

8 ECOLOGY

8.1 INTRODUCTION

8.1.1 This chapter concerns the potential ecological effects of the proposed development of industrial units and associated infrastructure on land at Rover Way, Cardiff, and has been prepared by Sturgess Ecology.

8.1.2 The purpose of this chapter is to describe the ecological conditions found within the site, to evaluate the ecological features and to provide an evaluation of likely impacts and mitigation associated with the construction and operation of the proposed project.

8.1.3 The scope of the Ecological Impact Assessment (EIA) has been based on:

- Consideration of the ecological resources, focusing on those for which there is legal or planning policy in favour of protection or enhancement.
- Data on protected sites within 1 to 2km of the proposed development.
- Data on notable flora and fauna; for example, legally protected, Local (Cardiff) and UK Biodiversity Action Plan, and other species of conservation concern within 500m of the proposed development boundary.
- Review of the proposed outline development and its effect on ecological resources.

8.1.4 Whilst assessed afresh, this element of the scheme proposals is common to, and consistent with, the previous (approved) development for the site. The principal conclusions drawn and set out in the consideration and determination (approval) of the previous (bio-mass and related development) scheme for the site record the following:

- the Council's Ecologist has undertaken an 'Appropriate Assessment' (AA) on behalf of the Council as the 'competent authority' which concludes that, based upon the submitted application, the proposed development will not have an adverse effect upon the integrity of the Severn Estuary sites, provided certain conditions are attached to any permission;
- it is recognised that the landscaping proposals for this development, which are a reserved matter requiring future approval by the Local Planning Authority, will be important in the future protection of the existing habitats.
- The Council's Ecologist is satisfied that the policy requirements of Section 5.5.3 of TAN 5 as above can be addressed at this site, however this is dependent upon the details of the final landscaping scheme of the proposed development; and
- The Ecologist recommends that a comprehensive Green Infrastructure Strategy (GIS) for the site is secured via condition to secure details of all measures to avoid, mitigate and compensate for impacts upon ecological interests, together with measures to provide habitat enhancement.

8.2 CONTEXT

8.2.1 The site occupies an area of approximately 15 hectares. It lies immediately adjacent to the Cardiff foreshore, which is part of the Severn Estuary. This is a statutory protected site, designated as a Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar site and Site of Special Scientific Interest (SSSI), mainly because of its value to estuarine waders and wildfowl.

8.2.2 The site is known locally as the Cardiff Frag Tip and it is largely underlain by tipped material from the nearby metal works. It was used for 'Fragmentation Waste', which was a varied mix of toxic industrial wastes including steelworks slag and non-metallic waste (e.g. carpet, plastic, etc. from cars being crushed and recycled by the steelworks), old conveyor belts and various other materials. The tip was capped and landscaped by Dwr Cymru Welsh Water in approximately 2001 as part of the development of the Cardiff East Waste Water Treatment Works. It was then re-landscaped in approximately 2008/9 for use as an off-road motorcycle course (Cardiff Motocross Centre MX and Minibike Track). The Wales Coastal Footpath runs along the seaward side of the tip.

Legislative and Planning Policy Context

8.2.3 The following national planning policy relating to Ecology is applicable to this development.

- *Planning Policy Wales: Edition 11 (February 2021)*. Particularly Chapter 5, which includes land remediation, and Chapter 6, which includes coastal areas and green infrastructure;
- *Technical Advice Note (Wales) 5: Nature Conservation and Planning (2009)*; and.
- *The Environment (Wales) Act (2016)*, which includes a number of considerations that local authorities have to take into account in planning, particularly an enhanced biodiversity and resilience of ecosystems duty (Section 6 Duty).

8.2.4 These over-arching policy documents set out the land use planning policies of the Welsh Government, to achieve nature conservation objectives through a partnership between local planning authorities, NRW, voluntary organisations, developers, landowners and other key stakeholders; to integrate nature conservation into all planning decisions; to ensure that the UK's international obligations for site, species and habitat protection are fully met in all planning decisions; and to look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally.

Local Planning Policy

8.2.5 The *Cardiff Council Local Development Plan* was adopted in 2016. This includes a series of policies relating to ecology and nature conservation. The most relevant to this assessment are policies EN5, EN6 and EN7, reproduced below:

EN5: DESIGNATED SITES

Development will not be permitted that would cause unacceptable harm to sites of international or national nature conservation importance. Development proposals that would affect locally designated sites of nature conservation and geological importance should maintain or enhance the nature conservation and/or geological importance of the designation. Where this is not the case and the need for the development outweighs the conservation importance of the site, it should be demonstrated that there is no satisfactory alternative location for the development which avoids nature conservation impacts, and compensation measures designed to ensure that there is no reduction in the overall nature conservation value of the area or feature.

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

- 8.2.6 In addition, City of Cardiff Council Green Infrastructure Supplementary Planning Guidance (November 2017) sets out principles and advice to guide developers in planning requirements relating to biodiversity, open spaces, trees, soils and other aspects of sustainable development.

8.3 METHODOLOGY

Assessment Methodology

8.3.1 This assessment has been undertaken using guidelines published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018). The terms used to assign value to a given ecological feature and to assess the impact of the proposed development within the CIEEM guidelines may differ from those used in other chapters of this Environmental Statement.

8.3.2 Where an ecological feature (i.e. a habitat or species) is likely to be subject to an impact, both the value of the feature/resource and the likelihood of a significant effect occurring are considered. Where an effect is identified on a particular feature, it is evaluated as adverse or beneficial at the relevant geographical scale (local, district etc.).

8.3.3 The potential impacts of the proposed development during construction and operation on identified ecological receptors provisionally identified through correspondence with the local authority and Natural Resources Wales are broadly summarised as follows:

- Potential pollution impacts on the adjacent estuary habitat through re-working of contaminated tip material;
- Possible effects on overwintering and migratory birds using the Severn Estuary;
- Direct loss of habitats within the site;
- Isolation and fragmentation of habitats;
- Changes in hydrology (e.g. rate/quality of surface run-off);
- Degradation of habitats following changes in management;
- Increased disturbance, from construction, traffic and people.

8.3.4 Potentially sensitive ecological receptors are identified through the collation of baseline data from surveys and existing records. Once the receptors are identified, information on their legal, conservation and distribution status, plus any known trends, are considered to measure their value. The key reference for assessing the value of habitats in this situation is the Guidelines for the Selection of Wildlife Sites in Wales¹.

8.3.5 All ecological receptors are described (including conservation status, status on site, sensitivity, planning and legal protection etc.) and assigned a value. The scale of value for ecological resources used in this assessment is as follows:

- International;
- UK;
- National (Wales);
- Regional (South Wales);
- County (Glamorgan: vice county 41);
- District (Cardiff);
- Local (South Cardiff); and

¹ Wales Biodiversity Partnership (2008). Guidelines for the Selection of Wildlife Sites in Wales.

- Within the development site boundary.

- 8.3.6 All resources valued at above a given threshold (in this case 'within the development site boundary' is the lowest level) are considered in terms of whether any effects are likely to be ecologically significant or not. Where activities associated with the development are likely to result in changes, the implications of these are considered in terms of magnitude, duration, reversibility and timing for the various ecological features, to determine if they are likely to cause significant ecological effects.
- 8.3.7 For the purposes of this assessment, an ecologically significant effect on a protected site is defined as a change that undermines the site's conservation objectives, or affects the conservation status of species or habitats for which the site is designated, or affects the condition of the site or its qualifying features.
- 8.3.8 For ecosystems, a project is considered to have a significant effect if it results in a change in the ecosystem structure and function. The assessment considers key processes and characteristics, the nature, extent, structure and function of component habitats, and effects on population size and viability of component species. The evaluation considers the site in its wider context, not just within the development boundary.
- 8.3.9 The evaluation of effects considers the conservation status of individual habitats and species. It also considers the influences acting on the habitats that would affect their extent, structure and function, as well as the distribution and abundance of species within a given geographical area. The assessment also takes account of background trends and ecological conditions, and levels of ecological resilience.
- 8.3.10 Following the description of the ecological resource in terms of value and geographical scale, and potentially significant effects, the residual effect of the development is presented, which includes consideration of mitigation measures.

Desk Study and Surveys

- 8.3.11 Information on the statutory protected sites was obtained from the Natural Resources Wales (NRW) web-site. This search was limited to sites within 5km of the study area. A South East Wales Biodiversity Records Centre (SEWBReC) search was commissioned to provide data on protected and priority species and protected sites within a 500m radius of the 2014 wind turbine site. This covered the whole of the current study area but yielded very few records from the site itself.
- 8.3.12 A number of ecology surveys have been carried out since 2014. An extended Phase 1 habitat survey was undertaken on 7 July 2014², and this was followed by a series of bird studies between October 2014 and March 2015³, to investigate whether the proposed turbine would affect overwintering birds using the estuary. The Phase 1 habitat survey was extended and

² Sturgess Ecology (2014). Proposed wind turbine at Rover Way, Cardiff: Ecology survey. Unpublished report for MDA Renewables Ltd.

³ Sturgess Ecology (2015). Proposed wind turbine at Rover Way, Cardiff: Winter bird survey. Unpublished report for MDA Renewables Ltd.

revised to cover the current development site, by a survey on 1 August 2017⁴, and a specialist survey of bees has also been carried out⁵. A reptile survey was undertaken during September 2017⁶. Relevant data from each of these reports has been included in this assessment. The results of earlier surveys that were carried out prior to the recapping of the Frag Tip have not been considered in the assessment because the site was almost totally reprofiled during the engineering works so that virtually none of the former habitat remains.

8.3.13 In terms of the lifespan of the previous surveys as set out above, the CIEEM advise 'On the Lifespan of Ecological Reports & Surveys' (April 2019) stating, *'it is important that planning decisions are based on up-to-date ecological reports and survey data. However, it is difficult to set a specific timeframe over which reports or survey data should be considered valid, as this will vary in different circumstances'*. In this instance, dialogue with Cardiff County Council has confirmed that no new ecology surveys are required at this stage, due to their acceptability being confirmed on 29th January approval under application 20/01279/MJR. However, it is understood that there may be a requirement for more surveys prior to developing the detailed design.

⁴ Sturgess Ecology (2017). Land at Rover Way, Cardiff: Ecology survey. Unpublished report for Parc Calon Gwyrdd Ltd

⁵ Olds, L.T. (2017). Aculeate survey of former frag tip, Rover Way, Cardiff. Unpublished report for MDA Consult Ltd.

⁶ Wildwood Ecology (2017). Land off Rover Way, Reptile survey for Parc Calon Gwyrdd Ltd.

8.4 BASELINE CONDITIONS

8.4.1 The following section summarises the findings of the ecology studies carried out to describe and evaluate the current ecological conditions at the site. The most recent survey documents are included as Appendices 8.1, 8.2 and 8.3 to this ES.

Protected Sites

8.4.2 The Severn Estuary which lies immediately outside the site boundary is an important protected area, designated as SAC, SPA, Ramsar site and SSSI. The boundary of the protected site (as obtained as a GIS layer from NRW) is shown in Figure 1. The difference between the boundary and the current shoreline is probably attributable to recent erosion at the base of the tip. Due to its protected status the estuary is considered important for nature conservation in a European context.

8.4.3 The SPA summary description from the JNCC web-site is as follows:

'The Severn Estuary is located between Wales and England in south-west Britain. It is a large estuary with extensive intertidal mud-flats and sand-flats, rocky platforms and islands. Saltmarsh fringes the coast backed by grazing marsh with freshwater ditches and occasional brackish ditches. The seabed is rock and gravel with sub-tidal sandbanks. The estuary's classic funnel shape, unique in the UK, is a factor causing the Severn to have the second- highest tidal range in the world (after the Bay of Fundy in Canada). This tidal regime results in plant and animal communities typical of the extreme physical conditions of liquid mud and tide- swept sand and rock. The species-poor invertebrate community includes high densities of ragworms, lugworms and other invertebrates forming an important food source for passage and wintering waders. A further consequence of the large tidal range is an extensive intertidal zone, one of the largest in the UK. The site is of importance during the spring and autumn migration periods for waders moving up the west coast of Britain, as well as in winter for large numbers of waterbirds, especially swans, ducks and waders.'

8.4.4 The SPA qualifying features include the following populations of European importance:

- Overwintering Bewick's Swans: 280 individuals, representing at least 4.0% of the wintering population in Great Britain (5-year peak mean 1991/2 - 1995/6);
- Overwintering Curlew: 3,903 individuals representing at least 1.1% of the wintering Europe - breeding population (5-year peak mean 1991/2 - 1995/6);
- Overwintering Dunlin: 44,624 individuals representing at least 3.2% of the wintering Northern Siberia/Europe/Western Africa population (5-year peak mean 1991/2 - 1995/6);
- Overwintering Pintail: 599 individuals representing at least 1.0% of the wintering North-western Europe population (5-year peak mean 1991/2 - 1995/6);
- Overwintering Redshank: 2,330 individuals representing at least 1.6% of the wintering Eastern Atlantic - wintering population (5-year peak mean 1991/2 - 1995/6);

- Overwintering Shelduck: 3,330 individuals representing at least 1.1% of the wintering North-western Europe population (5-year peak mean 1991/2 - 1995/6); and
- Ringed Plover, on passage: 655 individuals representing at least 1.3% of the Europe/Northern Africa - wintering population (5-year peak mean 1991/2 - 1995/6).

8.4.5 The estuary also meets the SPA qualifying criterion of being a wetland of international importance which regularly supports at least 20,000 waterfowl, summarised as follows:

'Over winter, the area regularly supports 93,986 individual waterfowl (5-year peak mean 1991/2 - 1995/6) including: Gadwall, Shelduck, Pintail, Dunlin, Curlew, Redshank, Bewick's Swan, Wigeon, Lapwing, Teal, Mallard, Shoveler, Pochard, Tufted Duck, Grey Plover, White-fronted Goose and Whimbrel.'

8.4.6 The Severn Estuary SAC selection features include the following:

- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Atlantic salt meadows
- Sandbanks which are slightly covered by sea-water all the time
- Sea Lamprey
- River Lamprey
- Twaite Shad.

8.4.7 The Severn Estuary is designated as a Ramsar site under the International Convention on Wetlands of International Importance especially as Waterfowl Habitat. It should be noted that several of the qualifying criteria are the same as for the SPA and SAC. Qualifying features include the following:

- Immense tidal range, affecting the physical environment and biological communities present.
- Unusual estuarine communities reduced species diversity and high productivity. The high tidal range leads to strong tidal streams and high turbidity, producing communities' characteristic of the extreme physical conditions of liquid mud and tide swept sand and rock.
- Important for the run of migratory fish, including Salmon, Sea Trout, Sea Lamprey, River Lamprey, Allis Shad, Twaite Shad and Eel.
- The fish assemblage of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded.
- Regularly supporting internationally important populations (1% or more) of waterfowl species in winter, including Bewick's Swan, European White-fronted Goose, Dunlin, Redshank, Shelduck and Gadwall.
- Regularly supporting internationally important populations of Ringed Plover (spring/autumn), Eurasian Teal (winter), Northern Pintail (winter), Lesser Black-backed Gull (breeding).

- Important for migratory birds during passage periods in spring and autumn, including nationally important populations of Ringed Plover, Dunlin, Whimbrel and Redshank.
- Regularly supporting over 20,000 waterfowl in winter. (1988/89 to 1992/93 average peak count was 68,026 waterfowl: 17,502 wildfowl and 50,524 waders).
- Supports an assemblage of international importance - (1998/99-2002/2003 5 year peak mean was 70,919 waterfowl).
- Nationally important wintering populations of: Wigeon, Teal, Pintail, Pochard, Tufted Duck, Ringed Plover, Grey Plover, Curlew and Spotted Redshank. Also nationally important breeding population of Lesser Black-backed Gull.

8.4.8 There are five SSSIs within 5km of the site. The closest of these is the Severn Estuary. There is a high degree of overlap between the SSSI features and those already outlined above as part of the European site designations, so this SSSI is not discussed further here. The Gwent Levels Rumney and Peterstone SSSI lies approximately 2.5km north-west of the site, east of the Rhymney estuary. This is one of six Gwent Levels SSSIs between Cardiff and Chepstow. The levels are made up of low-lying fields which are drained by an extensive network of drainage ditches. The nature conservation interest in the Gwent Levels is primarily associated with the ditches, which support a rich diversity of plants and invertebrates, many of which are nationally rare or notable. The hedgerows and flower-rich reed banks also provide valuable habitat for invertebrates. The Gwent Levels SSSI is evaluated as being of nature conservation importance in a National context.

8.4.9 The Rhymney Quarry, Rhymney River Section and Penylan Quarry SSSIs lie approximately 2.6km, 2.8km and 3.2km north of the site respectively. These are all designated for their geological importance. They are not discussed further in this document because there would clearly be no potential impact on them from the proposed development.

8.4.10 The closest Site of Importance for Nature Conservation (SINC) is Pengam Moors, which lies to the north-west. Its closest point is approximately 20m from the Parc Calon Gwyrdd site, on the north side of Rover Way. Pengam Moors SINC occupies the former site of Cardiff airport, and later the Rover Car Works. Following demolition, the site has reverted to saline, marshy conditions. It includes a network of drainage channels with good emergent aquatic vegetation. It also includes areas of bare ground and scrub. The SINC supports a number of locally rare plants including Sea Clover, Brackish Water Crowfoot and Water Whorl-grass. It is also considered important for water fowl and wintering birds of prey.

8.4.11 There are no other SINC sites within 500m of the proposed development, but several lie just beyond this. The Rhymney River SINC is approximately 570m north at its closest point. This is connected to the Lamby Saltmarsh SINC where it meets the estuary, and the Rhymney River Complex SINC further upstream. Between them they form a corridor of relatively unmodified estuarine and river habitats, with associated scrub and diverse grassland that extends from the coast to approximately 2.5km inland. The Tidal Sidings SINC lies approximately 590m south west of the proposed development at its closest point. And beyond this lies the Cardiff Heliport Fields SINC. Both sites occupy post-industrial land that now supports a mix of flower-rich neutral and calcareous grassland and scrub. SINC sites are evaluated as being important for nature conservation in a County context.

Habitats

- 8.4.12 The habitat map from the August 2017 survey is presented in Figure 1, which includes the Target Note numbering used to describe different parts of the site in the survey report. The descriptions, species list and photographs from the habitat survey are presented in the appendices and so are not repeated here.
- 8.4.13 The site supports a mix of habitats that have almost all developed since the reprofiling of the Frag Tip in 2001 and creation of the motorcycle track in 2008/9. The dominant habitats include:
- Open ground with ruderal vegetation;
 - Flower-rich neutral grassland;
 - Scrub and tree-planting areas.
- 8.4.14 There are also smaller areas of habitats including areas of bare steelworks slag, tall ruderal vegetation, transitory pools and eroding shore-line.
- 8.4.15 The motorcycle track on the central plateau area has very patchy vegetation. The most disturbed parts are bare, but the plant cover by sparse grasses and ruderal plants becomes denser with increasing distance from the main tracks. The parts of the track that are seldom disturbed support a developing neutral grassland flora. Outside the area used for motorcycling there are several open areas that support flower-rich neutral grassland and steep banks with a mix of ruderals and scrub. The bare ground, ruderal vegetation and developing grassland on recently formed substrata qualify the majority of the area as an example of the priority habitat 'open mosaic habitat on previously developed land'.
- 8.4.16 The definition of Open Mosaic Habitat on Previously Developed Land used in the UK BAP⁷ requires that each of the following criteria are met:
1. *The area of open mosaic habitat is at least 0.25ha in size.*
 2. *Known history of disturbance at the site or evidence that soil has been removed or severely modified by previous use(s) of the site. Extraneous materials/substrates such as industrial spoil may have been added.*
 3. *The site contains some vegetation. This will comprise early successional communities consisting mainly of stress-tolerant species (e.g. indicative of low nutrient status or drought). Early successional communities are composed of (a) annuals, or (b) mosses/liverworts, or (c) lichens, or (d) ruderals, or (e) inundation species, or (f) open grassland, or (g) flower-rich grassland, or (h) heathland.*
 4. *The site contains unvegetated, loose bare substrate and pools may be present.*
 5. *The site shows spatial variation, forming a mosaic of one or more of the early successional communities (a)–(h) above (criterion 3) plus bare substrate, within 0.25ha.*

⁷ DEFRA (2010). UK Biodiversity Action Plan Priority Habitat Descriptions Open Mosaic Habitats on Previously Developed Land (Updated July 2010). <http://jncc.defra.gov.uk>

- 8.4.17 These criteria are met over the majority of the study area. The qualifying habitat would include most of the area that is used by motorcycles, which maintains the open conditions with bare ground and early successional plant communities (approximately 10ha of qualifying habitat). This area of BAP priority habitat is evaluated as being important for nature conservation in a County context. The densest scrub, tree planting areas and longer established grassland habitats near the periphery of the site do not support sufficient open ground to be included in the DEFRA criteria, although they do contribute to the overall mosaic of habitat diversity.
- 8.4.18 The main areas of flower-rich neutral grassland (TN5, 7, 9, 10 and 15) have established on the re-engineered tip surface that was capped and sown with wildflower seed in 2001. A small remnant of the former frag tip that was not capped and reprofiled is still present near the steelworks fence at TN9, although this has mostly become over-shadowed by dense Butterfly Bush scrub. Because of its recent origin and establishment from wildflower seed this habitat is not considered as important or fragile as an ancient grassland would be because it could be readily re-created in a few years, given a similar range of starting conditions and similar wildflower seed. However, for the purposes of this assessment it is evaluated on the basis of the plants and invertebrates it supports, which would also measure it as being important in a county context (see the following sections).
- 8.4.19 The area of dense scrub and landscape planting mostly support a relatively limited range of tree and shrub species, and none are considered especially rare. However, they provide an element of structure to the habitat and cover for a range of wildlife, such as common birds and insects, and are evaluated as being valuable for nature conservation within the development site boundary.
- 8.4.20 The upper shoreline is largely formed from slag and rubble that has eroded from the tip. It supports very few plant species and there is no significant strandline vegetation. The part that lies within the study area boundary lies outside of the Severn Estuary protected site, and the previous studies have not shown it being used by roosting shore-birds or supporting any of the plant communities that are features of the SSSI or SAC. However, it is likely to be used by birds and insects at a small-scale, and it may be used by animals following the coast. The shoreline habitat is evaluated as being valuable for nature conservation within the development site boundary.

Plants

- 8.4.21 A total of 204 species of vascular plants have been observed within the study area during the recent surveys. On a disturbed site with transitional habitats like this, it is possible that other plants might also be present that only occur at a very low density, or which flower very early in the year.
- 8.4.22 None of the plant species recorded to date receive special protection under the Wildlife and Countryside Act or are listed in the Cardiff or UK BAP, or in the Environment (Wales) Act Section 7 list of species of principal importance for nature conservation. However, several of the plants are considered locally significant because they are uncommon in south Wales. The Wildlife Sites Guidelines lists Primary Species (PS) and Contributory Species (CS) according to their rarity

within Wales. The presence of one Primary Species or five or more Contributory Species is one of the qualifying criteria for considering a site of nature conservation significance in a county context.

8.4.23 In this case the following Primary and Secondary species have been recorded:

- Dittander (PS) (in 2014 & 2017);
- Great Lettuce (PS) (in 2014, possibly still present at low density);
- Bee Orchid (CS) (in 2017);
- Buckthorn (CS) (In 2017, planted in landscape planting);
- Grass Vetchling (CS) (in 2014, probably still present);
- Hairy St.John's-wort (in 2017);
- Meadow Crane's-bill (CS) (in 2014 & 2017);
- Pale Flax (CS) (in 2017);
- Pyramidal Orchid (CS) (in 2014, probably still present);
- Viper's Bugloss (CS) (in 2014 & 2017);
- Yellow-wort (CS) (in 2014 & 2017).

8.4.24 The uncommon species contributing to the wildlife sites flora criteria include several species that were clearly planted (e.g. Buckthorn) or probably introduced artificially by wildflower seeding (for example the Grass Vetchling, Meadow Crane's-bill and Pale Flax). Furthermore, the diversity is very variable within the study area, and several of the uncommon species are only present in small quantity (e.g. only a single plant of Great Lettuce was seen in 2014, and the Dittander is mostly confirmed to a small part of the site at TN14). Even after taking these factors into account, the site is evaluated as being important for its flora in a county context.

8.4.25 In addition to the flora assessment criteria, a number of plants observed are listed in the Wildlife Sites Guidelines habitat quality indicators of Open Mosaic Habitat on Previously Developed Land. One of the criteria for considering a site important in a county context is the presence of 20 or more such indicators. In this case a total of 49 indicators have been recorded (see full list in Appendix 8.1). This supports the habitat assessment above.

8.4.26 The few bryophyte species identified during the survey are very common ones that would be expected in grassland and disturbed ground. There were no signs to suggest that the site might support any uncommon moss or liverwort species, particularly given the relatively recent origin of the habitats. It is feasible that some of the metal-rich slag could become colonised by unusual species of moss or liverwort in time, but the bryophyte flora is not currently considered significant for nature conservation, even within the site.

8.4.27 Several plants of Japanese Knotweed were observed on the site. They were mostly small and near to the motorcycle tracks and Rover Way. It is possible that additional small Knotweed plants might have been overlooked. Other non-native invasive species listed on Schedule 9 of the Wildlife and Countryside Act included the shrubs Wall Cotoneaster and Entire-leaved Cotoneaster, which are both present in very small quantity. Sea Buckthorn is also present, and is not native in South Wales. This is not listed on Schedule 9, but it can develop into dense thickets and become problematic for management on some sites. These species have no

significant value for nature conservation but should be factored into any subsequent design for the site.

Fungi

8.4.28 A very small number of common fungi were recorded in grassland, on dead wood, and in association with the recently planted trees, and fungi will undoubtedly become more evident as the site matures. However, none of the fungi recorded to date are rare or have any special value for nature conservation, and the habitats would not be expected to have any significance for fungi. They are therefore considered not significant for nature conservation, even within the site.

Invertebrates

8.4.29 The specialist survey of bees and wasps was undertaken during late July/ Early August 2017. This confirmed the presence of 19 species of social and solitary bees and wasps, including the Brown Banded Carder Bee (*Bombus humilis*) which is listed as a Priority Species in the UK BAP and included in the Environment (Wales) Act Section 7 list of species of principal importance for nature conservation. The survey recorded several other notable bees and other insects. These are summarised below:

Bees

- Brown-banded Carder-bee (*Bombus humilis*). UK BAP Priority and Environment (Wales) Act S7.
- Red-tailed Cuckoo Bee (*Bombus rupestris*). Nationally notable.
- Painted Nomad Bee (*Nomada fucata*). Nationally notable.
- Chalk Yellow-face Bee (*Hylaeus dilatatus*). Locally significant.
- Spined Mason Bee (*Osmia spinulosa*). Locally significant.

Other insects

- Cinnabar Moth (*Tyria jacobaeae*): UK BAP and Environment (Wales) Act S7, for research purposes.
- Six-belted Clearwing (*Bembecia ichneumoniformis*). Nationally notable.
- Long-winged Conehead (*Conocephalus discolor*). Wildlife Sites Guidelines SINC species.
- Adonis Ladybird (*Hippodamia variegata*). Locally significant.
- Cinnamon Bug (*Corizus hyoscamii*). Locally significant.
- Hornet Hoverfly (*Volucella zonaria*). Locally significant.

8.4.30 The peak flight period for many bee and wasp species is April to June, so it is likely that many other species are present that would not have been recorded by a survey in July/August.

8.4.31 The mix of flower-rich grassland and areas of open ground, especially with sunny, south-facing banks provides ideal habitat for bees and wasps, as well as many other invertebrates. A moderate number of butterflies and moths were observed during the habitat surveys. These

were mainly observed in the flower-rich grasslands at TN7, 9, 10 and 11. The bee survey assessed the site as being of at least local importance based on the 2017 findings. However, it was considered that further surveys would add many more species to the invertebrate list and it would be likely to be of county significance for nature conservation given the nature of the habitats and the presence of scarce species (Olds, pers.comm.). The EcIA guidelines state that a precautionary principle should apply in cases where there is uncertainty. So, in this case it should be assumed that the site is of importance for invertebrates in a County context.

Amphibians

8.4.32 No amphibians were observed during the surveys or noted in the 2014 data search. The only potential breeding sites for amphibians on the site are the shallow ditch at TN4 and some of the puddles in the motorcycle tracks. These transitory features could feasibly be used by Common Frogs or Smooth Newts, but the probability of the site supporting a significant amphibian population is considered very unlikely.

8.4.33 The site is not directly connected to any good quality amphibian habitat. There are probably some amphibian species using the nearby SINC at Pengam Moors to the north, but it is unlikely to have been colonised by many amphibians or developed a large population of them since the tip was reprofiled in 2009. The presence of a few amphibians cannot be ruled out, so for the purposes of the assessment they are considered significant for nature conservation within the site boundary.

Reptiles

8.4.34 No reptiles were observed during the habitat surveys or data search. The patchy mix of vegetation and bare ground, with a mix of different slopes and substrata appears potentially suitable for them, especially since it is developing substantial areas of grassland habitat. However, the re-engineering of the tip in 2001 and 2009 would have involved clearance of virtually all of the vegetation and potential cover for reptiles while the work was carried out, and this lack of cover would have persisted for several years afterwards. Therefore, there has only been a relatively short time for the habitats to develop and become colonised by reptiles.

8.4.35 A reptile survey was undertaken during September 2017, and this found no evidence of reptiles within the site. On the basis of the lack of findings and the limitations affecting potential colonisation, it is assumed for the purposes of the assessment that the site supports no reptiles, or that numbers of any animals present are too low to be detected. The nature conservation value of the site for reptiles is therefore assessed as not significant, and they are not considered to be a constraint to the proposed project.

Birds

8.4.36 The data search listed a large number of bird records. The majority of these were recorded on the mudflats and foreshore but were provided on a 1km grid square basis so their precise location was not known. Many of the species have only been recorded once or on a small number of occasions. The site's location is likely to be a key factor in the high number of bird species recorded, particularly as it provides habitat for terrestrial and coastal species, and

because many bird species follow the coast during migration, and because the seafront is a popular site for bird watching.

8.4.37 The studies carried out for the proposed wind turbine involved a series of 12 three-hour vantage point bird surveys between October 2014 and March 2015. The main objective for the study was to observe the distribution and movements of the key species for which the Severn Estuary protected sites are designated. It also provided observations of bird species using the terrestrial habitats. The species observed during the study are summarised in Table 8.1 below. [In the table + indicates the habitats where they were recorded. (+) indicates where a species was only recorded flying over the tip.]

Table 8.1. Summary of birds observed during 2014-5 winter bird survey.

Species	Shore/ mudflats	Terrestrial habitat
Blackbird		+
Black-headed Gull	+	+
Blue-tit		+
Buzzard	(+)	+
Canada Goose	+	(+)
Carrion Crow	+	+
Chaffinch		+
Chiffchaff		+
Cormorant	+	(+)
Curlew	+	
Dunlin	+	
Duncock		+
Feral Pigeon		+
Gadwall	+	
Goldfinch		+
Herring Gull	+	+
Kestrel		+
Lesser Black-backed Gull	+	+
Linnet		+
Long-tailed Tit		+
Magpie		+
Mallard	+	+
Meadow Pipit		+
Mute Swan	+	
Oystercatcher	+	
Peregrine	(+)	(+)
Pied Wagtail		+
Pintail	+	
Raven	+	+
Redshank	+	
Robin		+
Shelduck	+	
Shoveler	+	
Song Thrush		+
Sparrowhawk		+
Turnstone	+	
Wren		+

8.4.38 The waders and wildfowl for which the Severn Estuary is designated all use the intertidal and coastal habitat beyond the development site boundary, and their greatest numbers are seen

during the winter. None of them use the tip as a roost site or breeding site and there do not appear to be any regularly used flight lines over the site.

- 8.4.39 The most frequently observed birds of prey using the site are Buzzard and Kestrel, which appear to favour the longer grass areas. The 2015 study also observed Sparrowhawk and Peregrine. Previous records of birds of prey nearby have also included Merlin, Marsh Harrier, Short-eared Owl and Barn Owl. These mainly refer to pre-2000 observations from the wider area rather than the site itself. Many past observations were of a pair of Barn Owls that bred in the steelworks during the 1980s.
- 8.4.40 Very few birds were observed in the scrub and ruderal vegetation. The scrub is undoubtedly used by several species as a breeding habitat. The species seen in recent surveys that are most likely to breed within the study area include Blackbird, Dunnock, Linnet, Magpie, Robin, Song Thrush, Whitethroat and Wren. Of these, the most significant is Linnet, which is a Cardiff LBAP and UK BAP species. It is feasible that some ground nesting birds might use the area as a breeding site. A pair of Oystercatchers laid a clutch of eggs in similar open-ground habitat within the nearby water treatment works in 2015 (P.Sturgess, pers.obs.) although this was unsuccessful, probably due to predation by gulls. It is possible that the developing grassland habitat could provide nest sites for Skylark and Meadow Pipit. The site is evaluated as being important for breeding birds in a Local context. It is also considered to have a similar level of value to birds from the wider areas as a feeding area, and also providing cover to birds on migration.

Mammals

- 8.4.41 Neither the survey nor data search confirmed any protected species of mammals within the site. There are no buildings, large trees or other structures suitable for roosting bats. Bats are known to occur nearby and they probably forage over the general area at least occasionally, especially following the sheltered scrub margins.
- 8.4.42 Otters are likely to pass along the coast from time to time, and where the wave protection has been eroded away from the front of the tip there is potential for them to use gaps behind the overhanging plastic sheeting as resting places. Otters could feasibly also use the dense scrub. However, there have been no records of Otters during the recent habitat surveys or the data search. It was not possible to search all of the dense scrub in detail during the habitat survey, but there were no signs of Badger activity at the scrub margins. The possibility of a sett being present is considered extremely low because of the limited depth of soil over the tip liner in this area, and the distance from other known Badger populations.
- 8.4.43 The site appears to support a large population of rabbits, especially in the areas of dense scrub. The survey also noted evidence of Fox and several runs in long grass areas that were made by small mammals such as mice and voles. Overall, the site is evaluated as being important for mammals within the site boundary.

Summary of Ecological Features

8.4.44 A summary of the ecological features described above and their value at a geographical scale are summarised in Table 8.2. Only the habitats and species features identified at a value of 'within the site boundary' or above have been included and are considered further in this assessment. Areas of roads and unvegetated hard-standing were considered of negligible value. Species that were searched for and considered likely to be absent, such as reptiles and Badger are also omitted from the table.

Table 8.2: Summary of ecological features

Ecological feature	Value (at geographical scale)
Severn Estuary	International (outside application boundary)
Rumney and Peterstone SSSI	National (outside application boundary)
Pengam Moors SINC	County (outside application boundary)
Rhymney River and associated SINC	County (outside application boundary)
Tidal Sidings and Cardiff Heliport SINC	County (outside application boundary)
Open Mosaic Habitat on Previously Developed Land /flower-rich grassland	County
Scrub and landscape planting	Within site boundary
Upper shoreline	Within site boundary
Plants	County
Invertebrates	County (precautionary assumption)
Amphibians	Within site boundary (precautionary assumption)
Birds (within site)	Local
Mammals	Within site boundary.

8.5 POTENTIAL IMPACTS

- 8.5.1 The following section considers the overall effect of the development on the ecological features, assessing the effects that would arise from construction and operation of the proposed development. These include both adverse and beneficial effects.
- 8.5.2 In considering the likelihood of a significant ecological impact on each of the ecological features, consideration is given to factors such as whether the impact is likely to be beneficial or adverse, magnitude (size) of the impact, extent, duration, timing and frequency and reversibility. Where the likelihood of an impact occurring is indicated, a certain impact is estimated at 95% chance or higher; likely or probable indicates an estimate between 50% and 95% probability, and unlikely indicates less than 50% probability.
- 8.5.3 Only the ecological features that are considered to be of value at or above 'within site boundary' have been included in the impact assessment (for example, fungi are not assessed). Although not all impacts are identified as being ecologically significant (that is the integrity of the feature may not be affected) there is still the possibility for beneficial or adverse effects on certain features of value at a given geographical scale. In the case of any adverse effects, appropriate mitigation measures are considered.
- 8.5.4 The current application is an outline proposal, so precise details will be subject to the final design. Therefore, this assessment has based the evaluation of impacts on the illustrative site layout plan for the site (Appendix 3.1). This masterplan and the general design principles incorporate all of the key features that will be included in the final design, and have sought to reduce the potential for impacts on the features of highest ecological value; particularly the Severn Estuary and the flower-rich grassland habitat. There will inevitably be some variation in the exact locations of the design features in the final design. In the absence of final details, the evaluation of potential impacts has assumed a likely worst-case scenario, in accordance with the CIEEM guidelines.
- 8.5.5 For the purposes of this assessment, the effects are separated into short-term activities associated with site clearance and construction and long term effects associated with the operational development. Please note that the assessment of impacts presented in this section is in the absence of any mitigation measures, which are summarised in the Mitigation section.

Site Clearance and Construction

- 8.5.6 The following activities and environmental effects are considered as integral to the site clearance/construction:
- Vegetation clearance across the majority of the site;
 - Setting up of contractors compounds and site security fencing;
 - Increase in noise and disturbance levels from presence of workforce and vehicles. At the same time there would be a cessation of disturbance from motorcycling and reduction in numbers of members of the public and dogs;
 - Increase in traffic as contaminated material is removed and new building materials brought to site;

- Reprofilling of ground levels, including removal of contaminated tip material and formation of stable ground conditions for new buildings;
- Temporary changes in hydrological conditions, and possible remobilisation of contaminants, as the old tip is reprofiled; and
- Construction of new industrial units, associated infrastructure and new landscaped landform.

8.5.7 The construction period is likely to be carried out as a series of phases, lasting approximately 2 years. The majority of the habitat loss during this period will be during the initial enabling works as the existing capping to the tip is removed and the site re-profiled. Construction impacts during the later stages will mainly be due to disturbance as the new industrial infrastructure is built.

8.5.8 The proposed construction would be phased in such a way that the initial works along the shoreline would be carried out during the summer months, when there are relatively few birds using the estuary. This would form a bund, which would fulfil a coastal protection and landscaping role, and would serve as a barrier between the work site and the estuary. After the bund is completed the work would continue inland of it.

Protected Sites

8.5.9 The development would not result in any loss of habitat within the Severn Estuary protected site. However, there is potential for direct disturbance to the upper shore while the eroding seaward edge of the tip is reprofiled and the new coastal bund formed. This part of the shoreline is entirely formed from slag and other industrial waste, so there would not be any loss of habitats for which the estuary is protected.

8.5.10 There is a risk of disturbance of overwintering and migratory estuary birds by construction noise and vibration while the work is undertaken. Visual disturbance due to the presence of people and machinery is also possible. The construction of the coastal bund during the summer months would be at a time of year when relatively few birds use the estuary, and the physical presence of the bund would reduce the potential for disturbance of the estuary once it is completed. It is likely that birds feeding out on the mudflats in front of the tip would quickly become habituated to construction noise behind the coastal bund. The previous studies of wintering birds have shown that birds do not remain in this area at high tide; preferring to head east towards the mouth of the Rhymney as the tide rises, so very few estuary birds would be expected to use the upper shoreline directly in front of the proposed development. In the absence of any specific mitigation, there is the potential for minor disturbance of birds at a very localised level, but there would be no significant impact on the overall protected site. (Additional mitigation is discussed later in this document.)

8.5.11 There is potential for an increase in contamination of the estuary habitats during re-working and removal of the tipped slag and other waste material. This could occur as contaminants are mobilised through crushing or disturbance of slag, and leached as soluble materials, or as suspended particulate materials washed down by rain, or as wind-blown dust. The highest risk would be during the initial construction of the coastal bund, during which the currently eroding shoreline would be re-worked. The existing contamination by slag in this area does not appear

to be having an adverse effect on the use of the adjacent mudflats by birds. Once the bund has been formed the remaining material would be more easily subject to containment measures. Any re-working of the tip would at least follow the minimum legal requirements to minimise the risk of pollutants entering the estuary, and it is not envisaged that any harmful increase would occur. Current levels of contamination from the eroding tip and broken membrane, and detailed mitigation measures for control of potential pollutants, are discussed in chapter 7 of this ES and are not repeated here. After the coastal bund is completed, the containment measures for reprofiling the remaining slag would probably mean that levels of pollution entering the estuary through the remainder of the construction period are below the current levels. In the absence of any specific mitigation, there is the potential for minor, short-term release of contaminants into the estuary while the coastal bund is formed, but this is unlikely to be a significant increase above the existing levels, particularly given the dilution effect by the tide, and there would be no significant impact on the protected site.

8.5.12 The works will require a temporary re-routing of the coastal footpath. This could potentially result in walkers and their dogs walking along the foreshore. However, the number of people using this part of the coast is very low, so even if people do walk along the shore the potential impact on estuary birds would be no significant impact on the overall protected site. Specific mitigation for this is discussed later in the ES.

8.5.13 Overall, the construction works are considered to have no significant impact on the Severn Estuary during construction. There would probably be some minor and localised effects near the shoreline, but these would not affect the conservation status of any of the key features of the protected site.

8.5.14 Rumney and Peterstone SSSI lies 2.5km outside the site boundary. At this distance, it is extremely unlikely that any potential construction impacts would affect the SSSI. Therefore, no significant impact is anticipated and no mitigation considered necessary.

8.5.15 Pengam Moors SINC lies approximately 20m outside the boundary at its closest point. It will not suffer any direct construction impacts but could potentially be subject to construction noise and dust. However, the site is already subject to noise and dust from the adjacent steelworks. In addition, Rover Way lies between the development site and the SINC and this is already subject to very heavy traffic from cars and lorries. Emissions of noise and dust would need to be within limits imposed by Cardiff Council. Taking all these factors into account any minor increase from the proposed construction works would have no significant impact on the SINC.

8.5.16 The other SINCs discussed earlier in the assessment all lie at least 500m away from the development site. Their particular features of interest are mainly plants, insects and birds, and these are unlikely to be affected by the construction works. There would be no significant impact on any of these sites during construction.

Habitats

8.5.17 The Open Mosaic Habitat on Previously Developed Land and flower-rich grassland on the capped tip would be removed in order to access and remove the tipped material beneath it, and facilitate the reprofiling work. A small quantity of grassland at the perimeter, mainly at the

south-west end of the site would probably remain *in situ*. The construction phase would result in a loss of at least 95% of the flower-rich grassland. New grassland would be established over the new landform near the end of the construction phase, but this would occupy less than the existing area. This is therefore assessed as a certain adverse impact.

8.5.18 The scrub and landscape planting over most of the site would be removed during the construction period, to reprofile the tipped material beneath the existing cap. A small amount near the south-western access road might remain, at least in the short term. There would be a loss of at least 95% of the scrub and landscape planting during the construction phase. The new landform would be landscaped at the end of the construction phase, and a smaller area of new trees and shrub would be planted. This habitat would therefore be subject to a certain adverse impact.

8.5.19 The upper shoreline would be reworked at the start of the construction phase to form the new coastal bund. It is likely to require the loss of most of the existing shoreline as the existing tip membrane is accessed and the coastline reprofiled and strengthened. There would be temporary disruption of at least 95% of the upper shoreline, although an equivalent length of reinstated shoreline would be re-established by the end of the construction phase. The disturbance is assessed as a certain adverse impact.

Plants

8.5.20 The notable plant species would be lost during the removal of the vegetation from the tip, with the possible exception of a small number near to the perimeter. In the absence of mitigation this is assessed as a certain adverse impact on plants during the construction phase.

Invertebrates

8.5.21 The notable insect species would be lost during the removal of the vegetation from the tip. Even assuming that small numbers of plants remain at the site margins, these may not be sufficient to support any invertebrate populations. In the absence of mitigation this is assessed as a certain adverse impact on invertebrates during the construction phase.

Amphibians

8.5.22 All potential cover for amphibians would be lost during the construction phase. Therefore, if any amphibians are present, there would be a certain adverse impact on them during the construction phase. The creation of the new infiltration pond may provide a potential new breeding habitat for amphibians if it is accessible to them and develops at least some marginal vegetation. In the absence of mitigation, the pond would be a possible beneficial impact, depending on whether the site is recolonised by amphibians in the long term, and assuming that the design is suitable for them.

Birds (within site)

8.5.23 Site clearance would result in the loss of all areas of dense and scattered scrub, tall ruderal vegetation and tussocky grassland area which birds might potentially nest in. There would be

no nesting habitat for birds through the duration of the construction period, so this is assessed as a certain adverse impact on nesting birds. The nests of all wild birds, while they are being built or used, are protected under the Wildlife and Countryside Act 1981, so this legislation would have to be taken into account when the vegetation clearance takes place.

8.5.24 There would be a loss of feeding habitat for birds that use the tip on an occasional basis, such as birds of prey. There would therefore be a certain adverse impact on bird feeding habitat within the site.

Mammals

8.5.25 All cover and breeding habitat for mammals would be removed during the site clearance works. The construction impact would therefore be assessed as a certain adverse impact. But this would not be significant because it would only affect a small number of individuals of a common species. Mammals are protected from certain harmful activities by the Wild Mammals Protection Act, so this legislation would be taken into account when the vegetation clearance takes place.

Operational phase

8.5.26 The operational phase assessment assumes that the new industrial units and all associated infrastructure have been completed and the new landscaping work has been implemented. As with the consideration of construction impacts, the assessment in this section does not include specific mitigation measures; these are described in the mitigation section which follows. The operational stage will take into consideration the following likely impacts:

- Changes in hydrology (run off rate/quality);
- Disturbance from people and traffic; and
- Disturbance from artificial lighting.

8.5.27 During the operational phase the industrial units would be screened from much of the surrounding area by the new bunding. The landscaping around the industrial areas would be managed as new grassland and scrub.

Protected sites

8.5.28 The industrial infrastructure would be separated from the shore by the new coastal bund. The development would therefore not have any direct impact on any habitat within the Severn Estuary protected site during its operational phase.

8.5.29 The noise levels reaching the estuary from the industrial units are unlikely to be any greater than the current motorcycle track, or nearby Water Treatment Works, particularly because the bund would absorb much of the sound produced near ground level within the industrial area. The risk of noise disturbance to waders and wildfowl using the mudflats is considered negligible because birds readily become habituated to low levels of industrial noise. Operational noise would therefore have no significant impact on the protected site.

- 8.5.30 The re-routing of the coastal footpath along the coastal bund has potential to cause disturbance to birds, because users on the path will be less screened than they are at present. However, the numbers of people using the path are generally very low and waders and wildfowl feeding on the mudflats at low tide are no more likely to be affected by people on it than they are at present because the tide falls so far from the shore. In addition, birds do not generally remain in front of the tip at high tide, so the potential for disturbance as the tide rises is relatively low. The greatest potential source of disturbance to birds is people with dogs walking along the shore, and this is unlikely to change due to the proposed development. There would therefore be no significant impact on birds using the protected site as a result of disturbance during the operational phase.
- 8.5.31 The potential for contaminants to be released from the tip into the estuary during the operation phase would be reduced from the existing level as a result of the remediation work along the shoreline and the removal of waste and re-capping of the tip and long-term soil washing facility. There should therefore be a benefit to the protected site. However, given that the existing levels of contamination do not appear to be having any adverse effect, there is probably no significant impact in the context of the overall protected site.
- 8.5.32 The power station has been removed from the previous application and the new industrial units would not be used for processes likely to produce environmentally damaging gaseous emissions. Therefore, aerial emissions would have no significant impact on the protected site.
- 8.5.33 Artificial lighting at the operational site has the potential to affect birds using the estuary. However, if external lighting is used it would generally not be directed towards the shore, and the majority of any light-spill would be blocked by the coastal bund. Artificial lighting has been demonstrated to benefit some wading birds⁸, but in this case, there is probably no significant impact due to the presence of the bund.
- 8.5.34 The operational phase of the development would have no direct effects on any of the nearby SINC sites. Neither do there appear to be any mechanisms by which indirect effects such as emissions, hydrology or disturbance effects might influence the flora or fauna within the SINCS. It is therefore concluded that there would be no significant impact on them.

Habitats

- 8.5.35 The majority of the margins around the site would be landscaped with a grassland seed mix with areas of scrub planting. In the absence of mitigation this would be of lower value than the existing flower-rich grassland and open mosaic habitat and without management it would eventually become overgrown by coarse grasses and a higher proportion of low diversity scrub. Therefore, in the absence of mitigation this is assessed as a certain adverse impact.
- 8.5.36 New areas of scrub and tree planting would be established on the reprofiled landform. These would occupy a much smaller area than the existing situation. In the absence of mitigation or management the scrub would probably support a relatively low diversity ground flora and would

⁸ Dwyer, R. G., Bearhop, S., Campbell, H. A. and Bryant, D. M. (2013), Shedding light on light: benefits of anthropogenic illumination to a nocturnally foraging shorebird. *J Anim Ecol*, 82: 478–485

undoubtedly become colonised by common and widespread plants and animals. The scrub habitat would remain largely undisturbed by the works taking place in the industrial units. Overall, the operational phase would probably have no significant impact on scrub and tree planting.

- 8.5.37 The current coastal erosion of tipped waste would have been halted by the reinstatement works along the shoreline, and this strip would remain unaffected by any operational works in the long term. There would therefore be no significant impact on the shoreline through the operational phase.

Plants

- 8.5.38 In the absence of mitigation, the landscaped areas are unlikely to support the same botanical diversity or number of notable plant species during the operational phase of the works. Without management, the grass would probably develop into a species-poor tussocky sward dominated by grasses rather than flowering herbs. The strip closest to the shore would probably be maintained in a slightly more diverse state by exposure to coastal wind and salt-spray, but in time would probably lose diversity due to scrub development. Overall, the operational phase without mitigation would have a probable adverse impact on plants.

Invertebrates

- 8.5.39 The grassland and scrub in the landscaped areas would be expected to support a moderate range of invertebrates. It is likely that without specific mitigation to encourage the uncommon species that currently occur on the site the invertebrate fauna would largely be limited to common and widespread species, although some species that require bare ground may be able to colonise areas beside the new roads and paths. Without management, the value of the landscaping for uncommon invertebrates would probably decline as the botanical diversity declines during the operational phase of the works. Overall, the operational phase without mitigation would have a probable adverse impact on invertebrates.

Amphibians

- 8.5.40 The new landscaping would include grassland and scrub and they may be able to access the new pond. However, the extent of potential foraging habitat for any amphibians that might colonise the site would be much less than the current situation. There would also be several potential hazards for them during the operational phase, including traffic and roadside drainage gullies associated with the new site infrastructure. On balance, the provision of habitat would probably off-set the negative aspects of the new roads, particularly as the industrial units would mostly be used during daylight hours. In the absence of mitigation, the operational phase is evaluated as having probably no significant impact on amphibians.

Birds (within site)

- 8.5.41 Nesting and feeding habitat for birds within the development site would be available on the reprofiled and landscaped bunds during its operational phase, although the amount of scrub would be substantially reduced from its current extent, so the numbers of nesting birds would

almost certainly be lower, even if there are more ground-nesting species. The roofs of the new buildings would probably become adopted as roost sites for gulls, and possibly birds of prey. There would be noise and regular vehicle movements associated with the industrial units, and pedestrians and dog-walkers along the coastal footpath, but it is likely that any birds would adapt to this type of ongoing low-level disturbance. Overall, without mitigation, the operational phase of the project would have no significant impact on birds within the site.

Mammals

- 8.5.42 The new bunds around the operational development would probably not support as many mammals as currently use the site due the overall reduction in landscaped area. Potential for Otters along the coastline would be more limited due to the reduction in scrub and repair of the upper shoreline. However, the landscaped area would become tussocky without any management, and support an increasing amount of scrub. This could provide good conditions for a range of common mammals. There could also be potential for a larger number of less desirable species such as rats and mice, in association with the new buildings. In the absence of mitigation, the activities associated with the operational phase would have no significant impact on mammals.

8.6 PROPOSED MITIGATION AND ENHANCEMENT

8.6.1 There are numerous options for including mitigation and enhancement measures into the design, but as this application is for outline planning permission the precise detail will need to be worked out in due course and approved as part of the final design. Therefore, the mitigation included in this section is limited to broad principles. Some key elements that limit the impacts of the project on wildlife have been included as part of the main construction approach, for example, the location of the coastal bund, sequencing of construction operations that would minimise impacts on the Severn Estuary, and provision of the soil washing facility and pond. Other parts of the mitigation would include:

- The clearance of scrub vegetation will be undertaken outside the bird nesting season (avoiding work between March and August inclusive). If this is not feasible any clearance will be preceded by a bird survey so that any nests can be afforded as much protection as possible;
- The scrub clearance will be undertaken in a manner that would allow any wild mammals that might be present to escape unharmed (for example, cutting the scrub using chainsaws and brush-cutters prior to clearance, rather than simply bulldozing it);
- The construction of the coastal bund will take place during the summer (April to September) to minimise potential disturbance of birds in the Severn Estuary. The coastal footpath will be re-routed onto the foreshore during the summer months while the coastal bund is formed (subject to agreement by Cardiff Council). The temporary route will be lined with Heras fencing to minimise impacts to the foreshore whilst the path is diverted. In addition, appropriate signage will be provided to minimise potential disturbance from people and dog-walkers using the shoreline. The works on the coastal bund will be completed in time for the final line of the footpath to be made available along the bund in time for the winter months, to ensure disturbance of the foreshore during this time is minimised;
- A working method will be agreed with NRW to minimise disturbance of estuary birds during the winter (this might include, for example, provision of temporary screening by Heras fencing and green Fencenet mesh (or similar) along the top of the bund, limiting certain operations to low tides, and ensuring that no construction personnel or their vehicles access the foreshore without authorisation from the site foreman).
- The new landform will be capped with subsoil and slag (not topsoil) and seeded with a wildflower seed mix. This low-nutrient substratum will encourage a short sward with a high proportion of flowering herbs rather than grasses. It will also provide more open structure within the sward which would favour some of the less common invertebrate species. The seed-mix will include a range of herbs to provide flowers throughout the summer, following the recommendations of the specialist bee survey. Based on the outline planning layout the area of new landscaping habitat would be a minimum of 3.1 hectares, which would mostly be flower-rich grassland;
- The new landform will include a series of south-facing ridges to maximise the value of the habitat for uncommon invertebrates;
- Scrub planting on the new landform will be limited to native tree and shrub species and the layout will be designed to provide localised patches of shelter for wildlife

while prioritising the area available to support diverse grassland habitat of value for plants and insects;

- The landscaped area will be maintained in accordance with a habitat management plan, aiming to maintain a high-quality mix of habitats that would meet the SINC qualification criteria and provide suitable habitat for the Brown-banded Carder Bee. The grassland will be managed by occasional mowing, carried out on a rotational basis so that not all of the area is cut in a single year, and a range of grassland height and density is maintained, and there is always some long grass left overwinter for bees and any reptiles that might colonise the site. Scrub will be cut back periodically to prevent it from spreading and keep it in favourable condition for wildlife;
- The Schedule 9 non-native invasive plant species (including Japanese Knotweed) will be removed, and the site maintained free of these in the long term. Butterfly Bush is not a Schedule 9 species but is abundant in nearby areas and has the potential to expand quickly over the new landscaping area, so this will also be regularly controlled;
- New paths through the landscaped area (including the coastal footpath) will be surfaced with free-draining materials such as hoggin, and kept free from shading scrub and other overhanging vegetation. This will help to maintain habitats suitable for insects that require open ground and sunny edges;
- The pond in the final solution will need to be designed with gently sloping, vegetated margins, although current plans are indicative only. It will also attempt to maximise its potential value for wildlife, seeking to increase the biodiversity net gain, rather than solely for its engineering function; and
- Nest-boxes will be integrated into the design of the new buildings to compensate for the reduction in available nesting habitat. These will inevitably cater for a different range of bird species but will include provision for species which are currently conservation priorities. In particular, the new design will include a minimum of 20 Swift Boxes. If feasible a Peregrine or Kestrel nest box will also be installed on one of the taller industrial units.

8.7 RESIDUAL IMPACTS

8.7.1 The impact assessment presented earlier in this chapter was on the basis that no mitigation, other than that integral to the development layout would be applied. The following section reassesses the ecological features taking the mitigation into account. For ease of reference, a table is presented at the end of this section (Table 8.3) summarising the impacts of the scheme on each of the ecological receptors with and without mitigation (i.e. the residual impact).

Protected sites

8.7.2 The proposed working methods during construction have the potential for minor disturbance of birds using the Severn Estuary at a very localised level. With additional mitigation, potentially including screening and avoidance of working during high tides through the winter, and re-routing the coastal footpath inland of the works, this additional disturbance could be reduced further but probably not eliminated completely. Even so, the residual impact on estuary birds during construction is assessed as neutral.

8.7.3 The potential for contamination of the Severn Estuary during construction and operation was judged to be not significant impact based on the proposed working methods, and consideration of existing contamination. There is potential for minor increase during construction of the coastal bund, and overall long-term reduction during the operational phase, but no additional mitigation is proposed, and the residual impact from potential contamination is assessed as neutral.

8.7.4 None of the nearby SSSIs or SINCs would be impacted by the proposed construction or operation of the development, so no further mitigation is required and the residual impact on them is assessed as neutral.

Habitats

8.7.5 All of the habitats within the site would be subject to a certain adverse impact during construction. This is unavoidable due to the requirement for reprofiling the former tip and removing waste materials. Mitigation will be implemented to ensure that the work is undertaken in keeping with wildlife protection and welfare legislation, but the residual impact of the construction would remain as a certain adverse impact on all of the habitats.

8.7.6 The implementation of the new landscaping and its associated mitigation strategy would ensure that flower-rich grassland and patchy scrub is reinstated in the majority of the landscaped area around the new development. The proportion of scrub and larger areas of bare ground would be substantially reduced from their current extent, but the new habitat management would ensure that it is maintained in favourable condition for a high diversity of plants and invertebrates. The current area of flower-rich grassland is approximately 4 hectares, with approximately 5 hectares of sparsely vegetated open-mosaic habitat and ruderal plants, and approximately 3.5 hectares of dense scrub and tree planting. The finished area would have about 2.6 hectares of flower-rich grassland and 0.5 hectare of scrub. The mitigation would enable the site to continue to support many of the species that are currently found on the site, but in smaller numbers than at present due to the reduction in area of habitat. The residual

impact on the open-mosaic and grassland habitat, would therefore be a certain adverse impact. The wildlife value of the reduced area of scrub would be maximised by using native species and managing it as several small patches and lines, so that there is a proportionally higher amount of scrub-margin habitat, because this would be better for insect diversity than large blocks of dense, species-poor scrub. However, the residual impact on scrub habitat would also remain as a certain adverse impact due to the scale of the reduction in area.

Plants

The short-term loss of grassland habitat cannot be avoided, so the residual impact due to loss of plants would remain as a certain adverse impact during construction. However, with mitigation and long term management the new landform would be expected to support a diverse flora that would include a good number of plants that are of at least local importance for nature conservation. The most flower-rich areas of the existing site at present are all areas that were sown with wildflower seed on subsoil, which demonstrates that this method should be well suited to developing a diverse sward in this location. In addition to the seeding, it is likely that some plants will be able to colonise the site from nearby habitats, potentially including wind-blown seed from the post-industrial SINC sites to the south-west. After taking account of the new landscaping and positive management, the residual impact on plants in the long term is assessed as a certain adverse impact, although the severity of the impact would be reduced.

Invertebrates

- 8.7.7 Habitat loss while the landform is reprofiled cannot be avoided or mitigated, so the residual impact on invertebrates would remain as a certain adverse impact during construction. However, the new landform will include grassland habitat specifically designed and managed so that it can support a diverse invertebrate flora. The colonisation of the site by notable insect species cannot be guaranteed, but it is likely that some species will find their way to the new habitat from the nearby SINCS and the Gwent Levels SSSI. Maintaining a continuous strip of flower-rich grassland parallel with the shore is likely to be beneficial for notable invertebrate populations in the wider landscape, and should be particularly suitable for species that require large areas or networks of this type of habitat for their populations to remain viable. It is anticipated that flower-rich grassland at this site could contribute to sustaining the populations of Brown-banded Carder Bee and Shril Carder Bee in Cardiff in the long term. With the mitigation in place, the residual impact on insects in the long term is assessed as a certain adverse impact, although the severity of the impact would be reduced and the managed habitat may possibly be beneficial for certain species.

Amphibians

- 8.7.8 There unlikely to be many amphibians on the site, and any that do use the site at present would probably not survive the construction stage of the project. The residual impact on amphibians during the construction phase would therefore be a certain adverse impact if any are present. In the longer term the presence of the new pond and managed grassland habitat would provide a suitable habitat for amphibians when designed accordingly, particularly

because it would introduce potential breeding habitat if the pond is designed so that it could be used by amphibians.

- 8.7.9 Any ongoing risks from traffic would probably be balanced by the improved habitat, and the detailed design could incorporate amphibian mitigation into the drainage system if this is considered a significant risk at the final design stage. Therefore, the residual impact on amphibians would be probably neutral in the long term.

Birds (within site)

- 8.7.10 There would be a substantial loss of potential nesting and feeding habitat within the site during the construction phase. Mitigation would be carried out to ensure that any risks to nests are minimised, but there would still be a residual certain significant impact during construction. The scrub habitat on the new landscaped bunds would be less extensive and more patchy than the present situation, so may encourage a different range of species. The new wildflower grassland habitat could potentially be used by ground nesting birds such as Skylark. In addition bird nest boxes would be incorporated into the new buildings, targeted at attracting species of high nature conservation value. After the mitigation is taken into account the residual impact would remain as a certain adverse impact due to the scale of the reduction in area, but the severity of the impact would have been reduced.

Mammals

- 8.7.11 Almost all of the mammal habitat within the site would be lost during the construction phase. Mitigation would be carried out to minimise harm to mammals during the site clearance, but there would still be a residual certain significant impact during construction. The new landscaped bunds with less cover by scrub is likely to support a different assemblage of mammals in the long term, possibly with a higher proportion of voles and fewer Rabbits, but the overall nature conservation value of the mammal population would be similar to the existing situation. Therefore, after mitigation is taken into account the residual impact would be neutral.

Table 8.3. Summary of residual impacts

Ecological feature and value	Impact before mitigation	Mitigation	Residual impact
Severn Estuary International value. (Outside boundary).	<u>Construction phase.</u> Minor disturbance to birds, but very localised. Minor short term release of contaminants during works on shoreline, but not significantly higher than existing levels. Possible disturbance from users of diverted footpath. Not significant.	Timing of works on foreshore and new coastal bund, and working methods to minimise disturbance and contamination.	Neutral.
	<u>Operation phase.</u> New coastal bund would screen most potential impacts from industrial units. Containment and soil washing would improved on existing release of contaminants. Aerial emissions within acceptable limits. Not significant.	No additional mitigation.	Neutral.
Rumney and Peterstone SSSI. National value. (2.5km outside boundary).	<u>Construction and operation phases.</u> Not significant.	None.	Neutral.
Pengam Moors SINC. County value. (20m outside boundary).	<u>Construction and operation phases.</u> Not significant.	None.	Neutral.
Rhymney River and associated SINCs. County value. (570m outside boundary).	<u>Construction and operation phases.</u> Not significant.	None.	Neutral.
Tidal Sidings and Cardiff Heliport SINCs. County value. (590m outside boundary).	<u>Construction and operation phases.</u> Not significant.	None.	Neutral.
Open Mosaic Habitat on Previously Developed Land and flower-rich grassland.	<u>Construction phase.</u> Certain adverse impact.	Small patches of grassland retained at perimeter if possible.	Certain adverse impact.

Ecological feature and value	Impact before mitigation	Mitigation	Residual impact
County value.	<u>Operation phase.</u> Certain adverse impact if not favourably landscaped and managed.	New flower-rich grassland, designed and managed for plant and insect diversity.	Certain adverse impact, but reduced in severity (still a significant impact due to reduction in extent of grassland habitat).
Scrub and landscape planting. Value within site boundary.	<u>Construction phase.</u> Certain adverse impact	No additional mitigation.	Certain adverse impact.
	<u>Operation phase.</u> Not significant.	New patchy scrub within flower-rich grassland, managed for plant and insect diversity.	Certain adverse impact but reduced in severity (still a significant impact due to reduction in extent of scrub).
Upper shoreline. Value within site boundary.	<u>Construction phase.</u> Certain adverse impact (very short-term).	No additional mitigation. Upper edge would grade into the landscaped grassland.	Certain adverse impact (very short-term).
	<u>Operation phase.</u> Not significant.	No additional mitigation.	Not significant.
Plants. County value.	<u>Construction phase.</u> Certain adverse impact.	Small patches of grassland retained at perimeter if possible.	Certain adverse impact.
	<u>Operation phase.</u> Certain adverse impact.	New flower-rich grassland, designed and managed for plant and insect diversity.	Certain adverse impact, but reduced in severity (still a significant impact due to reduction in extent of grassland habitat).
Invertebrates. County value (precautionary assumption).	<u>Construction phase.</u> Certain adverse impact.	No additional mitigation.	Certain adverse impact.
	<u>Operation phase.</u> Certain adverse impact.	New flower-rich grassland, designed and managed for plant and insect diversity.	Certain adverse impact, but reduced in severity (still a significant impact due to reduction in extent of grassland habitat).
Amphibians. Value within site boundary (precautionary assumption).	<u>Construction phase.</u> Certain adverse impact (if present).	None proposed.	Certain adverse impact (if present).

Ecological feature and value	Impact before mitigation	Mitigation	Residual impact
	<u>Operation phase.</u> Risks to amphibians from traffic and drainage infrastructure would be balanced by the potentially beneficial effects of the new engineering pond, if accessible. Probably not significant if not favourably designed and managed.	New pond would be designed to be favourable for amphibians.	Neutral (if amphibians colonise the site).
Birds (within site). Local value.	<u>Construction phase.</u> Certain adverse impact , due to habitat loss. Mitigation to avoid disturbance to nesting birds would be required.	Mitigation to avoid disturbance to nesting birds.	Certain adverse impact.
	<u>Operation phase.</u> Ongoing impacts probably not significant if not favourably designed and managed. But fewer birds present without mitigation.	New landscaping habitats would be favourable for birds. Nest boxes provided on buildings.	Certain adverse impact, but reduced in severity (with a different assemblage of bird species than existing habitat.)
Mammals. Value within site boundary.	<u>Construction phase.</u> Certain adverse impact due to habitat loss. Mitigation to minimise harm to wild mammals would be required.	Careful site clearance methods to minimise harm to mammals.	Certain adverse impact.
	<u>Operation phase.</u> Ongoing impacts probably not significant if not favourably designed and managed, but fewer mammals present.	No specific mitigation proposed.	Neutral (but a different assemblage of mammal species than existing habitat.)

8.8 CONCLUSION

- 8.8.1 The most important ecological feature in this assessment is the Severn Estuary, with several designations giving it international significance. This lies immediately adjacent to the site so the development proposals incorporate a number of measures to reduce potential disturbance of overwintering estuary birds and limit any temporary increase in the contamination from the tip would mean that there is no significant impact on the protected site during the construction works. The creation of a coastal bund would screen much of the potentially disturbing construction and operational activities, and the removal and remediation of tipped material would ensure that there is no impact on the protected site in the long term. In addition, there would be no impact on the Gwent Levels SSSI or any of the nearby SINC.
- 8.8.2 The features of greatest nature conservation value within the site are the mix of open mosaic habitat and flower-rich grassland, which support a diverse assemblage of wild plants and insects. These are all assessed as being important in a county context, yet they have all developed since 2001, and in the central area since 2009, following previous engineering works on the site. Virtually all of the existing habitats and their associated flora and fauna would be lost during the construction phase, because this would require the whole landform to be reprofiled. This would be a very severe impact, but one of a temporary nature. The proposed development would include at least 3.1 hectares of new landscaping on the bunds around the industrial area. This would represent a substantial reduction in the area of grassland, open mosaic and scrub habitat, but the new bunds would support a higher proportion of flower-rich grassland than the present situation, with small patches of scrub and south-facing ridges, which would be specifically designed and managed to favour wildlife. This would ensure that it retains SINC quality habitat for plants and insects in the long term, even though the area of this habitat is reduced. In particular, the new grassland would continue to provide suitable conditions for the nationally notable Brown-banded Carder Bee that is currently found on the site.
- 8.8.3 Birds and mammals were considered valuable for nature conservation in a more local context. Amphibians were also assumed to fall within this category for the assessment but may not actually be present. All of these groups would be taken into account in the new landscaping design, to reduce the severity of long term impacts. In the case of amphibians, modification of the new pond design could be beneficial in the long term and help to offset traffic and drainage-related impacts. The new habitats on the site would also be suitable for colonisation by reptiles. The new landform would inevitably support a different mix of species than those that currently occupy the site, but many of the less common species would be retained and the management priorities would aim to favour species of greater nature conservation significance.

Figure 1. Habitat map (2017), showing boundary of SPA, SAC and SSS

