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Habitats Regulation Assessment Screening:

Môr Hafren Bio Power, Cardiff

Technical Note

Project:	20.012	**Ref**:	BMD.20.012.RPE/TN.803.A.-.HRA Screening
Subject:	HRA screening assessment	**Date:**	January 2021
Status:	FOR PLANNING	**Rev:**	A

Originated	**Technical reviewed**	**Approved**
JP	JRMP	JRMP

SUMMARY

The project has been subject to a HRA screening process with regard to the following European sites;

- Severn Estuary Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar.
- The River Usk/Afon Wysg SAC.
- Cardiff Beech Woods SAC.

The assessment has concluded there will be no likely significant effects on interest features of these European sites, either alone, or in-combination with other plans and projects

No likely significant effects from the project either during construction or operation on the interest features of the European sites have been identified. Emissions from road traffic associated with the project has been considered alongside the emissions from the plant when operation in determining likely significant effects.

As no likely significant effects have been identified for the project alone, it cannot act in-combination with other plans or projects when considering likely significant effects. Following a request from NRW for amendments to the initial air quality assessment, a revised report has been prepared (Environmental Visage, January 2021). The revised air quality assessment includes an in-combination assessment of other plans and projects to confirm the absence of likely significant effects on the Severn Estuary SAC/SPA/Ramsar. The revised air quality report confirms that relevant critical levels and loads set for the protection of interest features for the site are not exceeded and no likely significant effect in-combination are considered likely to occur.

[redacted] **compliance with professional code of ethics or conduct**

The information which we have prepared and provided is true and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bonafide opinions.

Every reasonable attempt has been made to comply with the relevant best practice guidelines and BS42020:2013 (Biodiversity: Code of practice for planning and development).

1. BACKGROUND

1.1 The Scheme

1.1.1 The proposal is for a 15MW Energy Recovery Facility (ERF), fuelled by residual waste to produce electricity to the local area. The proposed built components within the development plot would comprise

- The tipping hall, fuel bunker, process buildings (boiler and turbine halls and stack)
- Air-cooled condensers;
- Flue gas treatment plant;
- Residue silos;
- Firewater tanks;
- Office and weighbridge.

1.1.2 The application site lies within 1.2km of the Severn Estuary Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar which form the Severn Estuary European Marine Site (EMS). The River Usk/Afon Wysg SAC lies approximately 9km to the east of the application site and Cardiff Beech Woods SAC lies approximately 9.8km to the north west of the application site. All these are statutorily designated sites of European importance.

1.1.3 Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) receive statutory protection under the Conservation of Habitats and Species Regulations 2017 (as amended) the 'Habitats Regulations'. The Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019 has updated to 2017 Regulations following the end of the end of the transition period in December 2020.

1.1.4 Under the Habitats Regulations, the relevant Welsh Minister is a competent authority, responsible for ensuring that development management decisions do not adversely affect the integrity of sites within the NSN. This document provides information for the Habitats Regulations Screening Assessment the relevant Welsh Minister will need to undertake in determining the planning application for site. This document screens the proposed development for likely significant effects on the three European sites (The Severn Estuary, Cardiff Beech Woods and River Usk/Afon Wysg) both alone, and in combination, with other plans and projects.

2. LEGISLATIVE CONTEXT AND TESTS OF THE HABITAT REGULATIONS

2.1.1 Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) receive statutory protection under the Conservation of Habitats and Species Regulations 2017 (as amended) the 'Habitats Regulations'. The Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019 has updated to 2017 Regulations following the end of the end of the transition period in December 2020. The Habitats Regulations afford a high level of protection to sites classified as SPAs as areas that hold significant populations of certain bird species (SPAs). They also afford the same level of high protection to tracts of land supporting habitats or rare species (other than birds) considered scarce or vulnerable at a European level (SACs).

2.1.2 SPAs, SACs and Ramsar sites form part of a network of nature protection areas with the UK known as the National Site Network (NSN). Prior to the UK leaving the European Union NSN were known as Natura 2000 sites. Ramsar sites are designated as wetlands of international importance that are afforded similar legislative protection to SPAs and SACs. Government has issued policy statements relating to the special status of Ramsar sites. This extends the same protection to Ramsar sites as that afforded to SPAs and SACs through the Habitat Regulations.

2.1.3 Under Regulation 63 of the Habitats Regulations the competent authority is responsible for assessing whether land use plans or proposed developments could adversely affect a site(s) within the NSN. This requires a process known as a Habitat Regulations Assessment (HRA) encompassing two tests required under Regulation 63(1) of the Habitats Regulations.

2.1.4 **Test 1:** having ascertained that the plan is not directly connected to, or necessary for site management for nature conservation, the first test of the HRA, commonly referred to as a screening test, considers whether or not a plan or project is likely to have a significant effect on a site with the NSN either alone or in combination with other plans or projects. A significant effect is any effect that would undermine the conservation objectives for the respective NSN site and may include physical loss and/or damage of a habitat, disturbance effects, and changes to water availability, deposition of contaminants through changes in air quality etc.

2.1.5 **Test 2:** The second test of the HRA is relevant to those plans or projects that are screened as likely to have a significant effect alone or in combination with other plans or projects, and requires an appropriate assessment. The role of the appropriate assessment is to consider the implications of the plan or project for the conservation objectives of the NSN sites in question, and determine whether they will have an adverse effect on the integrity of the site. In carrying out an appropriate assessment, a local authority must have regard to the manner in which the project is proposed to be carried out, or to any conditions or restrictions subject to which it proposes that the consent, permission or other authorisation should be given.

2.1.6 A recent European Court Judgment (ECJ) People Over Wind and Sweetman v Coillte Teoranta (C-323/17) has altered the process of screening for likely significant effects by overturning the 2008 Hart District Council vs. Secretary of State judgment (2008), known as Dilley Lane. This Dilley Lane judgment stated

"*there is no legal requirement that a screening assessment…. must be carried out in the absence of any mitigation measures that form part of that plan or project.*"

2.1.7 The recent People Over Wind and Sweetman ruling states that "*it is not appropriate, at the screening stage, to take account of measures intended to avoid or reduce the harmful effects of the plan or project on that site*". This means that mitigation measures must be excluded from assessing whether a project is likely to have a significant effect, either alone or in combination with other plans and projects.

2.1.8 A likely significant effect is any effect that is likely to undermine the site's conservation objectives, in light of the characteristics and specific environmental conditions of the SPA or SAC. Conservation objectives are identified for all NSN sites and cover all features that qualify the site for classification or designation. The conservation objectives apply under the Habitats Regulations and must be considered during a Habitats Regulation Assessment, including an Appropriate Assessment.

2.1.9 At the time of writing, it is understood that all courts in the UK, with the exception of the Supreme Court, will continue to be bound by judgements of the Court of Justice of the European Union handed down prior to the 31 December 2020.

3. DESCRIPTION OF DEVELOPMENT

3.1.1 The development plot is 1.67 ha of previously developed land. The proposed site layout is shown on Drawing 1383PL110. The proposed built components within the development plot would comprise: a tipping hall, fuel bunker, process buildings (boiler and turbine halls, and 70m stack), air-cooled condensers, flue gas treatment plant, residue silos, firewater tanks and office and weighbridge. Provision is included for 12 car parking spaces and 2 accessible spaces, in the northern part of the site, to the south of the railway.

3.1.2 Planning permission was granted in 2009 on the same site for the construction of an (200,000tpa) integrated waste management facility incorporating autoclave technology, materials recycling and combined heat and power generation, ancillary offices and weighbridge office, and associated roads, car parking and landscaping (planning reference 09/00246/E).

3.1.3 The proposed development comprises an ERF, fuelled by residual waste (i.e. that commercial and industrial waste remaining post treatment and destined for landfill), to provide electricity to the local area via the National Grid and has the potential to provide heat to adjacent developments.

3.1.4 The proposed ERF would use a moving grate technology with a steam raising heat recovery boiler. Steam would drive a condensing steam turbine generator set. Steam will be condensed in an air cooled condenser in a closed loop system for re-use. The turbine will have a tapping for steam and be capable of providing heat to the site and a wider heat network if viable. The ERF would be a recovery operation under the Waste Framework Directive and is designed to achieve R1 Recovery Status.

3.1.5 Feedstock would be sourced from within a predominantly 30-mile catchment area of the site, with up to 200,000 tonnes per year being delivered by road. Road access would be from Newlands Road and direct access routes from the strategic highway network, with the exception of locally sourced material.

3.1.6 The feedstock would comprise treated and commercial waste, generally considered to have minimum 50% biogenic content and potentially up to 70%. The proposed plant is designed for the generic category of feedstock, which is composed entirely of residual waste which is suitable for combustion and has a theoretical calorific value in the range of 9 – 16 MJ/kg. The plant would contribute to Wales's carbon reduction targets. The plant would contribute to sustainable waste management through using residual waste as feedstock and ensuring that waste is diverted from landfill and managed further up the waste hierarchy.

3.1.7 The proposed ERF would have an approximate output rating comprising approximately 15MW electrical. The facility would operate continuously, 24 hours per day, with an approximate average of 8,000 hours of operation per year, being offline for approximately 10% of the year for maintenance purposes.

4. BASELINE

4.1 Introduction

4.1.1 The following section sets out the location, designation criteria and conservation objectives of the NSN sites to be included in this HRA screening. A location plan of the designated sites is provided in the Appendix.

4.2 Severn Estuary SPA

4.2.1 The Severn Estuary SPA covers an area of 24487.91ha. It qualifies under Article 4.1 of the Directive (79/409/EEC) by regularly supporting an internationally important wintering population of Bewick's swan *Cygnus columbianus bewickii,* an Annex 1 species. During the period 1988/89 to 1992/93 a mean peak of 289 birds (1.7% of the northwest European population, 4.1 % of the British wintering population) used the estuary. The SPA lies 1.2km to the south of the application site.

4.2.2 The Severn Estuary qualifies under Article 4.2 as a wetland of international importance by regularly supporting over 20,000 waterfowl in winter. In the five-year period 1988/89 to 1992/93 the average peak count was 68,026 waterfowl comprising 17,502 wildfowl and 50,524 waders.

4.2.3 The Severn Estuary also qualifies under Article 4.2 by regularly supporting internationally important numbers of the following five species of migratory waterfowl in winter (average peak means for the period 1988/89 to 1992/93): 3,002 European white-fronted goose *Anser albifrons albifrons* (1.0% NW European, 50.0% British population), 2,892 common shelduck *Tadorna tadorna* (1.2% NW European, 3.9% British population), 330 gadwall *Anas strepera* (2.8% NW European, 5.5% British population), 41,683 dunlin *Calidris alpina* (2.9% East Atlantic flyway (EAF), 9.6% British population) and 2,013 common redshank *Tringa totanus* (1.3% EAF, 2.6% British population).

4.2.4 The Severn Estuary also supports nationally important wintering populations of a further 10 species: 3,977 wigeon *Anas penelope* (1.6% British population), 1,998 teal *Anas crecca* (2.0% British population), 523 pintail *Anas acuta* (2.1 % British population), 1,686 pochard *Athya ferina* (3.8% British population), 913 tufted duck *Aythya fuliglla* (1.5% British population), 227 ringed plover *Charadrius hiaticula* (1.0% British population), 781 grey plover *Pluvialis squatarola* (3.7% British population), 3,096 curlew *Numenius arquata* (3.4% British population), 246 whimbrel *Numenius phaeopus* (4.9% British population) and 3 spotted redshank *Tringa erythropus* (1.5% British population).

4.2.5 In addition, during passage periods, the estuary supports nationally important numbers of ringed plover (spring migration: 442 birds (1.4% British passage), autumn migration: 1,573 birds (5.2% British passage)) dunlin (spring: 3,510 birds (1.7% British passage), autumn: 5,500 birds (2.7% British passage)) whimbrel (spring: 246 birds (4.9% British passage), autumn: 66 birds (1.3% British passage)) and common redshank (autumn: 2,456 birds (2% British passage)).

4.2.6 The Severn Estuary also supports a nationally important breeding population of a migratory species. In 1993 2040 pairs of lesser black-backed gulls *Larus fuscus* bred on the islands of Steep Holm and Flat Holm within the estuary. This represents 2.5% of the British total.

4.3 Severn Estuary Ramsar

4.3.1 The Severn Estuary Ramsar was designated in 1995. The site covers an area of 24662.98ha. The estuary qualifies as a Ramsar site under Criterion 1, 3, 4, 5, 6 and 8. The qualifies under criterion 1 for supporting the following Annex 1 habitats: Sandbanks which are slightly covered by sea water all the time, estuaries, mudflats and sandflats not covered by seawater at low tide and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) and the immense tidal ranges which affects the both physical environment and biological communities. The Ramsar lies 1.2km to the south of the application site.

4.3.2 The site qualifies under criterion 3 due to unusual estuarine communities, reduced diversity and high productivity. The site qualifies under criterion 4 due to the importance of the estuary as a run for migratory fish including Atlantic salmon *Salmo salar*, sea trout *Salmo trutta*, sea lamprey *Petromyzon marinus,* river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *Alosa fallax* and eel *Anguilla anguilla*. The estuary is also of particular importance for migratory birds during spring and autumn.

4.3.3 The estuary qualifies under criterion 5 for supporting internationally importance assemblages of wintering waterfowl (70919 birds – 5-year peak mean 1998/99 – 2002/03).

4.3.4 The estuary qualifies under criterion 6 for supporting a wintering population of international importance of the following species:

- Bewick's swan of international importance (229 individuals – 5-year peak mean 1998/99 – 2002/03)
- European white-fronted goose (2076 individuals – 5-year peak mean 1996/97 - 2000/01)
- Common shelduck (3223 individuals – 5-year peak mean 1998/99 – 2002/03)
- Gadwall (241 individuals – 5-year peak mean 1998/99 – 2002/03)
- Dunlin (25082 individuals – 5-year peak mean 1998/99 – 2002/03)
- Common redshank (2616 individuals – 5-year peak mean 1998/99 – 2002/03

4.3.5 The site also contains species/populations identified subsequent to designation for possible future consideration under criterion 6 including breeding lesser black-backed gull, passage ringed plover and wintering populations of teal and pintail.

4.3.6 The site qualifies under criterion 8 for the diverse fish communities supported by the whole estuarine and river system. It is one of the most diverse in Britain with over 110 species recorded. As set out in paragraph 4.3.2, the Severn Estuary is a key migration route to spawning grounds for many migratory species. The site is also an important feeding and nursery ground for many fish species, particularly allis and twaite shad.

4.3.7 The Ramsar site supports twelve nationally important plant species: bulbous foxtail *Alopecurus bulbosus*, sea barley *Hordeum marinum*, goldilocks aster *Aster linosyris*, marsh mallow *Althaea officinalis*, slender hare's-ear *Bupleurum tenuissimum*, dittander *Lepidium latifolium*, corn parsley *Petroselinum segetum*, still saltmarsh-grass *Puccinellia rupestris*, sea clover *Trifolium squamosum*, *Zostera marina/angustifolia* and *Zostera noltei*.

4.3.8 A nationally important breeding population of herring gull *Larus argentatus argentatus* and nationally important passage populations of little egret *Egretta garzetta*, ruff *Philomachus pugnax,* whimbrel, curlew and greenshank *Tringa nebularia* occur within the site. Wintering populations of national importance of wigeon, shoveler *Anas clypeata*, pochard, water rail *Rallus aquaticus* and spotted redshank also occur.

4.3.9 Three nationally important invertebrate species have been recorded from the site: *Tenellia adspera*, *Corophium lacustre* and *Gammarus insensibilis.*

4.4 Severn Estuary SAC

4.4.1 The Severn Estuary SAC supports the following Annex 1 habitats that are a primary reason for the selection of the site: Estuaries, sandbanks which are slightly covered by seawater all the time, mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows *Glauco puccinellietalia maritimae* and reefs. It also supports populations of the following Annex II species that a primary reason for the selection of this site: river lamprey, sea lamprey and twaite shad. The SAC lies 1.2km to the south of the application site.

4.4.2 The Severn Estuary is important for its immense tidal range, which affects both the physical environment and the diversity and productivity of the biological communities. The tidal range is the second largest in the world, reaching in excess of 13 m at Avonmouth. There are several major rivers, including the Taff, Usk, Wye, Severn, Avon and Parrett which feed into the estuary, and influence the salinity regime. Together these rivers tend to produce a marked east-west salinity gradient and a range of conditions varying from brackish to fully saline, depending on the season and rainfall, which in turn influences the occurrence and distribution of habitats and species throughout the estuary and its fringes.

4.4.3 The intertidal zone of mudflats, sandbanks, rocky platforms and saltmarsh is one of the largest and most important in Britain and this range of habitats provides an ecosystem of great importance for a wide range of fish and bird species for feeding, breeding, resting and migration.

4.4.4 The subtidal sandbanks are largely restricted to the middle and outer parts of the estuary. The sand banks of the Middle and Welsh Grounds are relatively permanent sandbank features in the Severn Estuary, along with other long-established sandbank features at Cardiff Grounds and in Bridgwater Bay. The tops of these banks are intertidal, and the permanently submerged parts of the banks are considered to contribute to the subtidal sandbanks habitat. Areas where ephemeral subtidal sandbanks are known to occur include areas offshore from Avonmouth and at English Grounds (near Clevedon).

4.4.5 The intertidal mudflats and sandflats feature in the Severn Estuary covers an area of approximately 20,300ha. The intertidal mudflats and sandflats are distributed throughout the Severn Estuary with extensive mudflats fronting the Welsh shore and Bridgwater Bay, and large banks of clean sands in the more central parts of the estuary at Middle and Welsh Grounds.

4.4.6 The high biomass of invertebrates in the mudflats of the Severn provide an important food source for a diverse range and large number of fish and benthic predators. These intertidal areas are therefore important in supporting the fish assemblages of the SAC.

4.4.7 The Severn Estuary is fringed by saltmarsh. The huge tidal range in the Severn Estuary has led to extensive saltmarsh community development with an expanded zonation. The saltmarshes of the Severn Estuary have four principal zones corresponding to the four main sub-features that have been identified for this feature. Two of these zones (the lower to mid marsh communities and the mid to upper marsh communities) contain the principle saltmarsh types which are defined as Atlantic salt meadow as per the Annex 1 habitat description. However, these occur in an intimate mosaic and in transition with the communities of the other two zones (in the pioneer saltmarsh and transitional high marsh communities) which are therefore as part of the feature. The habitats within the "pills" provide important shelter and feeding habitats for both fish and bird species.

4.4.8 The Severn Estuary has areas of biogenic reefs, formed by the tube-dwelling polychaete worm *Sabellaria alveolata*. *Sabellaria alveolata* reefs in the UK are predominantly an intertidal habitat but the Severn Estuary is one of the few places where *Sabellaria alveolata* reefs occur extensively in subtidal, as well as intertidal areas. There are patches of intertidal *Sabellaria alveolata* reef throughout the Estuary, although it tends to be more common on the English side. The subtidal *Sabellaria alveolata* tends to be in the outer parts of the Estuary, southwest of a line between Clevedon and Newport.

4.4.9 There is approximately 1,500 ha of hard substrate habitat within the Severn Estuary, consisting of boulders, rock, mussel/cobble scars, rocky pools and shingle. The largest areas of hard substrate are located towards the outer estuary at Brean Down, Anchor Head and Sand Point together with rocky platforms and cliffs at Clevedon and Portishead. There are also extensive rock platforms at English Stones, Aust and Beachley. Beds of eelgrass *Zostera* spp., the largest in Wales, occur on some of the more sheltered mixed hard substrate areas around the Welsh side of the Second Severn Crossing.

4.4.10 These habitats provide a wide range of services for estuarine species. They are important components of the SAC Estuary feature, important supporting habitats for the wintering and passage bird features of the SPA and Ramsar Site and also important supporting habitats for the fish assemblage of the SAC and Ramsar designations.

4.5 Cardiff Beech Woods SAC

4.5.1 Cardiff Beech Woods SAC covers 114.45ha and supports the following Annex 1 habitat that is the primary reason for the selection of this site: *Asperulo-Fagetum* beech forests. The Cardiff Beech Woods contain one of the largest concentrations of this woodland type in Wales and represent the habitat close to the western limit of its past native range in both the UK and Europe. The priority Annex 1 habitat *Tilio-Acerion*

forest of slopes, screes and ravines is also present as a qualifying feature but is not the primary reason for the selection of the site. The SAC lies 9.8km to the north-west of the application site.

4.5.2 Both Annex 1 habitat types are found within Garth Wood and Fforestganol a Chwm Nofydd SSSI, but only *Asperulo-Fagetum* beech forests occurs in Castell Coch Woodlands and Road Section SSSI. The SAC management plan prepared for the site notes that the location of the woodland in industrialised South Wales together with the presence of nearby quarrying and associated activities mean that there is the potential for localised atmospheric pollution. It also notes that to date there is no evidence that atmospheric pollution has had an adverse impact on the European features of interest.

4.6 River Usk/Afon Wysg SAC

4.6.1 The River Usk/Afon Wysg SAC covers an area of 967.97ha. The site is designated for supporting populations of the following Annex II species that are the primary reason for the selection of this site: sea lamprey brook lamprey, river lamprey *Lampetra fluviatilis*, twaite shad, Atlantic salmon, bullhead *Cottus gobio* and otter *Lutra lutra*. The Annex II species allis shad is also present as a qualifying feature but is not a primary reason for the site selection. The Annex 1 habitat water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation is also present as a qualifying feature but is not the primary reason for the selection of the site. The SAC lies 9km to the east of the application site.

4.6.2 Surveys of sea lamprey in the River Usk has shown that juveniles and spawning adults are mainly restricted to the lower reaches of the catchment. The Usk supports healthy populations of brook and sea lamprey and is considered to provide exceptionally good quality habitat likely to ensure the continued survival of the species in this part of the UK. The River Usk is one of only four rivers in the UK where a known breeding population of twaite shad occurs. Water quality and quantity are considered to be favourable for this species. The main channel is largely unmodified and a variety of aquatic habitats are present including good quality spawning grounds and deep pools used for cover by adults and fry.

4.6.3 The River Usk is famous for Atlantic salmon with a high proportion of multi sea winter fish in the rod catch. In 1999 it had the highest estimated egg deposition of any British river south of Cumbria. The largely unmodified nature of the river makes it excellent habitat for spawning adults and parr. Bullhead are widespread throughout the Usk system. The good water quality, abundant cover and variety of aquatic habitats provides exceptionally high-quality habitat.

4.6.4 Otter are believed to most part of the main river from Newport upstream and the population appears to be increasing, with its upstream range expanding into several tributaries.

4.7 Severn Estuary SPA conservation objectives

4.7.1 With regard to the Severn Estuary SPA the conservation objective is to maintain the Bewick's swan population and its supporting habitats in favourable condition. The interest feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- the five-year peak mean population size for the Bewick's swan population is no less than 289 individuals (i.e. the five-year peak mean between 1988/89 – 1992/93).
- The extent of saltmarsh at the Dumbles is maintained.
- The extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose is maintained.
- The extent of vegetation with an effective field size of >6ha and with unrestricted bird sightlines >500m at feeding, roosting and refuge sites are maintained. Greater than 25% of suitable soft leaved herbs and grasses in winter season throughout the transitional saltmarsh at the Dumbles is maintained.
- Aggregations of Bewick's swan at feeding, roosting and refuge sites are not subject to significant disturbance.

4.7.2 With regard to the Severn Estuary SPA the conservation objective is to maintain the European white-fronted goose population and its supporting habitats in favourable condition. The interest feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- the five-year peak mean population size for the wintering European white-fronted goose population is no less than 3002 individuals (ie the five-year peak mean between 1988/89 – 1992/93). The extent of saltmarsh at the Dumbles is maintained.
- The extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose is maintained. Unrestricted bird sightlines >200m at feeding and roosting sites are maintained.
- Greater than 25% of suitable soft leaved herbs and grasses is maintained during the winter on saltmarsh areas.
- Aggregations of European white-fronted goose at feeding and roosting sites are not subject to significant disturbance.

4.7.3 With regard to the Severn Estuary SPA the conservation objective is to maintain the dunlin, common redshank and shelduck populations and their supporting habitats in favourable condition. The interest features will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- the five-year peak mean population size for the wintering population is no less than the five-year peak mean between 1988/89 – 1992/93. The extent of saltmarsh and associated strandlines is maintained. The extent of intertidal mudflats and sandflats is maintained. The extent of hard substrate habitats is maintained. The extent of vegetation with a sward height of <10cm is maintained throughout the saltmarsh. The abundance and macro-distribution of suitable invertebrates in intertidal mudflats and sandflats is maintained. The abundance and macro-distribution of suitable invertebrates in hard substrate habitats is maintained (dunlin and common redshank only). Unrestricted bird sightlines >200m at feeding and roosting sites are maintained. Aggregations of dunlin, common redshank and common shelduck at feeding and roosting sites are not subject to significant disturbance.

4.7.4 With regard to the Severn Estuary SPA the conservation objective is to maintain the wintering gadwall population and its supporting habitats in favourable condition. The interest feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- the five-year peak mean population size for the wintering gadwall population is no less than 330 individuals (ie the five-year peak mean between 1988/89 – 1992/93).
- The extent of intertidal mudflats and sandflats is maintained. Unrestricted bird sightlines >200m at feeding and roosting sites are maintained.
- Aggregations of gadwall at feeding and roosting sites are not subject to significant disturbance.

4.7.5 With regard to the Severn Estuary SPA the conservation objective is to maintain the internationally important assemblage of waterfowl and its supporting habitats in favourable condition. The interest feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- the five-year peak mean population size for the waterfowl assemblage is no less than 68026 individuals (i.e. the five-year peak mean between 1988/89 – 1992/93).
- The extent of saltmarsh and associated strandlines is maintained. The extent of intertidal mudflats and sandflats is maintained. The extent of hard substrate habitats is maintained. The extent of vegetation with a sward height of <10cm is maintained throughout the saltmarsh.
- The abundance and macroscale distribution of suitable invertebrates in intertidal mudflats and sandflats is maintained.
- The abundance and macroscale distribution of suitable invertebrates in hard substrate habitats is maintained. Greater than 25% of suitable soft leaved herbs and grasses is maintained during the winter on saltmarsh areas.
- Unrestricted bird sightlines >500m at feeding and roosting sites are maintained. Wildfowl aggregations at feeding and roosting sites are not subject to significant disturbance.

4.7.6 A series of favourable conservation tables underpin the conservation objectives for each interest feature of the SPA.

4.8 Severn Estuary Ramsar conservation objectives

4.8.1 The conservation objectives for the Severn Estuary Ramsar site is to maintain the estuaries feature in favourable condition as set out the in the conservation objectives for the SAC (see paragraph 4.9.1) in so far as these objectives are applicable to the area designated as Ramsar. The area of the estuarine ecosystem designated as Ramsar is restricted to the terrestrial and intertidal areas and excludes all subtidal areas.

4.8.2 The notable estuarine species assemblage included allis shad, sea trout and eel. It also covers migratory, estuarine, marine and freshwater fish species. The conservation objectives for migratory fish are the same as those laid out for Annex II fish species within the SAC (see paragraph 4.9.6 and 4.9.7).

4.8.3 The conservation objectives for the bird populations cover those within the SPA and populations of wigeon, teal, pintail, pochard, tufted duck, ringed plover, grey plover, curlew, whimbrel, spotted redshank and lesser black-backed gull. The conservation objectives for these species are the same as those for the overall assemblage within the SPA (see section 4.7).

4.9 Severn Estuary SAC conservation objectives

4.9.1 The conservation objective for the estuaries feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined. The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The total extent of the estuary is maintained, the characteristic physical form (tidal prism/cross sectional area) and flow (tidal regime) of the estuary is maintained.
- The characteristic range and relative proportions of sediment sizes and sediment budget within the site is maintained.
- The extent, variety and spatial distribution of estuarine habitat communities within the site is maintained.
- The extent, variety, spatial distribution and community composition of hard substrates habitats and their notable communities is maintained.
- The abundance of the notable estuarine species assemblages is maintained and increased. The physicochemical characteristics of the water column support the ecological objectives described above.
- Toxic contaminants in water column and sediment are below levels which would pose a risk to the ecological objectives described above.
- Airborne nutrient and contaminant loads are below levels which would pose a risk to the ecological objectives described above.

4.9.2 The conservation objective for the subtidal sandbanks which are covered by sea water all the time (subtidal sandbanks) feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined. The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The total extent of the subtidal sandbanks within the site is maintained, the extent and distribution of the individual subtidal sandbank communities within the site is maintained.
- The community composition of the subtidal sandbank features within the site is maintained.
- The variety and distribution of sediment types across the subtidal sandbank feature is maintained.
- The gross morphology (depth, distribution and profile) of the subtidal sandbank feature within the site is maintained.

4.9.3 The conservation objective for mudflats and sandflats not covered by sea water at low tide (mudflats and sandflats) feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined. The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The total extent of the mudflats and sandflats feature within the site is maintained, the variety and extent of individual mudflats and sandflats communities within the site is maintained, the distribution of individual mudflats and sandflats communities within the site is maintained.
- The community composition of the mudflats and sandflats feature within the site is maintained.
- The topography of the intertidal flats and the morphology (dynamic processes of sediment movement and channel migration across the flats) are maintained.

4.9.4 The conservation objective for the Atlantic salt meadow feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined. The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The total extent of Atlantic salt meadow and associated transitional vegetation communities within the site is maintained.
- The extent and distribution of the individual Atlantic salt meadow and associated transitional vegetation communities within the site is maintained.
- The zonation of Atlantic salt meadow vegetation communities and their associated transitions to other estuary habitats is maintained.
- The relative abundance of the typical species of the Atlantic salt meadow and associated transitional vegetation communities is maintained.
- The structural variation of the salt marsh sward (resulting from grazing) is maintained within limits sufficient to satisfy the requirements of the Ramsar and SPA features.
- The characteristic stepped morphology of the salt marshes and associated creeks, pills, drainage ditches and pans, and the estuarine processes that enable their development is maintained.
- Any areas of *Spartina anglica* salt marsh (SM6) are capable of developing naturally into other saltmarsh communities.

4.9.5 The conservation objective for the reefs feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined. The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The total extent and distribution of *Sabellaria* reef is maintained. The community composition of the *Sabellaria* reef is maintained.
- The full range of different age structures of *Sabellaria* reef are present.
- The physical and ecological processes necessary to support *Sabellaria* reefs are maintained.

4.9.6 The conservation objective for the river and sea lamprey features of the Severn Estuary SAC is to maintain these species in favourable condition, as defined. These species will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The migratory passage of both adult and juvenile lampreys through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows or poor water quality.

- The size of the lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term.
- The abundance of prey species forming the lamprey's food resource within the estuary is maintained.
- Toxic contaminants in the water column and sediment are below levels that would pose a risk to the ecological objectives described above.

4.9.7 The conservation objective for the twaite shad feature of the Severn Estuary SAC is to maintain the species in favourable condition, as defined. The species will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The migratory passage of both adult and juvenile twaite shad through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows or poor water quality.
- The size of the twaite shad population in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term.
- The abundance of prey species forming the twaite shad's food resource within the estuary, in particular at the salt wedge, is maintained.
- Toxic contaminants in the water column and sediment are below levels that would pose a risk to the ecological objectives described above.

4.9.8 A series of favourable conservation tables underpin the conservation objectives for each interest feature of the SAC and (in part) for the Ramsar.

4.10 Cardiff Beech Woods SAC conservation objectives

4.10.1 The conservation objectives for *Asperulo-Fagetum* beech forest is to maintain the feature in favourable condition, as defined. This feature is in favourable conservation status where all the following conditions are satisfied:

- The existing *Asperulo-Fagetum* beech forest will be maintained, at least 95% of canopy forming trees will be locally native species such as beech, ash and oak with some areas dominated by beech.
- The tree canopy will not be completely closed: approximately 10% of the canopy will include a dynamic shifting pattern of gaps encouraging natural regeneration of tree species of all ages.
- Dead wood, standing and fallen, will be maintained where possible to provide habitat for invertebrates, fungi and other woodland species.
- There are pockets of ground flora across the site, comprising species typical of lime-rich beech wood, including indicators of ancient woodland such as wood anemone *Anemone nemorosa*, ramsons *Allium ursinum* and sanicle *Sanicula europaea*.
- There is little evidence of browsing or squirrel damage to trees.
- Recreational use of the site will continue to be managed so it does not damage the wildlife interest of the site.

- All factors affecting the achievement of these conditions are under control.

4.10.2 The conservation objectives for *Tilio-Acerion* forest of slopes, screes and ravines is to maintain the feature in favourable condition, as defined. This feature is in favourable conservation status where all the following conditions are satisfied:

- The existing *Tilio-Acerion* forest will be maintained, at least 95% of canopy forming trees will be locally native species (sycamore *Acer pseudoplatanus* included).
- The tree canopy will not be completely closed: approximately 10% of the canopy will include a dynamic shifting pattern of gaps encouraging natural regeneration of tree species of all ages.
- Dead wood, standing and fallen, will be maintained where possible to provide habitat for invertebrates, fungi and other woodland species.
- There are pockets of ground flora across the site, comprising species typical of lime-rich beech wood, including indicators of ancient woodland such as wood anemone, ramsons and sanicle.
- There is little evidence of browsing or squirrel damage to trees.
- Recreational use of the site will continue to be managed so it does not damage the wildlife interest of the site.
- All factors affecting the achievement of these conditions are under control.

4.11 River Usk/Afon Wysg SAC conservation objectives

4.11.1 The underlying geology of the River Usk/Afon Wysg SAC consists predominantly of Devonian Old Red Sandstone with a moderate base status, resulting in waters that are generally well buffered against acidity. The geology also produces a generally low to moderate nutrient status.

4.11.2 The ecological status of the water course is a major determinant of the favourable conservation status for all features. The required conservation objective for the water course is defined below as:

- the capacity of the habitats in the SAC to support each feature at near-natural population levels, as determined by predominantly unmodified ecological and hydromorphological processes and characteristics and should be maintained as far as possible, or restored where necessary
- the ecological status of the water environment should be sufficient to maintain a stable or increasing population of each feature. This will include elements of water quantity and quality, physical habitat and community composition and structure
- flow regime, water quality and physical habitat should be maintained in, or restored as far as possible to, a near-natural state, in order to support the coherence of ecological structure and function across the whole area of the SAC
- all known breeding, spawning and nursery sites of species features should be maintained as suitable habitat as far as possible, except where natural processes cause them to change. Flows, water quality, substrate quality and quantity at fish spawning sites and nursery areas will not be

depleted by abstraction, discharge, engineering or gravel extraction activities or other impacts to the extent that these sites are damaged or destroyed

- the river planform and profile should be predominantly unmodified. Physical modifications having an adverse effect on the integrity of the SAC, including, but not limited to, revetments on active alluvial riverbanks using stone, concrete or waste materials, unsustainable extraction of gravel, addition or release of excessive quantities of fine sediment, will be avoided

- artificial factors impacting on the capability of each species feature to occupy the full extent of its natural range should be modified where necessary to allow passage, e.g weirs, bridge sills and acoustic barriers. Natural features such as waterfalls, which may limit the natural range of a species feature or dispersal between naturally isolated populations, should not be modified

- flows during the normal migration periods of each migratory fish species feature will not be depleted by abstraction to the extent that the passage upstream to spawning sites is hindered. Flow objectives for assessment points in the Usk Catchment Abstraction Management Strategy will be agreed with EA and CCW as necessary

- levels of nutrients, in particular phosphate, will be agreed between EA and CCW for each Water Framework Directive water body in the River Usk/Afon Wysg SAC and measures taken to maintain nutrients below these levels. Levels of water quality parameters that are known to affect the distribution and abundance of SAC features will be agreed between EA and CCW for each Water Framework Directive water body in the River Usk/Afon Wysg SAC and measures taken to maintain pollution below these levels

- potential sources of pollution not addressed in the Review of Consents, such as contaminated land, will be considered in assessing plans and projects. Levels of suspended solids will be agreed between EA and CCW for each Water Framework Directive water body in the River Usk/Afon Wysg SAC

- measures including, but not limited to, the control of suspended sediment generated by agriculture, forestry and engineering works, will be taken to maintain suspended solids below these levels.

4.11.3 For fish species the site will be in favourable conservation status when all the following conditions are satisfied:

- the conservation objective for the water course is met (see paragraph 4.11.2)

- the population of the feature in the SAC is stable or increasing over the long term

- the natural range of the feature in the SAC is neither reduced nor likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches where predominantly suitable habitat for each life stage exists over the long term. Suitable habitat is defined in terms of near-natural hydrological and geomorphological processes and forms e.g. suitable flows to

allow migration upstream, depth of water and substrate type at spawning sites and ecosystem structure and functions e.g. food supply. Suitable habitat need not be present throughout the SAC but where present must be secured for the foreseeable future

- natural features such as waterfalls may limit the natural range of individual species. Existing artificial influences on natural range that cause an adverse effect on site integrity, such as physical barriers will be assessed. There is, and will probably continue to be, sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis

4.11.4 Performance indicators for lampreys, both shad species, Atlantic salmon and bullhead have been set. For lampreys these relate to the distribution, ammocoete densities, age structure and ammocoete size and distribution. For both shad species they relate to spawning distribution and flow rates; for Atlantic salmon adult run size, juvenile densities, biological and chemical water quality and flow rates and for bullhead adult densities, distribution and age structure of the population.

4.11.5 For otter the site will be in favourable conservation status when all the following conditions are satisfied:

- the population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour

- the natural range of otters in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches that are potentially suitable to form part of a breeding territory and/or provide routes between breeding territories. The whole area of the River Usk/Afon Wysg SAC is considered to form potentially suitable breeding habitat for otters. The size of breeding territories may vary depending on prey abundance

- the population size should not be limited by the availability of suitable undisturbed breeding sites. Where these are insufficient, they should be created through habitat enhancement and, where necessary, the provision of suitable holts

- no otter breeding site should be subject to a level of disturbance that could have an adverse effect on breeding success. Where necessary, potentially harmful levels of disturbance must be managed

- the safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable riparian habitat, and underpasses, ledges, fencing etc at road bridges and other artificial barriers

4.11.6 Performance indicators have been set for otter relating to distribution, breeding activity and actual and potential breeding sites.

4.11.7 For water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation the site will be in favourable conservation status when all the following conditions are satisfied:

- the conservation objective for the water course is met (see paragraph 4.11.2)
- the natural range of the plant communities represented within this feature should be stable or increasing in the SAC. The natural range is taken to mean those reaches where predominantly suitable habitat exists over the long-term. Suitable habitat and associated plant communities may vary from reach to reach. Suitable habitat is defined in terms of near-natural hydrological and geomorphological processes and forms e.g. depth and stability of flow, stability of bed structure, and ecosystem structure and functions e.g. nutrient levels and shade. Suitable habitat for the feature need not be present throughout the SAC but where present must be secured for the foreseeable future, except where natural processes cause it to decline in extent
- the area covered by the feature within the natural range in the SAC should be stable or increasing
- the conservation status of the feature's typical species should be favourable. The typical species are defined with reference to the species composition of the appropriate JNCC river vegetation type for the particular river reach, unless differing from this type due to natural variability when other typical species may be defined as appropriate

4.11.8 Performance indicators have been set for this habitat relating to distribution, typical species and negative indicators (signs of eutrophication and alien/introduced species).

5. DETERMING BASELINE CRITICAL LEVELS/LOADS FOR AIR QUALITY MODELLING

5.1.1 The baseline critical levels and critical loads for the NSN sites were determined with reference to APIS and the relevant conservation objectives for the site. The citations for the component SSSIs which form the NSN sites were also assessed. If no critical level or load was given for a relevant habitat or species within NSN sites on APIS the SSSI citations were searched for additional information to determine relevant critical loads or levels that may be appropriate.

5.1.2 The habitat/pollutant impact records feature on APIS was used to identify appropriate critical levels and loads for habitats/ecosystem/species based on the citations for the NSN sites and SSSI's in the absence of any site-specific critical levels and loads given on APIS. Where critical levels or loads for habitats/ecosystem/species within the SSSI'S, that are considered to form part of the interest feature of the NSN sites, were lower than those for Annex 1 habitat or Annex II species the lower figure was used for the assessment. For example, the critical level for ammonia deposition for an Annex 1 habitat may be set at 3µg/m^3 for the protection of higher plants, but if lower plants (such as lichens) are mentioned in the same habitat within the SSSI citation the threshold of 1µg/m^3 for the protection of lower plants would be used.

5.1.3 Critical levels and critical loads are the ambient concentrations and deposition fluxes below which significant harmful effects to sensitive ecosystems are unlikely to occur. Critical Levels of air pollution and critical loads of pollutants have been identified by the United Nations Economic Commission for Europe (UNECE).

5.1.4 Critical loads are defined as: " a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge".

5.1.5 Critical levels are defined as "concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge".

5.1.6 It is important to distinguish between a critical load and a critical level. The critical load relates to the quantity of pollutant deposited from air to the ground, whereas the critical level is the gaseous concentration of a pollutant in the air.

6. AIR QUALITY MODELLING RESULTS

6.1.1 The air quality modelling was undertaken by Environmental Visage. A spatially variable surface roughness file was used in the modelling to account for the difference in land uses within the gridded area. The impact of the wind turbine at the G24 Innovations Ltd site approximately 300m to the south of the proposed EfW has been included in the modelling to determine if it was likely to impact of the dispersion of emissions from the stack of the EfW. The turbine data used in the modelling reflects the installed turbine.

6.1.2 Estimates for the background concentrations of NOx were provided by DEFRA at a resolution of 1km x1km grid spacing. The maximum annual average concentration of NOx (µg/m^3) within the NSN site was used for air quality assessment of ecological receptors. This background concentration of NOx used in the assessment represents the highest concentration anywhere within the NSN site.

6.1.3 The baseline concentration of NOx for the Severn Estuary SAC/SPA/Ramsar used in the air quality assessment is 43.58 µg/m^3. This is above the average figure given for the site on APIS of 11.08 µg/m^3. There are areas within the SAC where the annual average concentration of NOx exceeds 30µg/m^3, such as at Avonmouth, but generally across the site levels are well below the critical level set for all vegetation types of 30µg/m^3. The use of a baseline of 43.58 µg/m^3 for the Severn Estuary is considered to be suitably precautionary.

6.1.4 The baseline concentration of NOx for the Cardiff Beech Woods SAC used in the air quality assessment is 29.43 µg/m^3. This is below the average figure given for the site on APIS of 18.07 µg/m^3. There are no areas within the SAC where the annual average concentration of NOx exceeds 30µg/m^3 and the use of a baseline concentration of 29.43 µg/m^3 is considered to be sufficiently precautionary for initial screening.

6.1.5 The baseline concentration of NOx for the River Usk/ Afon Wysg SAC used in the air quality assessment is 33.43 µg/m^3. This is above the average figure given for the site on APIS of 12.27 µg/m^3. There are two areas within the SAC where the annual average concentration of NOx exceeds 30µg/m^3, in the centre of Newport, but generally across the site levels are well below the critical level set for all vegetation types of 30µg/m^3. The use of a baseline concentration of 33.43 µg/m^3 is considered to be sufficiently precautionary for initial screening.

6.1.6 The air quality modelling undertaken by Environmental Visage shows that the annual mean NOx process contribution (PC) is below 1% of the critical level for NOx at all three European sites except at one of the receptor points within the Severn Estuary (1.2%).

6.1.7 The APIS website gives a maximum critical level for NOx at Peterstone Great Wharf (325569,179043) of 16.51 µg/m^3. Even with the increase in NOx predicted on this part of the Severn Estuary SAC/SPA/Ramsar, the critical level for NOx will still be well below the level in the atmosphere above which direct adverse effects on receptors, such as plants and ecosystems, may occur according to present knowledge. Therefore, in this part of the SAC the overall critical level set for all vegetation types of 30µg/m^3 is not exceeded at this location.

6.1.8 The daily NOx PC is below 10% of the critical level for NOx on the River Usk/Afon Wysg SAC and the Cardiff Beech Woods SAC. The daily NOx PC on the two receptor points within the Severn Estuary is below 10% of the relevant short-term critical level threshold of 75 µg/m^3 (2.69% and 2.8% at the respective receptor points). The NOx daily (24 hour) predicted environmental concentration (PEC) which combines the PC plus background levels, is below 70% of the daily mean critical levels of 75 µg/m^3 for the protection of vegetation and ecosystems at the same points.

6.1.9 APIS shows that annual baseline levels of ammonia within the River Usk/Afon Wysg SAC average 1.29 µg/m^3 (maximum 2.05 µg/m^3). For the Cardiff Beech Woods SAC the average and maximum critical level is the same 1.36 µg/m^3. It should be noted that the *Asperulo-Fagetum* beech forest Annex 1 habitat type contains sensitive lichens and bryophytes (see para 6.1.10 below). For the Severn Estuary SAC APIS shows that annual baseline levels of ammonia average 1.24 µg/m^3 (maximum 2.71 µg/m^3).

6.1.10 The baseline critical level for the protection of vegetation set for ammonia is an annual mean of 3µg/m^3. For sites with sensitive lichen and bryophytes it is set at an annual mean of 1µg/m^3. At none of the receptor points modelled does the PC exceed 1% of the relevant critical level for ammonia in any of the three European sites. This allows for the lower annual critical level applied to the Cardiff Beech Woods SAC.

6.1.11 The PC of sulphur dioxide (annual) and hydrogen fluoride (daily and annual) on all three European sites is far below 1% (10% for short-term impacts) of the relevant critical level and therefore no impacts on the interest features of these sites are predicted.

6.1.12 The air quality modelling used a critical load of 20-30kg/N/ha/yr. as the baseline to assess impacts on habitats within the Severn Estuary SAC/SPA/Ramsar. This applies to the most sensitive habitat type identified on APIS: Annex 1 habitat estuaries (pioneer, low-mid and mid-upper saltmarshes). The same figures are used for the habitats within the River Usk/Afon Wysg SAC where no critical load is given on APIS for the Annex 1 habitat: water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. APIS notes that for rivers and streams in most lowland rivers, nitrogen inputs from catchment land-use, not deposition from the atmosphere, are likely to be much more significant.

6.1.13 These meso/eutrophic systems are often phosphorus limited (or nitrogen/phosphorus co-limited). As atmospheric deposition is unlikely to be a significant contributor to the river system and that the availability of phosphorus is likely to be a limiting factor on aquatic plant growth the critical load selected is considered to be appropriate for initial screening.

6.1.14 A lower baseline figure of 10-20kg/N/ha/yr. was used for the Cardiff Beech Woods SAC. The baseline critical loads were informed by a review of the site-specific critical loads for habitats/interest features within each site likely to be impacted by the proposals (see section 5).

6.1.15 The air quality modelling has shown that for all three European sites the PC is less than 1% of the lower end of the critical load range assessed. For the Severn Estuary the total nitrogen deposition remains below the lower end of the critical load range given for the most sensitive habitat within the site. For the

River Usk/Afon Wysg SAC and the Cardiff Beech Woods SAC although the PC is below 1% of the lower end of the critical load range given for the most sensitive habitats within the sites, the PEC exceeds the lower end of the critical load for the most sensitive habitat. In both cases, this occurs with or without the proposed development.

6.1.16 APIS shows that there are no habitat types within the Severn Estuary SAC that are sensitive to acid deposition. APIS does show that the habitat type standing open water and canals used by Bewick's swan and gadwall is sensitive to acidity with the Severn Estuary SPA. The Annex 1 habitats within the Cardiff Beech Woods SAC are considered to be sensitive to acid deposition. The habitats and species within the River Usk/ Afon Wysg SAC are considered to be sensitive to acidity although no critical loads are given for either the Annex 1 habitat or Annex II species.

6.1.17 Annual average acid deposition rates (keq/ha/yr PC of total acid) across Cardiff Beech Woods SAC and River Usk/ Afon Wysg SAC are insignificant with background levels barely changed by the proposed development.

7. NOISE MODELLING RESULTS

7.1.1 The noise modelling undertaken by Sol Acoustics Ltd have undertaken an assessment of the impacts of noise on ecological receptors around the site. The assessment covered noise generated by construction activities and operational activities. The acoustic assessment assessed impacts on two ecological receptors Gwent Levels - Rumney and Peterstone Site of Special Scientific Interest (SSSI) and the Severn Estuary SAC/SPA/Ramsar. The noise assessment identified the loudest activities during construction will be lorries tipping material, asphalt compacting and percussive piling.

7.1.2 The only ecological receptor where noise impacts have been identified is the Gwent Levels - Rumney and Peterstone SSSI. This site does not fall within the boundary of the Severn Estuary SPA/SAC/Ramsar. However, there is the possibility that the fields within the SSSI could provide supporting habitat for SPA birds.

7.1.3 The acoustic assessment found that noise levels exceeding 55dB *L*Aeq,*T* are expected to occur within 40m of the boundary during the operation of the facility. Levels exceeding 55dB *L*Aeq,*T* are expected to occur within 170m of the site boundary during parts of the construction phase. The acoustic assessment is based on the installation of a 2 metre high acoustic fence around the perimeter of the site during construction. This acoustic fence is proposed to mitigate impacts on commercial and residential receptors.

7.1.4 The noise modelling confirms that no noise impacts are predicted on birds within the European site.

8. SUMMARY OF THE POTENTIAL IMPACTS IDENTIFIED

8.1.1 The air quality assessment has shown that baseline ammonia levels within the Cardiff Beech Woods SAC are above 1 µg/m^3 although the process contribution is below 1% of this threshold. The modelling also shows that for nitrogen deposition on the Cardiff Beech Wood SAC although the PC is below 1% of the lower end of the critical load range the PEC exceeds the lower end of the critical load for this habitat.

8.1.2 The air quality assessment shows that the annual mean NOx process contribution (PC) at one of the receptor points within the Severn Estuary is 1.2%.

8.1.3 APIS does show that the habitat type standing open water and canals used by Bewick's swan and gadwall, with the Severn Estuary SPA is sensitive to acidity. The Annex 1 habitats within the Cardiff Beech Woods SAC are considered to be sensitive to acid deposition. The habitats and species within the River Usk/ Afon Wysg SAC are considered to be sensitive to acidity although no critical loads are given for either the Annex 1 habitat or Annex II species.

8.1.4 The air quality assessment shows that nitrogen deposition although the PC is below 1% of the lower end of the critical load range on the River Usk/ Afon Wysg SAC the PEC exceeds the lower end of the critical load for this habitat.

8.1.5 The only ecological receptor where noise impacts have been identified is the Rumney and Peterstone SSSI. This site does not fall within the boundary of the Severn Estuary SPA/SAC/Ramsar. However, there is the possibility that the fields within the SSSI could provide supporting habitat for SPA birds.

8.1.6 The first test of Regulation 63 of the Habitats Regulations requires an assessment of whether the emission from the proposal, are likely to have a significant effect on the European sites in question, either alone or in combination with other plans and projects.

8.1.7 As noted earlier in the document no specific measures to reduce the impact on emissions or noise levels on the European sites have been included as part of the project. Therefore, this project can be screened for likely significant effects in line with the recent People Over Wind ruling.

9. LIKELY SIGNIFICANT EFFECTS (LSE) TEST

9.1.1 The air quality assessment did not identify any significant increase in acid deposition within the Severn Estuary SPA. The habitats within the SPA closest to the site comprise intertidal mudflats and saltmarsh, habitats that are not considered sensitive to acid deposition when considering use by birds. No adverse impacts on waders and wildfowl using these habitats is predicted. The APIS website does show that the habitat types standing open water and canals used by Bewick's swan and gadwall is sensitive to acidity.

9.1.2 The wintering herd of Bewick's swan using the SPA are concentrated around Slimbridge and do not regularly occur in this part of the SPA. The habitat type standing open water and canals is not present in the part of the SPA. Gadwall are typically associated with freshwater habitats mainly at Slimbridge and Bridgewater Bay but notable concentrations also occur on the estuary around Avonmouth, between the two Severn Bridges and at Woodspring and Weston Bays. No likely significant effects on either interest feature of the SPA are anticipated.

9.1.3 The air quality assessment shows that the annual mean NOx process contribution (PC) at one of the receptor points within the Severn Estuary is 1.2%. As highlighted in paragraph 6.1.7 in this part of the SAC the overall critical level set for all vegetation types of 30µg/m^3 is not exceeded. No likely significant effects on the interest features of the SAC are anticipated.

9.1.4 The only ecological receptor where noise impacts have been identified is the Gwent levels - Rumney and Peterstone SSSI. This site does not fall within the boundary of the Severn Estuary SPA/Ramsar. However, there is the possibility that the fields within the SSSI could provide supporting habitat for SPA birds. The SSSI citation does not mention wintering or passage birds as being an interest feature of the site. The fields directly to the north of site are small and the reens lined with trees and shrubs meaning the extensive sightlines favoured by many wildfowl and waders on feeding and roosting grounds are not present which probably limits the suitably of this area for feeding and roosting SPA/Ramsar species.

9.1.5 The maximum extent of noise levels above 55dB *L*Aeq,*T* from the site boundary is 170m during construction and 40m during operation. These zones only impact on a small percentage of the SSSI and on habitat considered to be sub-optimal for many wintering and passage birds. Large areas of similar habitat are present within the SSSI to the east of the development site (and in contiguous SSSIs further east). It is not considered that noise associated with the proposed development will have a likely significant effect on birds from the SPA that may be using the SSSI as supporting habitat for roosting or feeding.

9.1.6 The APIs website shows that baseline ammonia levels within the Cardiff Beech Woods SAC are above 1 µg/m^3 although the air quality modelling shows the process contribution is below 1% of this the critical level. The conservation objectives for this site relate to the structure and composition of canopy trees, presence of dead wood and the maintenance of ground flora and ancient woodland indicators. The PC of ammonia is 0.0015 µg/m^3, this level of ammonia is considered to be insignificant and is unlikely to result in likely significant effects on the interest features of the SAC.

9.1.7 The modelling also shows that for nitrogen deposition on the Cardiff Beech Wood SAC although the PC is below 1% of the lower end of the critical load range the PEC exceeds the lower end of the critical load for this habitat. Significant contributors to the current high levels of nitrogen deposition on the site include livestock, European imports and road traffic, with only a slight reduction in overall levels of nitrogen deposition between 2006 and 2016.

9.1.8 The PC of 0.01kgN/ha/yr. will not result in any discernible difference in current rates of nitrogen deposition across this SAC. The background level of nitrogen deposition on the Cardiff Beech Woods SAC is 26.6kg/N/ha/yr. This exceeds the upper end of the critical load range given for the habitats within the SAC. The lack of identified effects on interest features of the European site is notable (see paragraph 4.5.2). Work by Kirby et al, 2005 cited in Caporn et al, 2016 notes that a study of woodlands in 1971 and revisited in 2001 found overall species richness unaffected by nitrogen, although changes in the composition of woodland communities was noted. The lack of response in species richness was attributed to three main factors: much woodland flora tends to be towards the middle and upper end of the Ellenberg spectrum, impacts on woodlands may be from localised sources of ammonia (e.g. livestock production) and the effects of canopy.

9.1.9 As already noted, the conservation objectives relate largely to the structure of the woodlands and the composition of the ground flora. The management plan for the site notes that there is no current evidence to indicate that pollution is adversely affecting the interest features of the site. It is concluded that the predicted rate of nitrogen deposition on this site is unlikely to result in likely significant effects on the interest features of the SAC.

9.1.10 The additions of nitrogen and ammonia to the Cardiff Beech Woods SAC are essentially nugatory and would be indistinguishable from background variations. It should also be noted that the ammonia concentrations (PEC) are below the critical level of 3 $\mu g/m^3$ set for the protection on higher plants and the additions from the project would not affect the ability to deliver the conservation objectives set for this site.

9.1.11 The Annex 1 habitats within the Cardiff Beech Woods SAC are considered to be sensitive to acid deposition. As discussed above for nitrogen deposition the management plan for the site notes that there is no current evidence to indicate that pollution is adversely affecting the interest features of the site. Increased levels of acidity in the soil can mobilise phytotoxic aluminium ions compounds.

9.1.12 Lime-rich soils do have a natural 'buffering' capacity against acidification through the dissolution of carbonates and other basic rocks and then the replacement of exchangeable base cations. Once cation exchange becomes the main buffering mechanism base saturation decreases and aluminium saturation increases. At this point changes in ground flora may be expected as plants characteristic of lime-rich soils are replaced with those associated with circumneutral or more acidic soils.

9.1.13 The PC of total acid of 0.0021kgN/ha/yr. will not result in any discernible difference in current rates of acid deposition across this SAC. As there is has been no observable changes in the composition of ground flora within the SAC it is concluded that the predicted rate of acid deposition on this site is unlikely to result in likely significant effects on the interest features of the SAC.

9.1.14 The habitats and species within the River Usk/ Afon Wysg SAC are considered to be sensitive to acidity although no critical loads are given for either the Annex 1 habitat or Annex II species.

9.1.15 The management plan for the site notes that the Annex 1 habitat is not present in the lower reaches of the Usk so likely significant effects on this feature can be screened out. The Annex II fish species migrate through the lower reaches of the Usk to reach spawning ground further upstream. Freshwater species such as bullhead will not be present in the lower reaches of the Usk where the tidal influence is still present.

9.1.16 The PC of total acid at this site will not result in any discernible difference in current rates of acid deposition across this SAC. As the fish populations in the lower reaches of the Usk where the increase in acid deposition is predicted to be highest are likely to be transitory it is concluded that the predicted rate of acid deposition on this site is unlikely to result in likely significant effects on the interest features of the SAC.

9.1.17 Nitrogen deposition for the River Usk/ Afon Wysg SAC marginally exceed the lower end of the critical load for the most sensitive habitat. As noted in paragraph 9.1.14 the Annex 1 habitat feature is not present in the lower reaches of the Usk so no likely significant effects on the interest features of the SAC are anticipated.

9.1.18 Traffic emissions associated with both construction and operational traffic will not reach levels on roads immediately adjacent to the Severn Estuary SAC/SPA/Ramsar where they will act in combination with emissions from the plant. The B4239 is c200m from the Severn Estuary SAC/SPA/Ramsar at the its closest point (between Common Farm and Ton-Y-Pill Farm). Levels of pollutants related to emission from road traffic tend to highest at road edge and rapidly dissipate. Given the distance of the road from the site and the lack of any significant increase in traffic related to this project on the B4239 it is concluded the project is unlikely to result in likely significant effects on the interest features of the Severn Estuary SAC/SPA/Ramsar.

9.1.19 No significant increases in traffic flows associated with the project are predicted on major roads with 200m of the River Usk/Afron Wysg SAC or the Cardiff Beech Woods SAC.

10. ALONE AND IN-COMBINATION LIKELY SIGNIFICANT EFFECTS (LSE) TEST

10.1.1 The project alone is not considered to have any likely significant effects on the interest features of the relevant European sites. It follows that a project with no likely significant effects cannot act in-combination with other plans or projects as there are no appreciable effects on the site to consider.

10.1.2 For completeness the air quality modelling looked at in-combination effects of the emissions from three other projects: 68 Portmanmoor Road, replacement chimneys to boiler rooms (20/01626/MNR), land at Rover Way, Section 73 application to vary time limit of outline planning permission 17/02130/MJR for, amongst other things, a 9.5MW biomass facility (20/01279/MJR) and Uskmouth Power Station (20/0748).

10.1.3 Existing facilities and operations that will already be included in the background data from the DEFRA website include Trident Park EfW, Celsa Steel Section Mill, Tremorfa Melt Shop and the Welsh Water Anaerobic Digestion Facility. Emissions from existing plant will form part of the baseline conditions in the APIS figures, so inclusion of these project in the in-combination would result in double-counting.

10.1.4 The air quality modelling shows that the level of in-combination nitrogen deposition exceeds 0.2kg/N/ha/yr over parts of the Severn Estuary SAC/SPA/Ramsar during both years modelled. The highest rate of deposition predicted is approximately 0.25kg/N/ha/yr. As the area affected by deposition rates is greatest in 2018 this year is used for assessment purposes. APIS data shows that across the Severn Estuary SAC/SPA/Ramsar the lower end of the critical load range for nitrogen of 20-30kg/N/ha/yr is not exceeded. The addition of 0.25kg/N/ha/yr across part of the site will not lead to the lower end of the critical load range being exceeded.

10.1.5 The APIS website gives a maximum level of nitrogen deposition for Peterstone Great Wharf (325569,179043) of 9.5kg/N/ha/yr. Even with an additional 0.2kg/N/ha/yr. being deposited on this part of the Severn Estuary SAC/SPA/Ramsar, the baseline rate of nitrogen deposition will still be less than half the rate below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge.

10.1.6 A strategic employment site (approximately 45ha) located south of St Mellons Business Park is proposed 1.2km north-east of the application site. As set out in section 9 the project is not considered to have a likely significant effect on any of the NSN sites alone. It cannot therefore have any in-combination effects with this proposal.

10.1.7 A proposed solar farm and wind turbine development (installed generating capacity of 49.9MW) on land between Hawes Lane Broadway and the B4239 lies 3.7km east of the application site. As set out in section 9 the project is not considered to have a likely significant effect on the Severn Estuary SPA/SAC/Ramsar alone. It cannot therefore have any in-combination effects with this proposal.

11. CONCLUSIONS

11.1.1 This project has been subject to a HRA screening process which has concluded there will be no likely significant effects on interest features of the NSN sites, either alone, or in-combination with other plans and projects.

11.1.2 No likely significant effects from the project either during construction or operation on the interest features of the NSN sites have been identified. Emissions from road traffic associated with the project has been considered alongside the emissions from the plant when operation in determining likely significant effects.

11.1.3 As no likely significant effects have been identified for the project alone, it cannot act in-combination with other plans or projects when considering likely significant effects.

12. REFERENCES AND BIBLIOGRAPHY

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13. GLOSSARY

13.1 Scientific Terms and Acronyms

CIEEM Chartered Institute of Ecology and Environmental Management, the professional organisation and provider of professional codes of conduct for ecological consultancy.

EPS European Protected Species For the purposes of this report EPS are species that require particular licences to allow certain works to go ahead. Species falling within the following situations are not considered as EPS within this report:

Birds listed on Appendix 2 of the Bern Convention (European legislation). The protection requirements of this Appendix are fully integrated in UK law, notably through the Wildlife and Countryside Act 1981 (as amended).

Birds listed on Annex 1 of the Birds Directive (European legislation). The protection of such species survival and reproduction within their geographic distribution is ensured through special conservation measures in relation to their habitats. Such measures are implemented through the establishment of Special Protection Areas. Therefore, any implications are considered at regional habitat and country level rather than individual bird/species level.

Level of protection – 'EU' Protected under the Conservation of Habitats and Species Regulations (2017).

Level of protection – 'UK' Protected under the Wildlife and Countryside Act 1981 (as amended).

Non-native invasive species For the purposes of this report: species listed on Schedule 9 of the wildlife and Countryside Act 1981 (as amended). Widely naturalised species, such as grey squirrel, are excluded.

Protected species A species protected under specific UK or European legislation, including Habitats Directive, Wildlife and Countryside Act.

SAC Special Area of Conservation. Designated under European Union Habitat Directive (92/43/EEC) to protect species and habitat of European interest.

SPA Special Protection Area. A site designated under the European Union Directive on the Conservation of Wild Birds.

SSSI Site of Species Scientific Interest. Statutory designation of biological or geological importance.

UK Priority Habitat and species A habitat or species identified as a priority for conservation in accordance with Section 40 of the Natural Environment and Rural Communities Act (2006). Section 40 of the Act places a duty on public authorities to have regard for the conservation objectives of these habitats and species.

APPENDIX

Site proposals and location plan

Statutory site plan