of informal sporting spaces / urban parks.

1.3.2 Change Of Use

The former Toys R Us building is located in the centre of the site and to the south of the proposed velodrome. The building has more recently been used as a COVID 19 vaccination centre, but this use has now ceased.

Exact proposals for the building are currently being finalised with discussions ongoing with potential end users. The vision for the building includes the introduction of more sport related activities, some retail space as well as office provision to serve sporting governing bodies.

1.3.3 Outline Application

The outline element of the application would include proposals for a MSCP in the northeast corner of the masterplan site. The car park would have a capacity of circa 1,000 spaces and would be located to service the ISV development with access proposed off International Drive.

1.4 Objectives

The objectives of this Ecological assessment are:

- To establish baseline ecological conditions in the site and within the immediate vicinity, including the presence of or potential to support important habitats and notable/protected species;
- To identify key ecological constraints to the proposed works;
- To inform project design to allow significant ecological effects to be avoided or minimised wherever possible; and
- To recommend further ecological surveys required to inform an updated and full ecological impact assessment as appropriate for planning.

1.5 Legal Context and Policy Framework

1.5.1 Legislation

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

- The Conservation of Habitats and Species Regulations 2017 - as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019;
- Wildlife and Countryside Act 1981 (as amended);
- The Environment (Wales) Act 2016;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;
- National Park and Access to the Countryside Act 1949 (as amended);

- Countryside and Rights of Way Act 2000 (CRoW);
- The Hedgerow Regulations 1997;
- Protection of Badgers Act 1992;
- Wild Mammals (Protection) Act 1996;
- The Salmon and Freshwater Fisheries Act 1975;
- The Eels (England and Wales) Regulations 2009; and
- The Invasive Alien Species (Enforcement and Permitting) Order 2019.

These pieces of legislation include a number of offences relating to protected species and requirements for licences to allow construction works to proceed. In addition, the Conservation of Habitats and Species Regulations set out the requirement for the consideration of the potential effects of a project on European Sites.

Actions which are prohibited by legislation can be made lawful on the approval and granting of a protected species licence from Natural Resources Wales (NRW), subject to conditions.

At the national level the Environment (Wales) Act (EWA) 2016 requires public authorities to seek to maintain and enhance biodiversity to promote the resilience of ecosystems when undertaking their functions. This includes consideration of species and habitat listed under Section 7 of this act as those of 'principal importance' to conserving and enhancement biodiversity in Wales.

1.5.2 Planning policy

Planning Policy Wales[1] (which relates to conserving and enhancing the natural environment) requires development plan strategies, policies and development proposals to secure the conservation and enhancement of biodiversity, including the conservation of wildlife and habitats, safeguarding the ecological networks and components which underpin them (e.g. water and soil) and improve ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks. A recent CIEEM briefing paper outlines Welsh Government's Approach to Net Benefits for Biodiversity and the DECCA Framework in the Terrestrial Planning System[2], it instructs that any development must demonstrate that it has both maintained and enhanced biodiversity and built resilient ecological networks. Biodiversity enhancements must be delivered in a stepwise approach of avoiding, minimising, mitigating and as a last resort, compensating for adverse effects. Where adverse effects on the environment outweigh other material considerations, the development should be refused as per Planning Policy Wales.

Future Wales – the National Plan 2040[3] is the national development framework for Wales, setting the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of our communities. As the national development framework, Future Wales is the highest tier of development plan and is focused on solutions to issues and challenges at a national scale. Its strategic nature means it does not allocate development to all parts of Wales, nor does it include policies on all land uses. It is a framework which will be built on by Strategic Development Plans at a regional level and Local Development Plans at local authority level.

Welsh Government has also produced a Nature Recovery Action Plan[4] which is aimed at addressing the underlying causes of biodiversity loss by putting nature at the heart of its decision-making, by increasing the resilience of Wales' natural systems (ecosystems), and by taking specific action for habitats and species. It

[1] Welsh Government Planning Policy Wales Edition 11. February 2021. Planning Policy Wales - Edition 11 (gov.wales) [Accessed 10/07/2023]

[2] CIEEM, 2022. Welsh Government's Approach to Net Benefits for Biodiversity and the DECCA Framework in the Terrestrial Planning System.

[3] Update to Future Wales - The National Plan 2040 (gov.wales) [Accessed 10/07/2023]

[4] Nature recovery action plan | GOV.WALES [Accessed 10/07/2023]

sets out how Wales will deliver the commitments of the EU Biodiversity Strategy and the UN Convention on Biological Diversity to halt the decline in our biodiversity by 2020 and then reverse that decline. The Nature Recovery Action Plan links to and complements The Well-being of Future Generations (Wales) Act 2015 and the Environment Act (Wales) 2016. Developments should seek to complement this, in order to meet objectives set out in the Environment Act and Well-being Act.

Further consideration to the Sustainable Management of Natural Resources (SMNR) as required under the Environment (Wales) Act has been detailed under the Natural Resources Policy[5] (Welsh Government, 2017). This includes:

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

Area statements (as required under Section 11 of the Environment (Wales) Act) will play a key role in identifying these local opportunities and constraints.

The Cardiff Council Local Development Plan (LDP)[6] includes a number of policies relating to nature conservation, in particular:

- EN5: Designated sites development will not be permitted that would cause unacceptable harm to sites of international or national nature conservation importance.
- EN6: Ecological Networks and Features of Importance for Biodiversity Development will only be permitted if it does not cause unacceptable harm to:

  i. Landscape features of importance for wild flora and fauna, including wildlife corridors and 'stepping stones' which enable the dispersal and functioning of protected and priority species;

  ii. Networks of importance for landscape or nature conservation.

  Particular priority will be given to the protection, enlargement, connectivity and management of the overall nature of semi natural habitats. Where this is not the case and the need for the development outweighs the nature conservation importance of the site, it should be demonstrated that there is no satisfactory alternative location for the development and compensatory provision will be made of comparable ecological value to that lost as a result of the development.

- EN7: Priority Habitats and Species Development proposals that would have a significant adverse effect on the continued viability of habitats and species which are legally protected or which are identified as priorities in the UK or Local Biodiversity Action Plan will only be permitted where:

  i. The need for development outweighs the nature conservation importance of the site;

  ii. The developer demonstrates that there is no satisfactory alternative location for the development which avoids nature conservation impacts; and

  iii. Effective mitigation measures are provided by the developer.

  Where harm is unavoidable it should be minimised by effective mitigation to ensure that there is no reduction in the overall nature conservation value of the area. Where this is not possible compensation

[5] Welsh Government, (2017). Natural Resources Policy. Available at: https://gov.wales/sites/default/files/publications/2019-06/natural-resources-policy.pdf [Accessed 10/07/2023]

[6] Cardiff Council, (2016). Cardiff Local Development Plan. Final-Adopted-Local-Development-Plan-English.pdf (cardiffldp.co.uk) [Accessed 10/07/2023]

measures designed to conserve, enhance, manage and, where appropriate, restore natural habitats and species should be provided.

- EN8: Trees, Woodlands and Hedgerows Development will not be permitted that would cause unacceptable harm to trees, woodlands and hedgerows of significant public amenity, natural or cultural heritage value, or that contribute significantly to mitigating the effects of climate change.

Green Infrastructure Supplementary Planning Guidance (SPG) also supplements policies in the adopted Cardiff Council LDP. The LDP ecology, biodiversity and green infrastructure policies are intended to maintain and enhance biodiversity and green infrastructure, such that ecosystems are supported in their delivery of ecosystem services, in accordance with national and international strategies.

The Cardiff Council Local Biodiversity Action Plan (LBAP)[7] refers to habitats and species of importance for nature conservation within the county. Of relevance to this project are the Habitat Action Plans: broadleaved woodland, reedbed and neutral grassland habitats. In addition, it is likely that LBAP species also occur within the site (for example bats and reptiles).

Further details of the legislation and national and local planning policies are provided in Appendix A.

[7] Cardiff Council, (2008). Local Biodiversity Action plan. Available at:. https://www.outdoorcardiff.com/wpcontent/uploads/Cardiff-LBAP-2008.pdf [Accessed 10/07/2023]

2. Methods

2.1 Zone of Influence

The current guidance on ecological assessments (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018[8]) recommends that all ecological features that occur within a 'Zone of Influence' (ZoI) for a proposed development are investigated.

The ZoI includes:

- Areas directly within the land take for the proposed development and access;
- Areas which will be temporarily affected during construction;
- Areas likely to be impacted by hydrological disruption; and
- Areas where there is a risk of pollution and noise disturbance during construction and/or operation.

The ZoI is variable depending on the nature of the construction activities and the ecological receptors affected. For this assessment, the following zones have been defined (Table 1).

Table 1: Zone of Influence used for this assessment

Ecological Features	Zone of Influence
Internationally Designated Sites	5km buffer around the site boundary
Nationally and Internationally Designated Site, where bats are a qualifying feature	10km buffer around the site boundary
Nationally Designated Sites	2km buffer around site boundary
Locally Designated Sites	2km buffer around site boundary
Priority habitat (Ancient woodland, main rivers, and NRW priority areas)	2km buffer around site boundary
Relevant species records (including protected and invasive species)	2km around site boundary
Standing waterbodies	0.5km around site boundary
Habitats, protected/notable species and invasive species	Within the proposed site boundary, and adjacent habitats within 30m

2.2 Desk Study

A desk study was carried out to identify designated sites and protected species records within the ZoI as described in Table 1. Online searches were carried out using the Multi Agency Geographic Information for the Countryside (MAGIC)[9], NRW website[10] and the Joint Nature Conservation Committee (JNCC) website[11].

[8] Chartered Institute of Ecology and Environmental Management (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine (September 2018).

[9] http://magic.defra.gov.uk/ [accessed 10/07/2023]

[10] https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en [accessed 10/07/2023]

[11] http://jncc.defra.gov.uk [accessed 10/07/2023]

Biodiversity records data was provided by South East Wales Biodiversity Records Centre (SEWBReC)[12] on 12 July 2023. A search for waterbodies within 500m of the site was undertaken using aerial imagery.

2.3 Field survey

An initial Extended Phase 1 Habitat survey was undertaken by Arup ecologists Rosemary Cripps (MCIWEM C.WEM, C.Env) and Samuel Jones on 17 August 2022[13] of the original site extent (Cardiff Sport Village) and a further Extended Phase 1 Habitats survey was undertaken on the extended boundary areas (Cardiff Peninsula) on 3 May 2023.

The aim of the Extended Phase 1 Habitat Survey was to identify the habitats present within the site and within 30m of the boundary where access allowed. The survey was undertaken following the standard JNCC Phase 1 Habitat survey methodology[14]. Extended Phase 1 Habitat survey is a standard technique for rapidly obtaining baseline ecological information over a large area of land. It is primarily a mapping technique and uses a standard set of habitat definitions for classifying areas of land on the basis of the vegetation present.

The survey also provided an assessment of the potential for habitats present to support legally protected species. Relevant species were considered to include all those protected by UK law, and notable species including those identified as being of principal importance in Wales, in response to Section 7 of the Environment (Wales) Act 2016 (Appendix A). The assessment surveys of the habitats to support relevant species included:

- Any buildings or trees within the boundary and within 30m were appraised (from the ground only) for their suitability to support breeding, resting and hibernating bats using survey methods based on those outlined in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines[15].
- Searching for signs of badger *Meles meles* activity including setts, tracks, foraging holes and latrines within and up to 30m from the site where possible[16].
- Assessing the suitability of habitats for hazel dormice *Muscardinus avellanarius* [17].
- Assessing the suitability of watercourses for water vole *Arvicola amphibius*[18], otter *Lutra lutra*[19] and white-clawed crayfish *Austropotamobius pallipes*[20].
- Assessing the suitability of habitats for nesting birds (including any old nests);
- Assessing the suitability of habitats for common species of reptiles; adder, *Vipera berus*, grass snake *Natrix helvetica,* slow worm *Anguis fragilis* and common lizard *Zootoca vivipara*[21].

[12] LERC Wales' Biodiversity Information & Reporting Database, (2023). Cardiff International Sport village. LERC Reference: 0234-239 [accessed 12/07/2023].

[13] Arup, (2022). Preliminary Ecological appraisal. Cardiff International Sport Village and Cardiff Peninsula

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

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

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

[17] Bright. Paul, Morris. P, Mitchell Jones, T. (2006). The Dormouse Conservation Handbook 2nd ed. English Nature.

[18] Dean, M. *et al.* (2016). The Water Vole Mitigation Handbook (The Mammal Society Guidance Series). The Mammal Society, London.

[19] Chanin, P. (2003). Monitoring the Otter, *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10., English Nature, Peterborough.

[20]Peay, Stephanie (2002). Guidance on Habitat for White-clawed Crayfish and its restoration. Environment Agency.

[21] Gent, T. & Gibson, S. (2003). Herpetofauna Workers Manual. Joint Nature Conservation Committee, Peterborough.

- Assessing the potential of terrestrial and aquatic habitats to support amphibians, both protected species and species of conservation concern, including a Habitat Suitability Index (HSI) assessment[22] for waterbodies within the site boundary.
- Assessing the suitability of habitats for notable invertebrates.
- Evidence of the presence of invasive non-native plants listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and/or The Invasive Alien Species (Enforcement and Permitting) Order 2019 and subject to strict legal control, such as Japanese knotweed *Reynoutria japonica*, Himalayan balsam *Impatiens glandulifera* and giant hogweed *Heracleum mantegazzianum*.

All accessible areas of the site were walked, and the relevant habitat types classified according to their vegetation types. Habitat areas were mapped on the Extended Phase 1 Habitat Survey Plan (Figure 4) and Target Notes (TNs) were used to highlight any features or habitats of interest such as features that provide suitable habitat for protected species.

Targeted species and botanical surveys, as recommended by the PEA, have been undertaken between September 2022 – September 2023. Details of the survey methodology and results are provided within the relevant reports, but a summary is provided in this ecological assessment, where available at time of writing. A summary of the methodology of the targeted surveys is described in Table 2 below.

Table 2: Target survey methodology and date

Targeted species survey	Methodology	Date
Vegetation survey[23]	The objective of the study was to map and describe the plant communities using National Vegetation Classification (NVC) methods[24].	May 2023
Invertebrate surveys[25] [26]	Assessment of habitat quality for invertebrates and collect terrestrial invertebrate	August 2022 & June and July 2023
Bat presence absence surveys[27]	Emergence surveys of former Toys r us building and A4055 Flyover tunnel following best practice guidelines[15]. Internal surveys and automatic detector recording during hibernation season of A4055 Flyover tunnel following best practice guidelines[15].	August and September 2022 and June 2023 & November 2022 to February2023
Bat activity surveys[28][29]	Automated static data collection and transect surveys following best practice guidelines[15].	September and October 2022 & May to October 2023 & May to October 2023

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

[23] Sturgess Ecology, (2023). Vegetation survey. Cardiff International Sport Village, Cardiff Bay

[24] Rodwell, (1991). British Plant Communities. Volumes 1-5. Cambridge University Press, Cambridge.

[25] David Boyce, (2022). Invertebrate Assessment 2022. Land at Cardiff Bay, Glamorgan

[26] David Boyce, (2023) Invertebrate Assessment 2023. Land at Cardiff Bay, Glamorgan

[27] Arup, (2023). Bat presence/absence surveys. Cardiff International Sport Village and Cardiff Peninsula

[28] Wildwood, (2023). Bat Transect Surveys. Cardiff International Sport Village, Cardiff Bay

[29] Arup (2023). Bat activity surveys. Cardiff International Sport Village and Cardiff Peninsula

Targeted species survey	Methodology	Date
Otter survey[30]	Survey of river Ely and Cardiff Bay, 100m upstream and downstream from site. Aim of survey to identify for field signs and potential resting breeding habitat[19].	September 2023
Wintering birds[31]	Transect survey method used in undertaking assessments of wintering birds was derived from current best practice[32] [33] and conforms to the recommendations of the British Trust for Ornithology (BTO) and the JNCC	October 2022 to February 2023
Breeding bird surveys[34]	Transect survey method used in undertaking assessments of wintering birds was derived from current best practice[32] [33] and conforms to the recommendations of the British Trust for Ornithology (BTO) and the JNCC	April to June 2023
Reptile survey[35]	Presence/absence surveys including artificial refugia, following best practice[21].	September 2022 & June to August 2023

2.4 Limitations

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

The findings presented in this report represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys can be limited by factors affecting the presence of plants and animals, such as the time of year, migration patterns and behaviour. For example, the Extended Phase 1 Habitat survey was undertaken in August and may therefore have missed earlier flowering species.

Whilst not a full protected species or botanical survey, an Extended Phase 1 Habitat survey allows an experienced ecologist to obtain a sufficient understanding of the ecology of a site in order to either confirm the conservation importance of the site and assess the potential for impacts on habitats and species likely to represent a material consideration in planning terms, or to ascertain that further surveys will be required before such confirmation can be made.

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

Any limitations associated with specific targeted species surveys are detailed within the relevant reports.

[30] Arup, (2023). Otter survey report. Cardiff International Sport Village and Cardiff Peninsula

[31] Arup, (2023). Winter bird survey report 2022/2023. Cardiff International Sport Village

[32] Bibby et al. (1992) Bird Census Techniques, Second Edition. Academic Press

[33] Gilbert, G., Gibbons D. W., and Evans, J. (1998) Bird Monitoring Methods. RSPB

[34] Arup, (2023). Breeding bird survey report 2023. Cardiff International Sport Village

[35] Arup, (2023). Reptile survey report. Cardiff International Sport Village

3. Ecological Baseline

3.1 Designated Sites

The desk study identified a number of internationally, nationally and locally designated Sites. Legislation relating to these designations is described in Appendix A.

There is one international statutory designated site, the Severn Estuary, located within 5km of the site. Severn Estuary Special Area of conservation (SAC), Special Protected Area (SPA) and Ramsar site is located approximately 1.5km to the east of the site boundary. The SAC is designated for the presence of Annex l habitats: estuaries, mudflats and sandflats not covered by seawater at low tide, and Atlantic salt meadows. Sandbanks which are slightly covered by sea water all the time and reef habitats are also qualifying features of the SAC, but not a primary reason for the designation. Sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis* and twaite shad *Alosa fallax* are also a primary reason for the sites designation[36]. The SPA is designated due to supporting internationally important populations of regularly occurring Annex 1 and migratory assemblages of wildfowl bird species[37]. The Ramsar site is designated due to many of the SAC/SPA features but in particular: the presence of the estuary habitat, internationally important migratory fish assemblages and internationally important waterfowl populations largely during winter, and on passage and summer[38].

There are two national statutory designated sites (Sites of Special Scientific Interest (SSSI)) within 2km of the site, details of which are shown in Table 3 below. International and national designation locations are shown on Figure 2.

Table 3: National statutory designated sites within 2km of the site

Site Name	Designation	Distance & Orientation from Site	Description
Severn Estuary	SSSI	1.5km, East	The SSSI falls within the same boundary of the SAC, SPA and Ramsar designation (described above). The SSSI is important for migratory fish, Atlantic salmon *Salmo salar* and European eel *Anguilla anguilla*. The other species are allis shad *Alosa alosa*, the nationally rare twaite shad, the sea trout *Salmo trutta*, sea lamprey and the lampern or river lamprey. The SSSI is of international importance for wintering and passage wading birds, with total winter populations averaging about 44,000 birds[39].
Cwm Cydfin	SSSI	1.3km, Northwest	Cwm Cydfin SSSI is a mixed woodland, with pedunculate oak *Quercus robur*, ash *Fraxinus excelsior*, elm *Ulmus procera*, field maple *Acer campestre* and hazel *Corylus avellana*. The ground flora is varied and especially rich alongside the streams. Cwm Cydfin SSSI is set within a large complex of woodlands in the area, which add value to the site. Cwm Cydfin itself is the valley of a small tributary of the river Ely. The woods adjoin a creek which was formally tidal[40].

[36] JNCC, (2015). Natura 2000 – standard data form, Severn Estuary SAC.

[37] JNCC, (2015). Natura 2000 – standard data form, Severn Estuary SPA

[38] JNCC, (2008). Information Sheet on Ramsar Wetlands, Severn Estuary

[39] Countryside Council For Wales, (1989). Site of Special Scientific Interest Citation, Severn Estuary

[40] Countryside Council For Wales, (1985). Site of Special Scientific Interest Citation, Cwm Cydfin

No international/national designated sites for bats are located within 10km of the site.

There are a total of 12 local nature conservation sites within 2km of the site, ten of these sites are designated as Sites of Importance for Nature Conservation (SINC), one is a Local Nature Reserve (LNR), the other site is a B-line [41] which runs through the site. Details of these sites are shown in Table 4 below, and SINC and LNR locations are shown on Figure 3.

Table 4: Locally designated sites

Site Name	Designation	Distance & Orientation from Site	Description
B-Lines	B-Lines	Within the site	'Insect Pathways' with the mission to restore and create wildflower and pollinator rich habitat corridors[42].
Cogan Spur	SINC	<0.1km, West	Internal cavity of the A4065 flyover road. Cogan Spur SINC comprises a box girder bridge which supports lesser horseshoe bats *Rhinolophus hipposideros*.
River Ely	SINC	0.1km, West/South	One of the three main rivers within Cardiff, flowing through the city and into Cardiff Bay. The river acts as a major wildlife corridor and is important for migratory fish, otters, wildfowl. Numerous species have been recorded along the river Ely including bats, otter, kingfisher *Alcedo atthis* and barn owl *Tyto alba*.
Grangemore Park	SINC	0.5km, Northwest	Former landfill site now covered by rough unimproved grassland, scrub, plantations, two ponds and some damp ditches. It supports a wide range of animals and plants including common frog *Rana temporaria*, smooth newt *Lissotritan vulgaris* and palmate newt *Lissotriton helveticus*, narrow leaved everlasting pea *Lathyrus sylevestris*, fairy flax *Linum catharticum* and bee orchid *Ophyrus apifera*, skylark *Alauda arvensis* and slow worm.
River Taff	SINC	0.5km, North	One of the three main rivers within Cardiff, flowing through the city and into Cardiff Bay. Important for migratory fish, otters, wildfowl and bankside vegetation and acts as a major wildlife corridor. Bats, otter, salmon, sea trout *Salmo trutta*, grass snake and kingfisher and amongst the diverse species recorded in and around the River Taff SINC.

[41] B – lines are a landscape-scale solution to reverse the decline in pollinating insects set up by Buglife and other conservation organisations. A network of 3km wide highways across the UK has drawn up, with the mission of restoring and creating wildflower and pollinator rich habitat. Sites within B-lines are to consider this mission during the planning process.

[42] : https://cdn.buglife.org.uk/2021/03/B-Lines-Report-DIGITAL-01.pdf [accessed 12/07/2023].

Site Name	Designation	Distance & Orientation from Site	Description
Factory wood	SINC	0.8km, Northwest	This is an extensive area of dry calcareous woodland occupying a series of steep slopes and stream valleys below Leckwith. Notable species include autumn lady's tresses *Spiranthes spiralis*, barn owl, bluebell *Hyacinthoides non-scripta*, broad leaved spurge *Euphorbia platyphyllos*, kestrel *Falco tinnunculus*, common nightingale *Luscinia megarhynchos*, and green woodpecker *Picus viridis*.
Cardiff Bay Wetlands and Hamadryad Park	LNR	0.9km, Northeast	A former salt marsh and a complex of grassland and shallow lagoons which provides feeding and nesting opportunities for many birds including bearded tit *Panurus biarmicus*, Cetti's warbler *Cettia cetti* and little egret *Egretta garzetta*; important populations of wintering birds including snipe *Gallinago gallinago* and teal *Anas crecca*. Species including bats, common frogs and otters are present at this site which is also an important spawning area for coarse fish in Cardiff Bay.
Cardiff Bay Wetland & Reserve	SINC	0.9km, Northeast	A former salt marsh and a complex of grassland and shallow lagoons which provides feeding and nesting opportunities for many birds including bearded tit *Panurus biarmicus*, Cetti's warbler *Cettia cetti* and little egret *Egretta garzetta*; important populations of wintering birds including snipe *Gallinago gallinago* and teal *Anas crecca*. Species including bats, common frogs and otters are present at this site which is also an important spawning area for coarse fish in Cardiff Bay.
Reservoir Wood	SINC	1.3km, West	Broad leaved deciduous woodland.
Leckwith Pond & Marsh	SINC	1.7km, Northwest	A former saline pond dug as a storm water facility now dominated by reeds.
Case Hill Wood	SINC	1.9km, West	Broad leaved deciduous woodland.
Beach sidings	SINC	1.9km, East	Coastal habitat with population of childing pink *Petrorhagia nanteuilii*, a Cardiff LBAP species.

3.2 Habitats

The desk study identified pockets of ancient woodland habitat within 2km of the site, located to the west and south. The closest ancient woodland is within 0.6km. There are two main rivers within 2km of the site, the

River Ely and River Taff both terminate at Cardiff Bay. The river Taff is closest to the site next to the southern boundary of the site. The locations of Ancient woodland and main rivers in relation to the site is shown in Figure 3. The only standing water body identified within 0.5km of the site is a wharf feed by Cardiff Bay, located 0.2km south of the site across the River Ely. The site is partly within NRW Priority Area Coastal Saltmarsh.

During the field survey, a total of 15 Phase 1 habitats were identified within the site boundary. In parts of the site with existing ISV facilities and commercial and residential development, habitats include hardstanding, bare ground, amenity grassland, scattered broadleaved trees, hedgerows and introduced shrub associated with the existing buildings. Brownfield parcels on the site, can be split into seven different parcels, one located west of Olympian Drive adjacent to old Toys R Us and the Toys R Us car park, and six east of Olympic Drive adjacent to the bay. The brownfield parcels contain transitional habitat types and as a whole can be classified as Habitat of Principle Importance for the purpose of maintaining and enhancing biodiversity in relation to Wales as listed on Section 7 of the Environment (Wales) Act 2016 (henceforth referred to as Priority Habitat) 'open mosaic habitat on previously developed land'[43] and is further described in section 3.2.1 below.

Other habitats present on the brownfield parcels include an area of mixed semi-natural woodland bordering in part the northwest site boundary, scrub, and a large area of bare disturbed ground on land west of Olympian Drive. There are no permanent waterbodies within the site boundary, however the River Ely runs past the site to the south at a distance of approximately 100m, and flows into the Cardiff Bay waterbody which borders the east of the site. No other standing waterbodies were identified within 0.5km of the site.

A more detailed description of each of the habitats found within the site boundary is provided below. The habitats are listed in order of their JNCC Phase 1 Habitat code[14] with the exception of open mosaic habitat which does not correspond directly to any one of these codes. A plan of the habitats present within the site has been mapped in accordance with Phase 1 Habitat survey codes[14], and can be found in the Phase 1 Habitat survey Map (Figure 4). Target notes taken during the survey and referenced on the Phase 1 Habitat survey Map are included within Appendix B. A detailed National Vegetation Classification (NVC) survey[23] has also been undertaken on site in May 2023, although habitats on site don't correlate well with NVC classification system. Results from the NVC survey including detailed species list can be found in the report, but the results of the NVC are incorporated into this section where relevant. Habitats described within this section have been categorised using Phase 1 habitat classification.

3.2.1 Priority Habitat - Open Mosaic Habitat on Previously Developed Land[43]

Priority habitat 'open mosaic habitat on previously developed land' is present in the brownfield parcels on site. This habitat meets the five qualifying criteria as stated in the UK Biodiversity Action Plan[43] and is formed of successive and transitional plant communities which contain a mix of different Phase 1 habitat types (as shown on Figure 4). These habitats forming the open mosaic include bare ground/ephemeral habitat with pioneer vegetation in early stage of succession, tall ruderal habitat, areas of poor semi-improved grassland in a more advanced stage of succession, scrub habitat, and inundation plant communities (reedbeds mapped as swamp habitat).

3.2.2 Semi-Natural Broadleaved Woodland (A1.1.1)

One area of semi natural broadleaved woodland is present on the site at the northwest site boundary between the site and the A4055 flyover. The woodland is shown in Photograph 1 below. The woodland canopy included pedunculate oak *Quercus robur*, alder *Alnus glutinosa*, lime *Tilia sp.*, spruce sp. *Picea sp.*, grey alder *Alnus icana* and birch species *Betula sp.* The understory was composed of buddleia *Buddleja davidii*, willow sp. *Salix sp.*, field maple and dog wood *Cornus sanguinea*, ground flora was dominated by bramble *Rubus sp*. and horsetail sp. *Equisetum sp*.

[43] UK Biodiversity Action Plan Priority Habitat Descriptions, (2010). Open Mosaic Habitats on Previously Developed Land. https://data.jncc.gov.uk/data/a81bf2a7-b637-4497-a8be-03bd50d4290d/UKBAP-BAPHabitats-40-OMH-2010.pdf [accessed 12/07/2023]

Photograph 1: Broadleaved woodland at northwest site boundary

3.2.3 Scrub Dense/Continuous (A2.1)

Areas of dense/continuous scrub exist throughout the site boundary. The species composition of these areas of scrub commonly includes buddleia, willow sp., and dogwood. This habitat is at a more advanced stage of succession.

3.2.4 Scrub Scattered (A2.1)

Scattered scrub exists in small pockets through the site, the scrub is often transitional with other habitats within the open mosaic habitat. Scattered scrub species include buddleia (willow sp. sea buckthorn *Hippophae rhamnoides*, dogwood, bramble, broom *Cytisus scoparius* and dog rose *Rosa canina*.

3.2.5 Scattered Broadleaved Trees (A3.1)

Trees are scattered throughout areas of existing infrastructure of the site including the Toys' R Us car park, adjacent to roads and within the amenity grassland areas surrounding Cardiff International Pool. Species included grey alder, elm, London plane *Platanus x hispanica* and birch sp.

3.2.6 Semi-Improved Neutral Grassland (B2.2)

Neutral semi-improved grassland is found throughout the brownfields parcels east of Olympian drive. The semi-improved neutral grassland habitat is transitional with other habitat within the open mosaic. The vegetation varies within this habitat category as a result of varying drainage capacity of the soil and soil depth. Areas of this grassland are sparser than others and generally the more sparse areas exist on less well draining soil, while more closed sward areas have developed on well drained substrata, and represent a later stage of succession within this habitat type where the soil is deeper. The grassland varies in terms of scarcity of vegetation, and dryness of substrata.

Within the sparce dry areas the most frequent species include creeping bent *Agrostis stolonifera*, rat's-tail fescue *Vulpia myuros*, fern grass *Catapodium rigidum* and buddleia seedlings. Small acrocarpous mosses are often present but were not included in the survey due to time constraints and because they were all very dried up in the hot weather. Locally notable species occurring in this vegetation include hawkweed oxtongue *Picris hieracioides* and yellow-wort *Blackstonia perfoliata*.

Within the sparce damp areas, creeping bent is the most constant species of this assemblage, but there are also a number of other species commonly associated with damp ground, including hard rush *Juncus inflexus*, jointed rush *Juncus articulatus*, toad rush *Juncus bufonius*, and false fox-sedges *Carex vulpinoidea*. Buck's-horn plantain *Plantago coronopus* is locally very prominent. However, there is no clear-cut distinction between this and the sparse dry grassland community, and many of the same species are also present here, showing that there is probably a continuous gradation between the two groupings.

Closed sword dry areas are flower rich swards. Locally abundant beaked hawksbeard *Crepis vesicaria*, bird's-foot trefoil *Lotus corniculatus* and ox-eye daisy *Leucanthemum vulgare* make this a relatively colourful community. Most of the bee orchids *Ophrys apifera* that were found were generally associated with this more mature grassland, but they were not seen in large numbers. Wildflower seed may be the origin of the locally notable wild clary *Salvia verbenacea* and viper's bugloss *Echium vulgare*.

Closed sword damp areas are a taller sward, mostly characterised by creeping bent, pointed spear-moss *Calliergonella cuspidata*, with patchy hard rush, bird's-foot trefoil and hairy Sedge *Carex hirta*. This vegetation is often mixed with scattered willow and bramble scrub, and one patch has frequent common reed *Phragmites australis*. Bee orchids were occasionally found in this grassland.

3.2.7 Poor Semi-Improved Grassland (B6)

A pocket of lower diversity grassland is found on deeper soil within the brownfield parcel west of Olympian Drive. . The poor semi-improved grassland habitat is transitional with the short perennial habitat here. Species included: creeping bent cock's-foot *Dactylis glomerata*, and Yorkshire fog *Holcus lanatus*.

3.2.8 Tall Ruderal (C3.1)

A large area of tall ruderal vegetation is present within the northeast of the site, shown in Photograph 2, forming part of the open mosaic. Species within this habitat include goat's rue *Galega officinalis*, teasel *Dipsacus fullonum*, common nettle *Urtica dioica*, bramble, and cleavers *Galium aparine*.

Photograph 2: Tall ruderal vegetation forming part of open mosaic

3.2.9 Swamp/Reedbed (F1)

A large area of swamp/reedbed habitat exists on poorly drained soil in the brownfield parcel (Photograph 3). Smaller areas are also present on other parts of the site. At time of the Phase 1 Habitat survey no standing water was present, but inundation plant species were found including common reed *Phragmites australis* which was mainly located in one area, indicating seasonal pooling. The vegetation was dominated by common reed; hard rush and teasel were also present in this habitat.

Photograph 3: Reedbed/swamp habitat

3.2.10 Amenity Grassland (J1.2)

Amenity grassland is present on the site particularly associated with developed land east of Olympian Drive, where it surrounds Cardiff International pool. Species include perennial ryegrass *Lolium perenne*, red fescue *Festuca rubra*, yarrow *Achillea millefolium*, white clover *Trifolium repens*, common bird's-foot trefoil. Bee orchid was also found within this habitat.

3.2.11 Short perennial (J1.3)

Short perennial habitat is frequent within the Open Mosaic area. Areas of sparsely vegetated ground with short perennial vegetation are common, this habitat is within an early stage of succession. This habitat is transitional with the grassland habitats. Some areas of this habitat are prone to pooling due to poorly draining soil. Species include common fleabane, common bird's-foot trefoil, creeping cinquefoil *Pontentilla reptans*. ragwort *Jacobaea vulgaris*. Locally notable Yellow-wort is frequent through this habitat.

3.2.12 Introduced Shrub (J1.4)

Introduced shrub has been planted around areas of the site that have been developed, these include the Toys R Us car park, around Cardiff International Sport Village and by the residential area southeast of the site. *Cotoneaster* sp. presumed to be Schedule 9 Invasive Non-Native is present in this habitat, all affected areas have been target noted. Other species include shrubby veronica *Hebe rakaiensis*, shrubby cinquefoil *Pontentilla fruticosa*, fortunes spindle *Euonymus fortuniei*, New Zealand flax *Phormium tenax* and lavender *Lavandula sp*. Native species are also present in this habitat including dog rose, ivy leaved toadflax *Cymbalaria muralis*, ivy *Hedera sp*, and bramble.

3.2.13 Species Poor Intact Hedges (J2.1.2)

Two species-poor hedges are present within the site, both are located to the southeast of the site creating boundaries between public pathways and amenity grassland. They are both dominated by beech *Fagus sylvatica*.

3.2.14 Buildings (J3.6)

Five buildings exist within the site boundary, these include the old Toys R Us building west of Olympian Drive, Cardiff International Pool, Ice Arena Wales both to the east, residential premises to the south of the site, and another residential premises to the northeast of the site (Watermark building). The three commercial buildings are constructed from metal, and all have flat or low gradient sloping roofs. The two residential buildings are fairly new (20 years old) with brick construction and flat roofing.

3.2.15 Bare Ground (J4)

The habitat refers to areas such as car parks and walked tracks where heavy disturbance has resulted in little/no vegetation growth. A large area of bare ground is present to the west of Toys r Us building.

3.2.16 Hardstanding (J5)

This habitat refers to roads, paths and car parks where tarmac has been laid. There are large areas of hardstanding as the site is in an urban area and much of the site has existing infrastructure.

3.2.17 Contaminated land

Contaminated land bunds present on site take up large areas of land in two land parcels to the east and south of the site next to the bay. These areas do not conform to Phase 1 habitat categories and so are mapped as contaminated land bunds on Figure 4. Neutral grassland surrounds these areas, the bunds are shown in Photograph 4 below.

Photograph 4: Contaminated land bund

3.3 Species

The potential for the site to support legally protected species and notable species has been assessed using the results of the desk study, observations made during the Phase 1 Habitat survey and results of surveys conducted prior to this report. Only records from the last 10 years have been considered relevant from the desk study. Further considerations on the likelihood of species presence on site are detailed below.

3.3.1 Birds

The data search returned records of 126 protected and notable bird species, of which, 34 are Section 7 species, 36 are RSPB UK Birds Red list species, and 34 are RSPB Welsh Birds Red list species. There are two records of bird species listed on Cardiff's LBAP[7]; these are European pied flycatcher *Ficedula hypoleuca* recorded 1406m from site and hawfinch *Coccothraustes coccothraustes* recorded 2088m from site.

There are records of six non-native Schedule 9 bird species (species that are established in the wild). These are Canada Goose *Branta canadensis*, Black Swan *Cygnus atratus*, Egyptian goose *Alopochen aegyptiaca*, ring-necked parakeet *Psittacula Octule*, snow goose *Anser caerulescens* and mandarin duck *Aix galericulata*.

The woodland, scrub, grassland, reedbed and open mosaic habitats found on the site have been assessed as likely to provide nesting habitat for a range of bird species, as could the buildings and structures. Areas offering suitable habitat for breeding bird are marked by TN5 on Figure 4. Given the proximity to the Severn Estuary, there is potential that the site could support overwintering and passage birds that form part of the designation feature of the Severn estuary SPA, Ramsar and SSSI site.

As the site was assessed as of potential importance to breeding and wintering birds, the original PEA recommended breeding and wintering bird surveys. The results of these surveys are detailed within the relevant reports. A summary of the results is given here:

Winter bird surveys[31] recorded no qualifying species as listed under the Severn Estuary SPA or Ramsar site. Nine target species were recorded on either (or both) of the Welsh Red and British Red List. Fifteen target species were recorded on both the Welsh Amber and British Amber List. Nine target species were listed on Section 7.

Breeding bird surveys[34] recorded a good assemblage of birds, including a range of warblers and finches. Two schedule 1 species were also recorded during these surveys; two whimbrel *Numenius phaeopus* were recorded using the site to rest (on passage), and Cetti's warbler *Cettia cetti* was recorded close to the site boundary. Further details for both wintering and breeding birds will be reported in relevant reports[31] [34].

3.3.2 Bats

The desk study returned 88 records of bats within 2km of the site. A total of eight species were recorded these included common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Nathusius' pipistrelle *Pipistrellus nathusii*, brown long-eared *Plecotus auritus*, lesser horseshoe, Daubenton's *Myotis daubentonii*, whiskered *Myotis mystacinus* and noctule *Nyctalus noctule*.

There are records of a lesser horseshoe roost within the Cogan Spur SINC, an access tunnel within the A4055 flyover within 10m of the northeast site boundary.

The vegetated brownfield areas was assessed as likely to offer good opportunities for foraging bats, as is the edge habitat of Cardiff Bay which borders the east of the site. The woodland and dense scrub are likely to offer good linear features for navigation locally, aiding bats commuting across the site and into the wider landscape. The broadleaved woodland has potential to be particularly important due to connectivity with the known roost of lesser horseshoe bats within the A4055 access tunnel.

A preliminary roost inspection of buildings and trees on site/in proximity to site identified three structures offering potential for roosting bats, namely the A4055 flyover structure (Photograph 5), old Toys R Us building (Photograph 6) and the Watermark building (Photograph 7). Structures offering potential for roosting bats are marked by TN3 on Figure 4. The suitability of these structures was assessed using best practice guidance[15]. The A4055 and Watermark building were assessed as offering high suitability and the old toys R was assessed as offering moderate suitability.

Photograph 5: A4055 Flyover eastern access tunnel

Photograph 6: Old Toys R Us building

Photograph 7: Watermark building

An additional six buildings within the site boundary or within proximity to the site were identified. These include Cardiff International Pool, the Ice Arena, Cardiff Whitewater Centre, and three high rise residential complexes. These six buildings were assessed as offering negligible potential for roosting bats due to no obvious features being present. The commercial buildings were metal construction with flat roofs, unlikely to be of suitability for bats due to temperature fluctuations of the metal. Although presence of bats can be difficult to rule out, professional judgement suggests these buildings are unlikely to support roosts of importance (including maternity and hibernation roosts). The residential complexes were brick and metal construction, they are fairly new (20 years old), with flat roofs.

Surveys undertaken are summarised here but will be detailed within the relevant species specific reports. Internal surveys of the A4055 access tunnel undertaken in winter 2022/2023 during hibernation season (December – February), revealed presence of small numbers of lesser horseshoe, common pipistrelle, and myotis sp. Counts varied between visits suggesting the species use the roost in combination with other roosting sites throughout the winter. Evidence of use by high numbers of bats was demonstrated by the large amount of droppings and feeding remains recorded throughout the structure. Species recorded during the

internal surveys were confirmed from data collected from automated bat recorders left in the structure over winter; additionally, Nathusius and soprano pipistrelle calls were recorded. Results from surveys carried out during the winter revealed the structure is a hibernation roost used transitionally by bats including lesser horseshoe. Emergence surveys undertaken in June 2023 recorded lesser horseshoes emerging from the roost; all recorded emergences were from the west side of the tunnel away from site. Soprano pipistrelles and common pipistrelles were recorded emerging from the east side (site side) of the tunnel during surveys undertaken in August and September 2022 and June 2023. In combination, these results have revealed that the A4055 access tunnel is a roost for lesser horseshoe, soprano pipistrelle, common pipistrelle and myotis species used throughout the year. Due to numbers of lesser horseshoe and soprano pipistrelles recorded emerging from the site during the maternity season (May – June), the roost is likely a maternity roost for these species.

Surveys undertaken of the other suitable structures on site include the old Toys R Us building only, and no surveys have been undertaken on the Watermark building at time of writing. Surveys undertaken in summer 2022 didn't record any bats emerging from the Toys R Us building; therefore, the building is considered not likely to be used by roosting bats.

Activity surveys of the site undertaken through the summer 2023, including automatic statics and transect surveys. The results of these surveys are not complete and are yet to have been analysed and interpreted.

3.3.3 Badger

The desk study returned three records of badger, the closest was 729m from the site.

No badger setts or signs of badger activity were observed during the Phase 1 Habitat survey. Suitable habitat in the form of semi natural broadleaved woodland and scrub does exist on the site. The woodland and scrub areas are not extensive; however, the site does have limited connectivity to the wider landscape. Due to the urban setting of the site and proximity to major roads badger presence is unlikely.

3.3.4 Otter

The desk study returned three records of otter, the closest record was 1026m from the site.

Otters are widely reported to be present in the wider area of Cardiff Bay. Both the River Taff and River Ely, which are near to the site, have known records of otters and could be used for foraging and commuting.

No evidence of otter was observed during the Phase 1 Habitat survey. The scrub border along the east site boundary below the boardwalk and the semi natural woodland on the site may some offer potential holt creation habitat. The woodland however is small and has limited connectivity with the wider landscape. Due to high disturbance the site experiences due to its urban setting and the major roads around it, suitability of the woodland considered very limited. The scrub border below the boardwalk on the east boundary of the site offers relatively undisturbed habitat on the bay, providing potential suitability for resting otter. Areas assessed as offering suitable resting habitat for otter during the Phase 1 Survey are shown by TN2 on Figure 4.

Further detailed surveys were undertaken in September 2023[30] from water level, where habitats and signs could be assessed fully; otter spraints were recorded along the River Ely and within Cardiff Bay, on the edges of the proposed development area (south and east boundaries). No holts were identified during surveys but a number of areas of habitat suitable for lay ups were identified in close proximity to the site, particularly the eastern boundary of the site below the boardwalk where scrub is present.

3.3.5 Water Vole

There are no records of water vole returned within the desk study.

Lack of suitable waterbodies in the vicinity of the site makes water vole presence unlikely on site. There were no banks suitable for burrowing (banks consisting of sheet piles or hard defences such as block stone with regular wave action) and no areas of suitable food source. As such they are not considered further within this report.

3.3.6 Hazel Dormouse

There are no records of hazel dormouse returned within the desk study.

A small area of semi-natural woodland provides limited potential to dormice; due to its small size and lack of connectivity to other suitable habitat in the wider area it is considered the site is unlikely to support dormice and as such they are not considered further within this report.

3.3.7 Other Section 7 Mammals

The desk study returned 29 records of other Section 7 mammal species not already mentioned in this section within 2km of the site. Most of the records were of hedgehog *Erinaceus europaeus* with the closest recorded 590m from the site, a single record of polecat *Mustela putorius* was returned. Records of invasive species including American mink *Neovison vison* and grey squirrel *Sciurus carolinensis* were also returned.

The site provides suitable habitat for certain mammal species including field vole *Microtus agrestis* and hedgehog particularly due to the urban setting of the site as hedgehogs are known to utilise a range of urban habitat. Brash and log piles are scattered through the site offering suitable nesting and hibernating habitat for hedgehogs (see TN4 Figure 4).

3.3.8 Reptiles

The desk study returned 13 records of reptiles within 2km of the site. Of these records ten are of slow worm with the closest record 228m from the site, located to the south of the site separated by the River Ely which acts as a barrier to dispersal. There is a single record of grass snake recorded 1350m from the site. Two records of invasive non-native red-eared terrapin *Trachemys scripta elegans* were returned.

Suitable habitat and refugia exist for reptiles on the site. The tall ruderal, grassland, scrub and woodland habitats offer foraging opportunities, and the ephemeral and bare ground is suitable for basking reptiles. There are a number of log/brash piles (Photograph 8) scattered across the brownfield parcels (see TN4 Figure 4) that may act as refugia/hibernaculum for reptiles on site. However, the site is isolated and opportunities for dispersal between the site and suitable habitat in the wider landscape is limited.

No reptiles were recorded during reptile surveys undertaken between September to October 2022 and May – August 2023, despite suitable habitat existing on site. It is considered unlikely that the site will support a significant number of reptiles. However, low numbers could be present particularly where habitats are better connected.

Photograph 8: Log piles forming potential refugia

3.3.9 Amphibians

There are eleven records of amphibians including common frogs and toads within 2km of the site. The closest record is of a common toad *Bufo bufo* 211m from the site.

No areas of standing water existed on site at time of Phase 1 Habitat survey, however on subsequent visits after heavy rain temporary pools of water have been observed. There is no obvious connectivity to other waterbodies within 500m of the site for amphibians; the river Taff to the east and Ely to the west also likely act as barriers to dispersal. The site does offer limited suitable terrestrial habitat for amphibians and during the reptile survey in 2023, a common toad was recorded underneath a reptile mat.

Owing to the lack of records, waterbodies and connectivity to surrounding standing waterbodies, it is considered unlikely the site will support significant populations of amphibians. However, low numbers could be present particularly where habitats are better connected.

The site is not likely to support the European protected species, great crested newt *Triturus cristatus* due to lack of records and suitable waterbodies, as such this species is not considered further within this report.

3.3.10 Fish

The desk study returned two records of Section 7 listed fish species Atlantic salmon 630m from the site, and European Eel *Anguilla Anguilla* 984m from site.

There are no suitable habitats for fish on the site, but the River Taff, River Ely, Cardiff Bay waterbody and Severn Estuary provide suitable habitat for a variety of fish species, and are located within 1km of the site, with the River Ely and Cardiff Bay bordering the site.

3.3.11 Invertebrates

The desk study returned records of 142 invertebrates species within 2km of the site, 28 of these species are listed under Section 7.- A record of silver washed fritillary *Argynnis paphia,* a species with a LBAP for Cardiff was identified, this record was 1208m from the site. The data search returned records of two Invasive Non-Native Species (INNS): Harlequin ladybird *Harmonia axyridis* 758m from the site, and western conifer seedbug *Leptoglossus occidentalis* 1357m from the site.

Brownfield sites have potential to support rare and notable invertebrate species. The range of habitats on the site provide a varied food source potentially supporting a rich assemblage of invertebrate species.

Survey undertaken in August 2022 of the original site boundary (Cardiff Internal Sport Village), included areas of the open mosaic habitat. These surveys recorded a number of common and ubiquitous species. The surveys also revealed two notable invertebrate species, Section 7 brown-banded carder bumblebee *Bombus humilis Illiger,* and nationally scarce blunthorn nomad bee *Nomada flavopicta*. Surveys undertaken in 2023 on additional areas of the site boundary not surveyed in 2022 recorded Adonis' ladybird *Hippodamia variegata* and the weevil *Larinus carlinae*. Due to recent population expansion of these two species, they are considered of local importance only. The flower rich ruderal grassland was identified as a key habitat for these species on site.

Presence of white clawed crayfish is not considered likely due to lack of suitable waterbodies within the site; as such, there are no further considerations within this report.

3.3.12 Native Plants

The desk study returned 62 records of protected or notable native plant species within 2km of the site. These include one Section 7 (Environmental Act Wales 2016) listed species, one Schedule 8 (Wildlife and Countryside Act 1981) listed species, 5 Red Data Book listed plants for Wales, 6 Red Data Book listed plants for UK. Species within these lists include:

- Cornflower *Centaurea cyanus* which is a Section 7 listed species, closest record is 838m to the site;
- Jersey cudweed *Helichrysum luteoalbum* which is a Schedule 8 listed species, closest record is 1265m to the site;

During the field survey yellow wort, which is listed in Cardiff's LBAP, was recorded. Much of the site is assessed as open mosaic habitat with flower rich ruderal vegetation dominating in areas. These areas particularly have potential to support protected and notable plant species not recorded during the Phase 1 Habitat survey.

Detailed botanical assessment of the site undertaken during the NVC survey revealed a number of notable botanical species listed as being rare or scarce in the Wildlife Sites Guidelines including:

- Yellow-wort
- Long-bracted Sedge *Carex extensa*
- Viper's bugloss
- Round-leaved crane's-bill *Geranium rotundifolium*
- Pale flax *Linum bienne*
- Bee orchid
- Hawkweed oxtongue
- Wild clary
- Stone parsley *Sison amomum*
- Keeled-fruited cornsalad *Valerianella carinata*

Full details of the NVC survey are available within the relevant report[23].

3.3.13 Invasive Non-Native Plant Species

The desk study returned 78 records of invasive non-native plant species within 2km of the site. These records include 21 species of which nine are Schedule 9 listed species. Schedule 9 INNS within 2km of the site included: Japanese knotweed *Reynoutria japonica*, montbretia *Crocosmia x crocosmifolia*, Indian balsam *Impatiens glandulifera*, floating pennywort *Hydrocotyle ranunculoides*, giant hogweed *Heracleum mantegazzianum*, three cornered garlic *Allium triquetrum*, cotoneaster sp., wall cotoneaster *Contoneaster horizontalis* and Japanese rose *Rosa rugosa*.

During the site visit, one presumed Schedule 9 listed species (cotoneaster sp.) was observed in multiple areas of the site (TN 1 Figure 4). The plant is particularly associated with introduced shrub habitats on site, where it was likely introduced as part of the planting scheme for the areas of the site where development has occurred. A large area bordering the north of the Toys R Us car park is dominated by cotoneaster sp, as shown in Photograph 9.

Photograph 9: Cotoneaster hedgerow

4. Interpretation of Results and Recommendations

Sensitive ecological receptors which could be impacted by the site redevelopment are discussed in more detail below. Recommendations for further consultation, further species surveys and mitigation to avoid or minimise impacts of the proposed works on habitat and species are stated below, in line with PEA guidance[44]. Opportunities to enhance biodiversity are also recommended in this section.

4.1 Designated Sites

The Severn Estuary SAC, SPA, SSSI and Ramsar Site is located approximately 1.5km to the east of the site. Given the proximity of the proposed development to the Severn Estuary, there is the potential for the proposed development to result in impacts to the designated features, most notably its importance to overwintering and migratory birds. A Habitat Regulations Assessment (HRA) Stage 1 Screening is recommended to assess the potential for a Likely Significant Effect from the project to the Severn Estuary SAC, SPA and Ramsar Site. As a result of case law as ruled by the European Court of Justice[45], mitigation measures cannot be included within the Screening stage of HRA, and therefore any potential pathways for effect will need to be evaluated within a Stage 2 Appropriate Assessment. For any planning applications, the Local Planning Authority (LPA) will also require a copy of the Appropriate Assessment as it is assumed they would become the 'competent authority'. If there are pathways for effect from the project to the Severn Estuary SSSI, SSSI assent will need to be applied for from Natural Resources Wales.

Cwm Cydfin SSSI is located upstream of the proposed project and, although no pathway for effect is anticipated, this should be reviewed once full project details are known to ensure that no mobile species are likely to be affected.

Land designated as Cogan Spur SINC borders part of the northern boundary of the site, which is also directly adjacent to River Ely SINC. Several other SINCs are located within 2km with potential pathways for effect existing between the proposed project area and the SINC. Development proposals should seek to avoid impacts to the habitats and species for which the SINCs are designated. Where this is not possible, any loss or damage of valuable habitats should be minimised. Any loss of habitat within an SINC would need to be adequately mitigated or compensated in order to comply with local planning policy. Early consultation with the LPA in relation to the SINCs is recommended.

A key insect and pollinator pathway has been identified as running through the site area. This has been formalised through identification as a B-line[42] by bug life. The B-Line network is designed to identify connections for insect 'super-highways' that would help reconnect our landscapes, enabling pollinators and other wildlife to move freely and support nature's recovery. It is recommended that the design of the project includes landscaping that provide enough insect and pollinator habitat to allow this highway to function effectively in its role of connecting adjacent habitats and providing important food sources for insects.

4.2 Habitats

The brownfield areas on site as a whole can be considered open mosaic habitat on previously developed land, a habitat of principal importance for the conservation of biodiversity as listed on Section 7 of the Environment (Wales) Act 2016 (priority habitats).

[44] Chartered Institute of Ecology and Environmental Management (CIEEM) (2017). Guidelines for Preliminary Ecological Appraisal. Second Edition. Available online at: https://cieem.net/resource/guidance-on-preliminary-ecological-appraisal-gpea/ (accessed 09/04/20).

[45] ECJ (2018). People over Wind, Case C323/17 European Court of Justice, 12th April 2018.

Development proposals at the site should seek to avoid impacts to habitats of ecological value. Where avoidance of such habitat is not possible, their loss or damage should be minimised. Any loss of valuable habitat should be adequately mitigated or compensated in order to comply with national and local planning policy.

Areas of the Section 7 habitat should be avoided and set aside as wildlife areas incorporated into the landscape design. Habitat to be set aside should focus on areas with most diversity within the mosaic. Any new habitat creation should include as much of the range of habitat diversity as is currently found on the site, i.e. sparse vegetation, species-rich grassland, damp and dry conditions, and ideally with some wetland features. The plant species at this site that are most valuable for nature conservation require a low nutrient substratum, rather than deep, nutrient rich topsoil, which should be a consideration of the landscape design.

It is recommended that a habitat management plan is written to manage areas set aside for nature conservation. Much of the vegetation is at a relatively early stage of succession, and in time will naturally develop to scrub. Therefore, any attempt to maintain the range of species currently on the site in the long term will require sufficient resources for occasional vegetation management. Occasional scrub control and cut-and-collect mowing are likely to be important management methods for maintaining this type of vegetation in the long term. A distinctive feature of this vegetation is its patchiness, so any future vegetation management should not be applied uniformly across the whole area, but carried out in small areas, perhaps on a rotational basis, to cut back a different section each year. Damp areas are likely to require more frequent management than dry areas because the vegetation will grow more quickly. A Landscape Environmental Management Plan (LEMP) should be produced detailing management and monitoring. In addition, Method Statements and a Construction Environmental Management Plan (CEMP) should be produced detailing methods to protect retained habitats during the construction phase.

Many of the plant species characteristic of this type of drought-stressed open vegetation are well adapted to green roofs. If incorporating green roofs on any new buildings, it would be far preferable to use a diverse mix of native species, rather than a simple ‘Sedum roof’ mix. Green roofs would then provide compensation for loss of open mosaic habitat resulting from the development. The green roofs should use a low nutrient substratum as currently exists within the brownfield areas of the site.

The small section of woodland on the northwest boundary of the site, although not likely to be considered Section 7 (priority habitat) due to its size and condition, is still considered to be of high ecological and environmental value in a local context. The habitat is likely important for both commuting and foraging bats and breeding birds recorded on site. Therefore, it is strongly recommended that the woodland is retained as part of the design.

Planting design should include native species mixes of local provenance similar to those existing on site, including species of importance for invertebrates identified on site. Rare and scarce botanical species should be translocated, if practical, into retained areas where conditions are similar to those from which they have been translocated.

4.3 Species

Protected and notable species are known to occur on the site. Further surveys and specific mitigation will be required for known and potential protected/notable species, these are summarised below. During the construction phase notable species will need to be safeguarded. Method Statements and a Construction Environmental Management Plan (CEMP) will likely need to be produced detailing safeguards during construction and vegetation clearance. Toolbox talks for specific ecological receptors identified on site will likely need to be delivered by a suitability qualified ecologist to contractors working on the site.

If any proposed works has potential to impact EPS, as is the case with the A4055 flyover lesser horseshoe bat roost, consultation with NRW will be sought and an EPS development licence will likely be required to carry out the works.

4.3.1 Birds

All wild birds, their young and nests are protected under the WCA from taking, injury and killing. Birds under Schedule 1 of the WCA are also protected against disturbance while nesting.

A breeding bird survey undertaken in accordance with good practice guidelines[46,47], recorded a good assemblage of bird species including breeding birds on site. Notable species recorded during these surveys include Cetti's warbler and whimbrel (both schedule 1 species), although neither of these species was recorded breeding on site. Wintering surveys revealed the site is of importance for overwintering species including red and amber listed species and Section 7 species; however, no qualifying species as listed under the Severn Estuary SPA or Ramsar site were recorded using the site over winter.

Any future works should consider breeding birds, and where possible construction works and vegetation clearance should be timed to avoid breeding season taken to be March to August inclusive. If vegetation clearance occurs within the breeding bird season a check for nests should be undertaken within 24 hours prior to clearance by a suitably qualified ecologist. Suitable habitat should be retained through the development, but where the loss of vegetation is unavoidable, an appropriate bird mitigation strategy will be required. The design of the development should consider the importance of the site for birds and landscaping should include a diversity of habitats as currently exists on site. Post development habitats should include areas of woodland, scrub, reedbed, tall grassland, and open poor draining sparce grassland.

4.3.2 Bats

Bats are protected under the WCA and the Conservation of Habitats and Species Regulations They are protected from disturbance, capture, injury and killing and their roosts are protected from obstruction, damage or destruction.

Three structures within the site boundary and surrounding 30m were identified as offering suitability to roosting bats. The A4055 flyover, the old Toys R Us building and the Watermark building were identified as offering moderate to high suitability. The A4055 flyover is a known lesser horseshoe roost and designated as a SINC for this reason.

Presence/absence surveys of the A4055 flyover and former Toy's R Us building revealed that the A4055 tunnel is used transitionally by lesser horseshoe during hibernation season and also likely used a maternity roost. The tunnel is also roost for soprano pipistrelle, common pipistrelle year-round and likely used as a maternity roost by soprano pipistrelle. Other species including Myotis and Nathusius pipistrelle also roost in the structure transitionally through winter. Surveys of the Toys' R us building have determined it is likely not a roost.

Further surveys are recommended on the Watermark building to confirm presence/likely absence of roosting bats in line with good practice guideline[15]. These will comprise of three emergence/re-entry surveys of the Watermark building (assessed as offering high suitability) Emergence and re-entry surveys should optimally be undertaken between May and August, but surveys can also be undertaken in April and September.

The A4055 bat roost is likely to be disturbed by the works, due to this a European Protected Species (EPS) development licence will be required from NRW. Results of emergence surveys on the Watermark will determine requirement for licence to cover this building also.

Due to the presence of habitats within the site being of potential value for foraging and commuting bats, static bat activity monitoring, and transect surveys were undertaken monthly from May- October 2023 in accordance with best practice survey guidance[15]. Results of activity surveys undertaken in 2023 at time of writing are not yet analysed and interpreted. Results of the activity surveys should identify any flight lines for bats particularly associated with the A4055 flyover where a woodland and scrub habitats border the northern boundary of the site, and identify important foraging habitats.

The results of surveys should be used to assess the potential impacts of development proposals on bats and inform the design of the development including mitigation such as retention of known bat roosts and important foraging and commuting habitat. Any indirect impacts to roosts, such as lighting and habitat fragmentation, should also be considered within the detailed development design. The design should ensure there is no lighting upon A4055 flyover roost or any further roosts identified on site. The design should

[46] Bibby, B.B., (2000). Bird Census Techniques. London: Academic Press.

[47] Gilbert, G.G., Gibbons, D.W. and Evans, J.,(1998). Bird Monitoring Methods: A manual of techniques. Bedfordshire, RSPB.

retain/create the dark corridor around site, particularly the northern boundary of the site between the A4055 flyover and Cardiff Bay.

No roosts will be lost to the proposed development but potential impacts to roosts from disturbance will need to be mitigated, through the development of an appropriate bat mitigation strategy.

4.3.3 Badger

Badgers are protected under the Protection of Badgers Act 1992. They are protected from disturbance (while in their setts), injury and killing.

No signs of badger were found during the Phase 1 Habitat survey or subsequent site visits and suitable habitat on the site is limited to the small area of semi natural mixed woodland. The woodland is small and has limited connectivity to other habitats. This and the urbanised setting of the site (which is surrounded by busy roads) means that badgers are considered unlikely to be using the site, but a precautionary approach to their presence should be taken.

A pre-construction survey of the site, preferably in the early spring, is recommended at least 8 weeks prior to any works on site, focusing on the woodland where there is potential for sett creation. Should evidence be recorded and setts impacted, a badger licence sought from NRW may be required depending on the scope of the works. Licensed badger work is only permitted between the months of July and November.

The retention of existing habitats and the design of new habitat corridors within the site should consider habitat requirements of badgers, with a focus on maintaining permeability across the site.

4.3.4 Otter

Otters are protected under the WCA and Habitat Regulations (as amended). Under this legislation, they are protected from disturbance, capture and injury/killing. Their breeding sites and resting places are also protected from damage and destruction.

Due to suitable foraging habitat (including Cardiff Bay and River Ely) bordering the site, and evidence of otter presence observed during surveys, where spraints and suitable habitat for lay-ups were identified, any works on the site will need to consider otters. Although suitable resting and breeding habitat is limited within the site boundary, the scrub border on the edge of the bay, beneath the suspended boardwalk, offers potential opportunities for resting and breeding otters.

Dependent on the scope of the works (if there is potential to disturb resting/breeding otters), particularly on the eastern boundary of the site where Cardiff Bay borders, a EPS development licence may need to be sought. We recommend pre-construction surveys 8-12 weeks prior to any construction focusing on suitable habitat on site (scrub/woodland) and also suitable habitat bordering the site. Surveys should be undertaken within the site and also from Cardiff Bay checking for holts and couches within the scrub border below the boardwalk on the eastern border of the site. Should any suspected holts or couches be identified, these should be monitored with camera traps to inform the EPS development licence.

The retention of existing habitats and the design of new habitat corridors within the site should consider habitat requirements of otters, with a focus on increasing permeability and connectivity across the site.

4.3.5 Hedgehog & other Small Mammals

Hedgehog is a Priority Species in accordance with Section 7 of the Environment (Wales) Act 2016 and must be considered during the planning process.

There are suitable habitats within the site for hedgehog and other small mammals including scrub, open grassland, and woodland edge. The retention of existing habitats and the design of new habitat corridors within the site should consider habitat requirements of hedgehog and other small mammals (e.g. field vole), with a focus on maintaining permeability and connectivity of habitat across the site for these species.

All mammals are protected under the Mammal Act 1996 safeguarding them from mortality/injury. Therefore, vegetation clearance timing and methodology should consider how such impacts will be avoided and may require supervision from a suitably experienced Ecological Clerk of Works (ECoW).

4.3.6 Reptiles and Amphibians

Reptiles are protected from reckless or intentional harm under the WCA.

No reptiles were found during the 2022 or 2023 surveys, therefore it is considered unlikely that the site will support a significant number of reptiles. However, given the presence of suitable reptile habitats, in the form of grassland, tall ruderal, scrub and woodland, low numbers could be present particularly where habitats are better connected.

The site is not likely to support the European protected species, great crested newt due to lack of records and suitable waterbodies. Common species of amphibian such as common toad however have been found on the site and are likely to be present in low numbers. Therefore a precautionary approach should be taken during any vegetation clearance.

Any potential refugia such as log or rubble piles should be dismantled carefully under the supervision of the SQE, and where possible this should be undertaken outside of the winter months to avoid disturbance to hibernating reptiles or overwintering amphibians. Any reptiles or amphibians should be relocated to suitable habitat, which will be unaffected by the development in agreement with Cardiff Council's ecologist. In the event higher numbers (>5) of reptiles are found during site clearance or hibernating reptiles are found, clearance should be delayed until further mitigation has been agreed with Cardiff Council ecologist.

4.3.7 Invertebrates

The mosaic of habitats within the site, are likely to support a range of notable invertebrates. Surveys undertaken in 2022 and 2023 recorded two notable species associated with the ruderal grassland within the Open mosaic habitat. Where important populations of invertebrates are identified, the design of the development should seek to retain the habitats of value to these invertebrate assemblages alongside the development wherever possible. Where the loss of notable invertebrate habitats is unavoidable, an appropriate mitigation strategy, including compensatory habitat creation, will be required to safeguard the local invertebrate population.

4.3.8 Notable Plant Species

Notable flora was recorded during the NVC surveys including ten that are listed as rare or scarce in the wildlife site guidelines. Therefore, the site can be considered as of county importance in terms of botanical species, based on criteria stated in the wildlife site guidelines. These species should be retained through design of the development, or, where they are to be lost, they should be translocated to areas of similarly retained habitat.

Landscape design should retain or replicate areas of existing habitat that these notable species are associated with. Management of the site post development will be important for the success of these species and a LEMP should be produced outlining monitoring and management.

4.3.9 Introduced Non- Native Invasive Species

Schedule 9 of the WCA makes facilitating the spread of listed invasive species, an offence. Cotoneaster sp. presumed to be Schedule 9 was identified on the site.

INNS can require multiple years of treatment to eradicate them from a site. It is therefore recommended that a specialist INNS contractor be appointed to undertake a detailed survey of the site and develop a management strategy for the safe removal of INNS present at the site. In the interim, areas of INNS should be clearly marked and a 10m buffer zone be established around them to ensure any pre-construction survey works do not inadvertently spread INNS and thereby commit an offence under the aforementioned legislation.

4.4 Enhancement Opportunities

A recent CIEEM briefing paper (2022)[2] outlining 'Welsh Government's Approach to Net Benefits for Biodiversity and the DECCA Framework in the Terrestrial Planning System' sets out that any development must demonstrate that it has both maintained and enhanced biodiversity and built resilient ecological networks. Details and specific enhancement opportunities, over and above measures required for mitigation

that demonstrate increased biodiversity and ecosystem resilience will be provided as part of the design process and may include:

- Creation of green roof and walls, over and above any required as compensation for lost habitat, using low nutrient substratum should be used and use a diverse mix of native species, rather than a simple 'Sedum roof' mix. Green roofs can be used in combination with solar panels and shade from solar panels can create microhabitats increasing the diversity;
- Creation of a range of habitats on the post-development site replicating or increasing current diversity on site. This can be achieved by varying soil drainage capacity and topography;
- Habitat creation for species (subject to further survey results) over and above that required for mitigation and compensation, e.g. bat boxes, bird houses, ponds, log pile/brash piles to encourage invertebrates and also act as refugia to reptiles, amphibians, hedgehogs and small mammals;
- Increasing wildlife corridors to provide further connectivity through site and to wider landscape. Green corridors should focus on scrub habitat; this will benefit a range of species on site including birds, bats, other mammals;
- Replacing existing areas of introduced shrub that may be lost, with native species mixes;
- Nature based solutions for drainage systems and water capture, including reed bed and damp grassland (e.g. swale) habitat; and
- Options to build up edge of bay beneath eastern boardwalk by placing large boulders in bay, with aim of enhancing the existing scrub line. Scrub border will create otter habitat, and suitable breeding bird habitat and boulders will create fish spawning habitat. Other options include floating reed beds along edge of bay, although discussion should be had on feasibility of these options.

Long-term management plans will be required for any notable retained habitats, as well as newly created habitats, to ensure the desired objectives for biodiversity are achieved. Such plans should clearly set out roles and responsibilities and include adequate ecological monitoring to inform ongoing management actions.

5. Summary and Conclusions

There is one internationally designated wildlife site, the Severn Estuary SAC, SPA, Ramsar site, within 5km of the site. Two nationally designated sites, and numerous locally designated sites, occur within 2km of the site, including the Severn Estuary SSSI, Cwm Cydfin SSSI, and Cogun Spur SINC.

Section 7 habitat of principal importance 'open mosaic on previously developed land' is present on site. Other habitats present on the site are: tall ruderal, ephemeral, bare ground, neutral grassland, poor semi-improved grassland, dense continuous scrub, scattered scrub, reedbed, broadleaved woodland, species poor intact hedgerow, amenity grassland, scattered trees, introduced shrub, buildings and hardstanding.

The site is known to support roosting bats, breeding and wintering birds, notable invertebrates, and rare and scarce plant species. Due to the type and range of habitats present, the site potentially supports hedgehog, reptiles, otter, and badger, though these have not been recorded on site to date.

Further surveys have been recommended to provide additional information on the presence/likely absence of protected species within the site.

- Emergence bat surveys of Watermark building - between May and August 2024
- Pre-construction surveys for badger and otter - 8-12 weeks prior to construction.

Detailed mitigation for protected species and habitats will be provided in relevant reports. With the current understanding of the site, the following mitigation is required.

- EPS bat licence for A4055 lesser horseshoe roost.
- Retention of priority open mosaic habitat, where possible, and areas set aside and managed to maintain the habitat.
- Retention and protection of broadleaved woodland habitat.
- Retention or replacement of breeding bird habitat and habitat of importance to notable invertebrate species such as tall ruderal grassland.
- Cotoneaster sp. presumed to be Schedule 9 was identified on the site. It is recommended that a specialist INNS contractor be appointed to undertake detailed survey of the site and develop an invasive species management plan for the site.
- Precautionary methods of working have been recommended to avoid potential impacts to species/habitats during the proposed works.

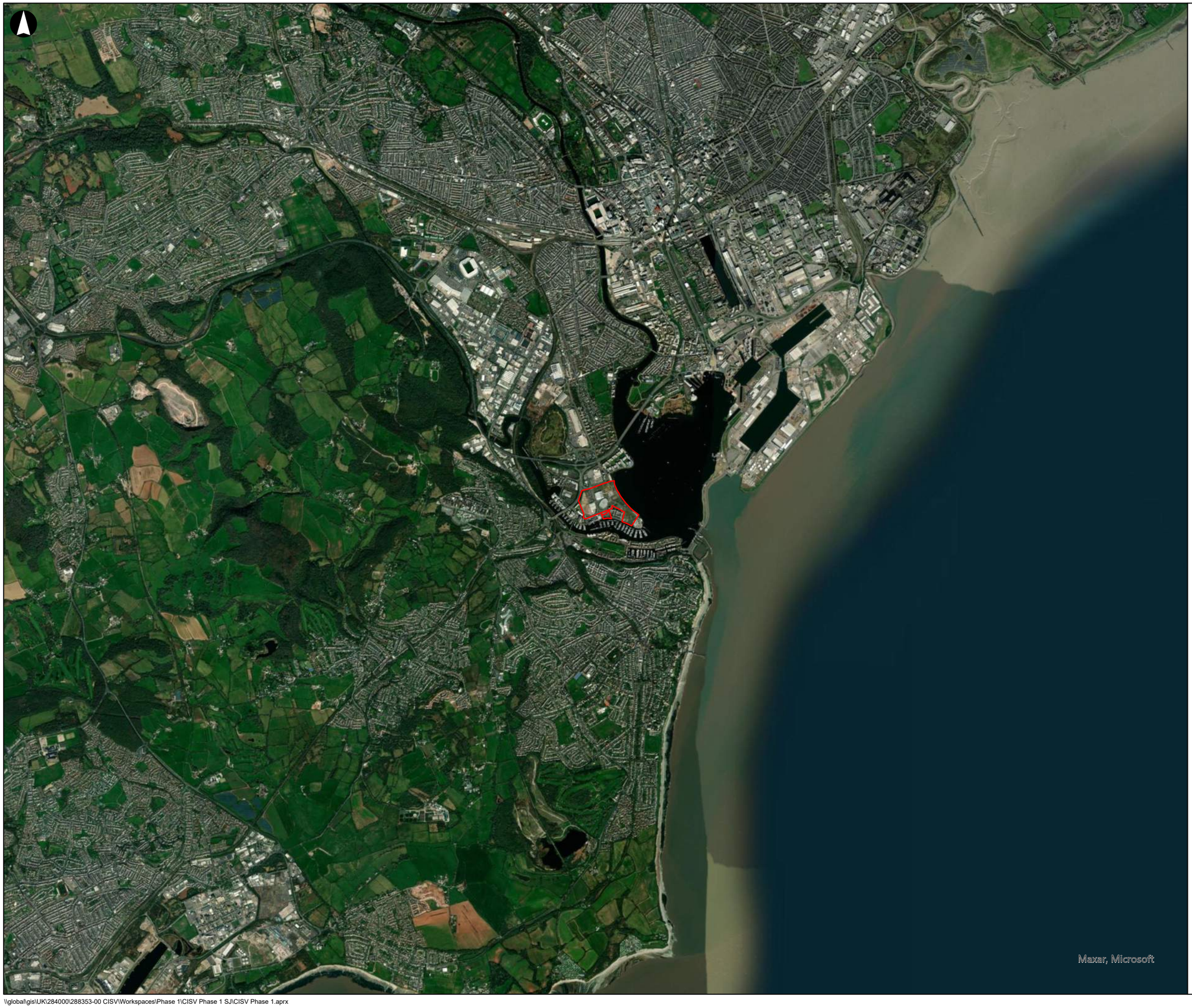
Mitigation and enhancements proposed for the site therefore include retention and management of priority habitats, but also habitat creation for protected species found on site, retention and enhancement of wildlife corridors, incorporation of green roofs on any proposed buildings, planting regimes of native species focusing on biodiversity and climate change that replace existing introduced shrub planting, lighting requirements, and nature-based solution for drainage systems and water capture.

An Ecological Impact Assessment (EcIA) report should be prepared for planning which will need to consider the significance of impacts to ecological receptors as a result of the final design and construction methods. A Habitats Regulation Assessment (HRA) Screening will also be required due to the proximity of the Severn Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site.

This report is the result of survey work undertaken between September 2022 and September 2023. This report refers, within the limitations stated, to the condition or proposed development of the site at the time of the inspections. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey. It is also advised that if there is a delay of over two years in undertaking the works, an updated walkover survey is undertaken to ensure the baseline conditions have not changed. No warranty is given as to the possibility of future changes in the condition of the site.

This report is produced solely for the benefit of the Cardiff Council and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

Figure 1: Site location



Site boundary

A3

12/07/2023 15:49

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

Rev	Date	By	Chkd	Appd	Authd
02	12/07/2023	SJ	CE	PC	--

ARUP

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Client

Cardiff Council

Project Name

Cardiff International Sport Village and Cardiff Peninsula

Drawing Title

Site location

Scale at A3

1:40,000

Role

Suitability

Project Number

295462-00

Rev

02

Drawing Number

Figure 1

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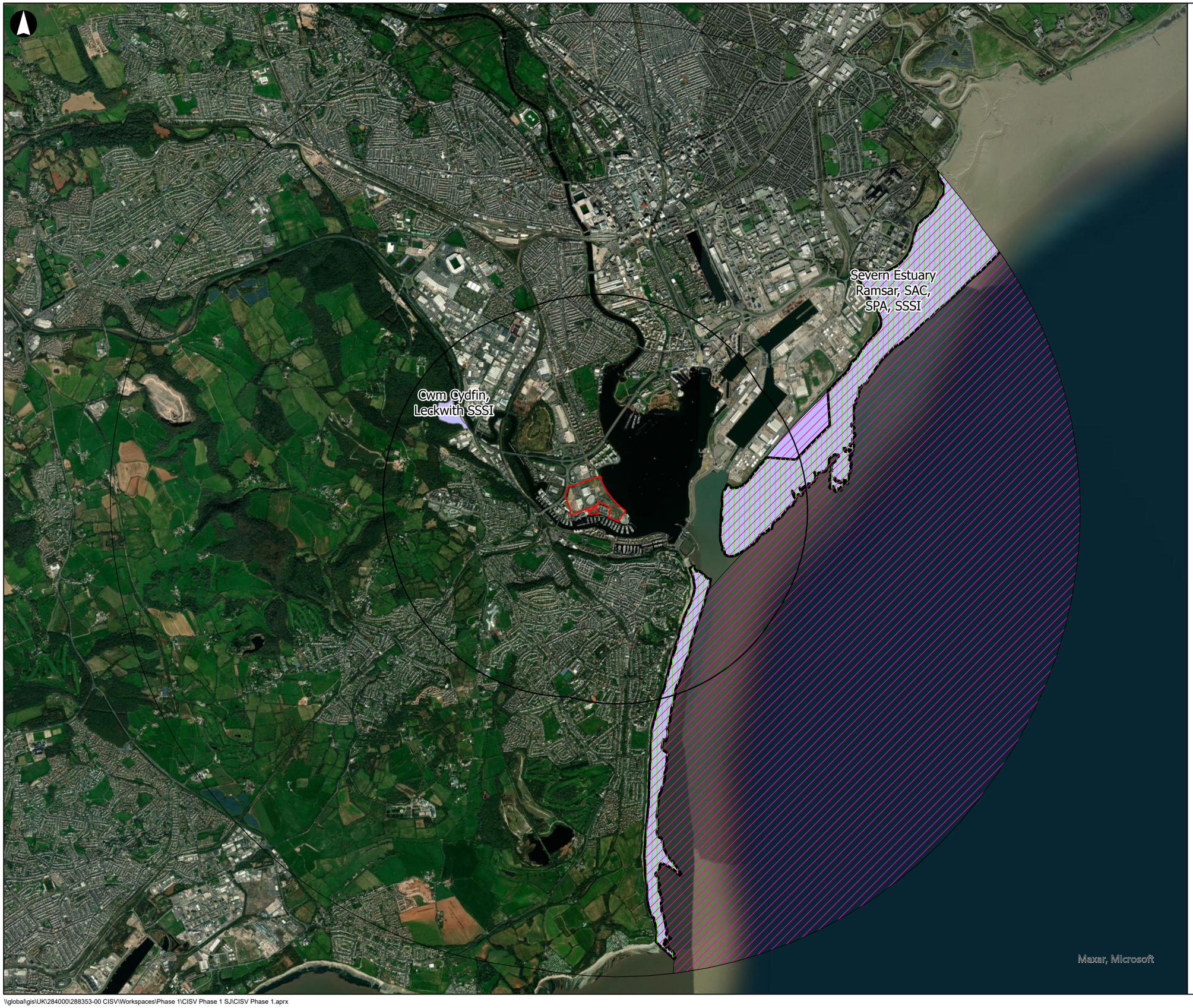
Figure 2: International and National Statutory Designated Sites



A3

23/10/2023 11:03

- 5km
- Site boundary
- 2km
- Site of Specific Scientific Interest (SSSI)
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Ramsar

Coordinate System: British National Grid

Metres

0 287.5 575 1,150

Rev	Date	By	Chkd	Appd	Authd
01	12/07/2023	SJ	CE	PC	--

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Project Name
Cardiff International Sport Village and Cardiff Peninsula

Drawing Title
Internationally and Nationally Designated Sites

Scale at A3
1:40,000

Role

Suitability

Project Number
295462-00

Rev
01

Drawing Number
Figure 2

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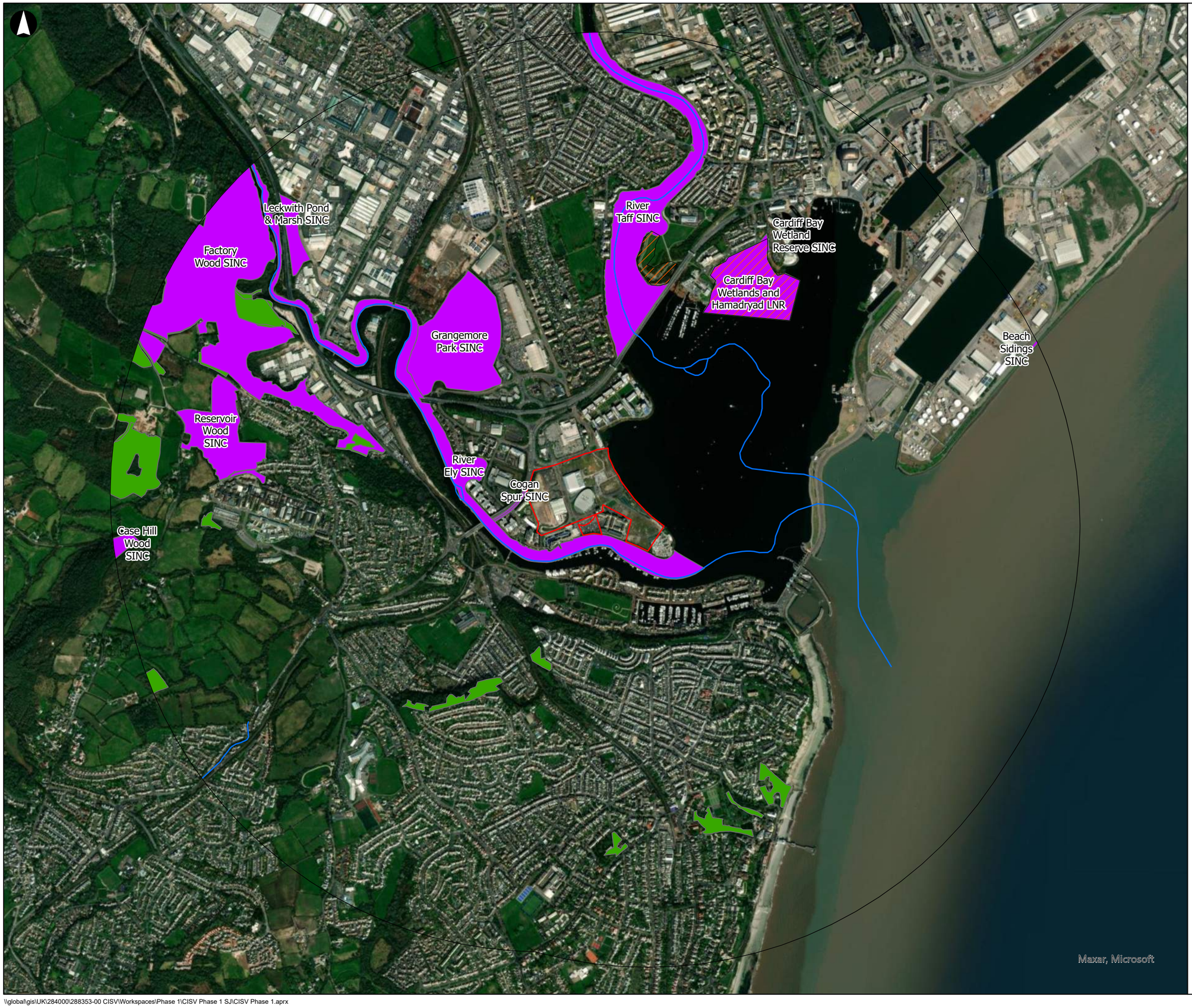
Figure 3: Local Designated Sites and notable habitats in wider landscape



A3

23/10/2023 11:25

- Site boundary
- 2km
- Site of Importance for Nature Conservation (SINC)
- Local Nature Reserve (LNR)
- Ancient woodland
- Main river

Coordinate System: British National Grid

Metres

0 125 250 500

Rev	Date	By	Chkd	Appd	Authd
01	12/07/2023	SJ	CE	PC	--

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Project Name

Cardiff International Sport Village and Cardiff Peninsula

Drawing Title

Locally designated sites and priority habitats

Scale at A3

1:17,500

Role

Suitability

Project Number **295462-00**

Rev **01**

Drawing Number

Figure 3

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Figure 4: Phase 1 Habitat Map

TN1 - cotoneaster sp.
TN2 - suitable for resting otter
TN3 - suitable for roosting bat
TN4 - suitable refugia for reptiles, amphibians, and small mammals
TN5 - suitable habitat for breeding birds

A3

12/07/2023 19:59

- Site boundary
- A1.1.1 - Broadleaved woodland - semi-natural
- A2.1 - Scrub - dense/continuous
- A2.2 - Scrub - scattered
- B2.2 - Neutral grassland - semi-improved
- B6 - Poor semi-improved grassland
- C3.1 - Other tall herb and fern - ruderal
- F1 - Swamp
- J1.2 - Cultivated/disturbed land - amenity grassland
- J1.3 - Cultivated/disturbed land - ephemeral/short perennial
- J1.4 - Introduced shrub
- J2.1.2 - Intact hedge - species-poor
- J3.6 - Buildings
- J4 - Bare ground
- J5 - Gravel/hard standing
- Contaminated land bundle
- A3.1 - Broad-leaved parkland/scattered trees
- TN - Target note

Coordinate System: British National Grid

Metres
0 25 50 100

Rev	Date	By	Chkd	Appd	Authd
02	12/07/2023	SJ	CE	PC	--

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Project Name
Cardiff International Sport Village and Cardiff Peninsula

Drawing Title
Phase 1 Habitat survey map

Scale at A3
1:2,250

Role

Suitability

Project Number
295462-00

Rev
02

Drawing Number
Figure 4

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Appendix A

Legislation

A.1 Legislative Context

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

A.2 Designated Sites

A network of nationally designated sites has been established through the designation of Sites of Species Scientific Interest (SSSI) and National Nature Reserves (NNR) under the Wildlife and Countryside Act 1981 (as amended). The protected afforded by the Act means it is an offence to carry out or permit to be carried out any operation listed within the notification without the consent of the Statutory Nature Conservation Organisation[48] (Natural Resources Wales).

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

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

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

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

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

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

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

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

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

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

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

[48] Section 28 of the Wildlife and Countryside Act 1981 (as substituted by Schedule 9 of the Countryside and Rights of Way Act 2000).

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

A.3 Protected/Notable Species

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

A.3.1 European Protected Species

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

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

Regulation 43 makes it an offence to:

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

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

Licences can be granted by the relevant Statutory Nature Conservation Organisation (SNCO) for developments (sometime referred to as EPS Licences or Derogation Licences) providing the purposes of the licence is for "preserving public health or public safety or other imperative reasons of overriding public

interest including those of a social or economic nature and beneficial consequences of primary importance for the environment".

A.3.2 UK Protected Species

A.3.2.1 Wildlife and Countryside Act 1981

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

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

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

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

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

A.3.2.2 The Protection of Badger Act 1992

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

A.3.2.3 Eels (England & Wales) Regulations 2009

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

A.3.2.4 Salmon and Freshwater Fisheries Act 1975

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

A.3.3 Other Legislation Relating to Species

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

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

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

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

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

- The list published under Section 7;
- The State of Natural Resources Report (SoNARR) published under Section 8[49]; and
- Any area statement published under Section 11 for an area that includes all or part of an area in relation to which the authority exercises functions.

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

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

A.3.4 Invasive Species

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

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

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

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

A.4 Hedgerow Regulations 1997

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

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

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

[49] https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en

A.6 The Well-being of Future Generations Act

The Well-being of Future Generations Act 2015[50] places a duty on public bodies to carry out sustainable development. In this Act "sustainable development" means the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals.

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

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

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

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

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

A.7 Planning Policy

A.7.1 Planning Policy Wales (PPW)

At national level, Planning Policy Wales[51] sets the national policies in relation to development control through the Town and Country Planning Act 1990. This is supported by a series of Technical Advice Notes, with Technical Advice Note (TAN) 5[52] being of particular relevance as it sets out the consideration of nature conservation in the determination of planning applications. This policy and TAN 5 require Local Authorities to take measures to:

- Promote the conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats;
- Ensure that action in Wales contributes to meeting international responsibilities and obligations for the natural environment;
- Ensure that statutorily designated sites are properly protected and managed;
- Safeguard protected species; and
- Promote the functions and benefits of soils, and in particular their function as a carbon store.

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

[50] Acts of the National Assembly for Wales. The Well-being of Future Generations (Wales) Act 2015. https://www.legislation.gov.uk/anaw/2015/2/contents/enacted

[51] Welsh Government (2018). Planning Policy Wales, Edition 10, December 2018.

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

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

Statutorily designated sites must be protected from damage and deterioration, with their important features conserved and enhanced by appropriate management.

Although non-statutory designations carry less weight than statutory designations, they can make a vital contribution to delivering an ecological network for biodiversity and resilient ecosystems, and they should be given adequate protection in development plans and the development management process.

Planning authorities must follow a step-wise approach to maintain and enhance biodiversity and build resilient ecological networks by ensuring that any adverse environmental effects are firstly avoided, then minimized, mitigated, and as a last resort compensated for; enhancement must be secured wherever possible

The presence of a species protected under European or UK legislation, or under Section 7 of the Environment (Wales) Act 2016 is a material consideration when a planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat and to ensure that the range and population of the species is sustained.

Planning authorities should protect trees, hedgerows, groups of trees and areas of woodland where they have ecological value, contribute to the character or amenity of a particular locality, or perform a beneficial and identified green infrastructure function. Planning authorities should consider the importance of native woodland and valued trees, and should have regard, where appropriate, to local authority tree strategies or SPG. Permanent removal of woodland should only be permitted where it would achieve significant and clearly defined public benefits. Where woodland or trees are removed as part of a proposed scheme, developers will be expected to provide compensatory planting.

Ancient woodland and semi-natural woodlands and individual ancient, veteran and heritage trees are irreplaceable natural resources, and have significant landscape, biodiversity and cultural value. Such trees and woodlands should be afforded protection from development which would result in their loss or deterioration unless there are significant and clearly defined public benefits; this protection should prevent potentially damaging operations and their unnecessary loss. In the case of a site recorded on the Ancient Woodland Inventory, authorities should consider the advice of NRW.

Nature based solutions should be the first consideration given the opportunity to deliver other multiple benefits, including habitat creation, biodiversity enhancement and water quality improvements. Overall, green infrastructure opportunities can benefit ecosystem resilience and provide opportunities for leisure facilities or renewable energy generation.

A.7.2 Local Biodiversity Action plan

The Cardiff Council Local Biodiversity Action Plan (LBAP)53 refers to habitats and species of importance for nature conservation within the county. Of relevance to this project are the Habitat Action Plans: broadleaved woodland habitats, boundary and linear features, neutral grasslands and standing open water. In addition, it is likely that a number of LBAP species also occur within the site, including bats.

[53] https://www.outdoorcardiff.com/wp-content/uploads/Cardiff-LBAP-2008.pdf

Appendix B

Target Notes

B.1 Target Notes

Target Note	Description
TN1	Cotoneaster sp.
TN2	Suitable for resting otter
TN3	Suitable for roosting bats
TN4	Suitable refugia for reptiles, amphibians, and small mammals
TN5	Suitable habitat for breeding birds