FORD ENERGY RECOVERY FACILITY AND WASTE SORTING AND TRANSFER FACILITY, FORD CIRCULAR TECHNOLOGY PARK

13 Natural heritage

Introduction

13.1 Lindsay Carrington Ecological Services (LCES) was commissioned to assess the ecological impact of the proposed energy recovery facility (ERF) and waste sorting and transfer facility (WSTF) at Ford Circular Technology Park, Ford, West Sussex, on behalf of the applicants. This chapter describes and evaluates the current nature conservation interest of the site and assesses its potential to support protected and notable species. Where the proposed development is likely to have significant effects on habitats and species, appropriate mitigation measures have been incorporated into the design.

13.2 The references and data sources used in the assessment are set out in table 13.1.

Bright, P., Morris, P. and Mitchell-Jones, A. (2006). The Dormouse Conservation Handbook. Second Edition. English Nature, Peterborough.
Collins, J., Charleston, P., Davidson-Watts, I., Markham, S. and Kerslake, L. (2016). Bat Surveys for Professional Ecologists Good Practice Guidelines. Bat Conservation Trust.
Department for Communities and Local Government (2005). Circular 06/2005: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System.
Kirby, K.J., Smart, S.M., Black, H.I.J., Bunce, R.G.H.,Corney,P.M.and Smithers,R.J. (2005). Long term ecological change in British woodland (1971-2001).
Sussex Biodiversity Information Centre (November 2019). Data search.
Joint Nature Conservation Committee (2016. Handbook for Phase 1 Habitat Survey: A technique for environmental audit. JNCC, Peterborough.
Lindsay Carrington Ecological Services (2020). Ecological Appraisal and Phase 1 Bat Survey at Ford Circular Technology Park.
Multi-Agency Geographical Information for the Countryside (www.magic.gov.uk)
National Planning Policy Framework (2019)
Peterborough: English Nature (Research Report 653).
Pitcairn, Carole E.R.; Leith, Ian D.; van Dijk, Netty; Sheppard, Lucy J.; Sutton, Mark A.; Fowler, David. 2009 The application of transects to assess the effects of ammonia on woodland groundflora. In: Sutton, Mark A.; Reis, Stefan; Baker, Samantha M.H., (eds.) Atmospheric Ammonia: Detecting emission changes and environmental impacts. Results of an Expert Workshop under the Convention on Long-range Transboundary Air Pollution. Springer, 59-69.

Table 13.1: References and data sources

Legislation and policy

Legislation

13.3 The following legislation and guidance documents will be of relevance to the proposed works. Full details of statutory obligations with respect to biodiversity and the planning system can be found in DEFRA Circular 06/2005.

- The Conservation of Habitats and Species Regulations (2019) (as amended)
- The Wildlife and Countryside Act 1981 (as amended)
- The Countryside and Rights of Way Act 2000
- The Protection of Badgers Act 1992
- Wild Mammals (Protection) Act 1996
- Hedgerow Regulations 1997

- Natural Environment & Rural Communities Act 2006, Section 41 (NERC S41)

National policy

13.4 The following policies are implemented nationally throughout England, to ensure biodiversity interests are considered for all developments:

- National Planning Policy Framework 2019
- Circular 06/05: Biodiversity and Geological Conservation—Statutory Obligations and Their Impact Within the Planning System
- UK National Biodiversity Action Plans

Local policy

13.5 The following policies have been adopted locally to enable consideration for biodiversity during the planning process:

- Chapter 17, paragraphs 17.4.1-17.4.4 of the Arun Local Plan 2018 (Development & Biodiversity) - this document outlines the requirement to appropriately assess for protected species and for development to undertake survey work specific to the legal protection of these species following Natural England's standing advice. Under this section there is also the requirement for all new development to enhance the biodiversity of the site and the surrounding area.
- Arun District Council Biodiversity Checklist - the biodiversity checklist is intended to ensure that sufficient transparent ecological information accompanies an application. The requirements set out in the Local Validation Requirements (LVR) and the Biodiversity Checklist has been designed to comply with the requirements of the Policy INF2 of the Development Management Policy Annex.
- Sussex Biodiversity Action Plans - this Biodiversity Action Plan lists priority species and habitats at a county level in relation to UK post-2012 Biodiversity Framework. This reflects the requirement of the local authority under section 41 and 41 of the Natural Environment and Rural Communities Act 2006 to consider priority species and habitats as material considerations in planning at a local level.

Guidance

13.6 Guidance for considering biodiversity in planning and undertaking suitable ecological surveys is available through the following documents.

- Sussex Wildlife Trust - Biodiversity and Planning in Sussex 2014
- BS 42020: 2013 Biodiversity – Code of Practice for Planning and Development
- Chartered Institute of Ecology and Environmental Management: Guidelines for Ecological impact Assessment in the UK and Ireland 2018

Methodology

Baseline

13.7 A combination of a desk study and a suite of ecological field surveys have been used to provide the baseline information on which this assessment has been based.

13.8 The desk study entailed a collation of records obtained from internet sources, including Multi-Agency Geographical Information for the Countryside (MAGIC), along with records from the Sussex Biological Record Centre (SxBRC). SxBRC provided records in November 2019[1], of protected and notable species and statutory and non-statutory wildlife sites within a 2 km radius of the proposed development, whilst MAGIC was used to identify all internationally statutory protected sites and granted protected species licenses (PSL) within 10 km.

13.9 The proposed development site was surveyed using the standard Phase 1 habitat survey methodology (JNCC, 2016) whereby habitats are mapped using colour codes (see Technical Appendix I for further details). A detailed walkover survey was undertaken on the 27th November 2019[2], directly searching for legally protected and invasive species of plant and categorising any habitats of ecological value that were encountered. A general description of the vegetation was also noted, listing species encountered and scoring their abundance using the DAFOR scale:

- D-Dominant
- A-Abundant
- F-Frequent
- O-Occasional
- R-Rarely distributed
- L-Local (used as a prefix to any of the above).

13.10 Habitats and features were also assessed during the Phase 1 survey for their potential to support protected species. This included but was not limited to searches for signs of badger (*Meles meles*), bats, hazel dormice (*Muscardinus avellanarius*), great crested newts (*Triturus cristatus*), nesting birds and reptiles.

13.11 A direct search was undertaken for signs of badger. Signs of badger may include setts, dung pits, latrines, paths or hairs on fences and vegetation. Any setts encountered were classified according to the number of entrances and the extent of their use.

13.12 All buildings and trees within the proposed development areas were assessed for their potential to support roosting bats, and habitats were assessed for their suitability to provide foraging and commuting habitat, in line with the *Bat Surveys*

[1] This desktop search data is still valid within the CIEEM guidelines. No new statutory or non-statutory protected sites have been designated since the previous submission as per a MAGIC desktop search.
[2] An update site walkover was not deemed necessary in 2020 or 2021 due to the overall low amount of habitat with biodiversity value on site. This is in line with CIEEM guidelines on survey data validity.

for Professional Ecologists, Good Practice Guidelines (Collins, 2016). The survey was carried out by a licensed bat surveyor using appropriate equipment.

13.13 The habitat on site was assessed for the potential to support hazel dormice, which are found in habitats such as woodlands, scrub and hedgerows with good connectivity and suitable food plants. Satellite images were used to assess the connectivity of any suitable habitat present on the site to other areas of woodland and hedgerow networks.

13.14 Habitats within the proposed survey area were assessed for their suitability to provide breeding, foraging and commuting habitat for great crested newts. All ponds within 500 m of the proposed development area were identified from a variety of mapping resources. Suitable breeding ponds are essential to support populations of great crested newt, although they actually only spend a relatively short period of the year in the ponds during the spring for breeding. The remainder of the year is spent in suitable foraging habitat such as tall grassland and woodland. During the winter the great crested newt hibernates, often amongst the roots of trees and scrub or in places such as piles of rubble, amongst foundations of buildings or under fallen trees and logs.

13.15 Birds utilise a wide variety of vegetation and buildings for nesting and several breeding species can be present in a small area. All habitats within the proposed development area were searched for evidence of breeding birds and assessed for their suitability to support bird nests.

13.16 Reptiles are widespread in habitats that provide both cover, in the form of scrub or tall vegetation and basking areas such as areas of hard standing or short grassland communities. Piles of debris or rubble also provide excellent cover and hibernation sites for reptiles. Habitats within the site were therefore assessed for their suitability to support reptiles.

13.17 Invertebrates are key species within all ecosystems and can be found in most habitats throughout the UK. Detailed invertebrate surveys are normally only carried out where records of rare or protected species are recorded nearby and suitable habitat for these species is recorded on site. Surveyors record common invertebrates during Phase 1 surveys where possible.

Impact assessment

13.18 The Chartered Institute of Ecology and Environmental Management (CIEEM) guidance (2018) is followed in assigning importance or value to a feature and in the assessment of the significance of effects. The value of a feature is assigned by CIEEM to seven levels, from ‘international’ to ‘within the immediate zone of the proposal only’. For the purpose of this assessment, international, national, regional / county / district and local levels are considered. To provide consistency with the approach used in other chapters of this ES, table 13.2 explains how the CIEEM levels relate to the general Terence O’Rourke Ltd approach to assessment described in chapter 5 of this ES. In accordance with the CIEEM guidance and its examples, the values set out in table 13.2 are modified as appropriate, given local circumstances and context. The justification for selecting the level of significance is given for each feature in the assessment.

CIEEM guidelines	Terence O'Rourke approach
International	High
UK	High
National (England / Northern Ireland / Scotland / Wales)	High to medium
Regional	Medium
County / Metropolitan area	Medium
District / Unitary Authority / City / Borough	Medium
Local or Parish	Low

Table 13.2: Comparison of the CIEEM and Terence O'Rourke approach for assessing the importance / value of a receptor

13.19 A nature conservation designation does not necessarily imply a level of effect significance. For example, if a county wildlife site is identified for the population of a particular species of bird, that population is considered to be of county importance; however, other features of the site may be less important. Similarly, legal protection at a national level, or the presence of a priority species or habitat in the United Kingdom Biodiversity Action Plan (UK BAP), does not always imply national importance. For example, in the case of badger this species is afforded legal protection to prevent illegal culling rather due to its scarcity. The mitigation required to meet legal obligations is provided as separate advice for protected species.

13.20 For each ecological feature, the effects of the proposed activities during and after construction are assessed and the type of impacts are characterised according to their extent, magnitude, duration, reversibility, timing, frequency and cumulative effects. The effect of the impact on the function of the ecosystem (its integrity), the quality and extent of the habitat or the population size of the species is predicted and an estimate made of the degree of uncertainty in the prediction. Mitigation and enhancement measures, if applicable, are described and the residual effect after these measures have been taken into account is quantified as accurately as possible.

13.21 In order to provide an assessment of impacts that is comparable with the other chapters of this ES, a degree is given to each effect following protocols developed by Terence O'Rourke Ltd. Significance has been derived from two measures: the importance of receptors and the magnitude of change. These two sets of criteria are used together in the significance matrix to derive the generic definitions of the degree of potential effects. This process is set out in figures 13.1 to 13.3. Where there is doubt over the appropriate degree of effect, for example where there is uncertainty about the full extent of the local resource (habitat area or population size), this is stated and as a precaution the higher degree of effect is applied.

13.22 The CIEEM guidelines suggest that an effect is either ecologically significant or not, whereas the Terence O'Rourke Ltd approach is a development of this and determines significance based on the degree of the effect. The CIEEM and Terence O'Rourke Ltd approaches are compared in table 13.3.

IEEM guidance	Terence O'Rourke Ltd approach
Significant	Very substantial
	Substantial
	Moderate
Not significant	Slight
	Negligible

Table 13.3: Comparison of the CIEEM and Terence O'Rourke Ltd approach for assessing potential significance of effects

Limitations and uncertainties

13.23 The Phase 1 habitat survey for the proposed development was not undertaken during the peak season for this survey type. However, due to the largely urbanised nature of the site and lack of habitats, this was not considered to be a constraint. All other surveys to identify suitable habitat for protected species were carried out within the guideline timings and conditions.

Baseline

Off-site

13.24 The SxBRC was contacted in November 2019, with a request for all notable and protected species records and all statutory protected and non-statutory protected sites within 2 km. The MAGIC online resource was used to identify all internationally statutory designated sites within 10 km of the proposed development area. These results were used to inform and to provide additional information in support of the field survey results. Statutory and non-statutory designated sites and an assessment of their importance is presented below. Figure 13.4 shows the designated sites in relation to the proposed development area. There are no statutory or non-statutory site areas present within the proposed development area, all are off-site.

13.25 One internationally statutory protected site group, combining the Arun Valley Ramsar site, special area of conservation (SAC) and special protection area (SPA) is outside of the 10 km consultation zone. However, Natural England specifically asked for these sites to be considered as part of the assessment process and they are therefore included.

Internationally and nationally important sites

13.26 The Arun Valley Ramsar, SAC and SPA sites lie approximately 10.17 km north east of the proposed development. The SAC is designated for the Annex II species ramshorn snail (*Anisus vorticulus*) and the Arun Valley is one of the three main population centres for this species in the UK. The SPA and Ramsar sites are designated for an important overwintering population of Bewick's swan (*Cygnus columbianus bewickii*) and important assemblage of over 20,000 waders and wildfowl overwinter. These sites are receptors of high (or international) importance.

13.27 Duncton to Bignor Escarpment SAC is approximately 9.9 km north of the proposed development area. The site is designated for a steeply sloping area of broadleaved woodland and heathland noted for Annex I habitat *Asperulo-*

Fagetum beech forests. This site is a receptor of high (or international) importance.

13.28 There are no sites of special scientific interest (SSSI) within the 2 km scoping distance of the proposed development.

Locally designated sites

13.29 There are no locally designated sites within 2 km of the proposed development area.

Priority habitats

13.30 Ford Ancient Woodland is located approximately 1.3 km to the north of the proposed development. Specific information on the site's status was not made available in the data request to SxBRC, however ancient woodland is a habitat listed under section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Habitats listed under section 41 of the act are considered material considerations in the planning process as outlined under section 42 of the NERC Act.

On site

Vegetation

13.31 The application site covers a 6.72 ha area, of which approximately 5.88 ha is proposed for development, which includes the built areas and landscaped areas (the remaining area forms the existing access road to the site). The results of the Phase 1 habitat survey are shown on figure 13.5 and a summary of the habitats recorded on site is provided below. Table 13.4 summarises the level of importance that can be attributed to each habitat that was encountered during the survey.

13.32 The majority of the site comprises colonised hardstanding, with small areas of unconnected poor semi-improved grassland, scrub, a non-native hedgerow, scattered trees and buildings.

Colonised hardstanding

13.33 A large proportion of the site comprises hardstanding which has been colonised in some small areas. Species present within the areas of colonised hardstanding include abundant common mouse-ear (*Cerastium fontanum*), frequent spear thistle (*Cirsium vulgare*) and rare red valerian (*Centranthus ruber*).

Poor semi-improved grassland

13.34 Small areas of poor semi-improved grassland are present in patches throughout the site. Species present within the poor semi-improved grassland include dominant cock's foot (*Dactylis glomerata*) and frequent false oat-grass (*Arrhenatherum elatius*) and bristly oxtongue (*Picris echioides*).

Scrub

13.35 Small, unconnected patches of scrub are present throughout the site. Species present included locally dominant bramble (*Rubus fruticosus agg.)* and frequent buddleia (*Buddleja sp.).*

Non-native hedgerow

13.36 A recently planted ornamental hedgerow was present in the west of the site. Species present within the hedgerow included abundant ornamental species, occasional hawthorn species (*Crataegus sp*.), rose species (*Rosa sp*.) and ornamental oak species (*Quercus sp*.) and rare hazel (*Corylus avellana*).

Scattered trees

13.37 Scattered trees are present throughout the site in the form of a single willow species (*Salix sp*.) in the north of the site and a conspicuous line of pollarded white poplars (*Poplus alba*) along the new road in the south east of the site.

Buildings

13.38 A total of three buildings are present. These are hangar style buildings, which have been converted for industrial use and offices.

Summary of receptor importance

13.39 Table 13.4 summarises the importance of the habitat receptors listed above.

Receptor	Evaluation rationale	Value of receptor
Colonised hardstanding	This is a common habitat at local levels that provides limited biodiversity value for pollinators and foraging birds.	Local / low
Poor semi-improved grassland	Poor semi-improved grassland is locally common and provides habitat for a range of flora and fauna, including foraging bats, birds, invertebrates, reptiles and amphibians. The low floral diversity of poor semi-improved grassland lowers its overall biodiversity value.	Local / low
Scrub	The bramble scrub is a locally common habitat of semi-urban environments locally. It provides foraging and nesting habitat for a variety of bird species.	Local / low
Non-native hedgerow	This is a common habitat locally. Non-native hedgerows are dominated by species not found in native hedgerows and are therefore of lower biodiversity value. The hedgerow provides foraging and nesting habitat for birds.	Local / low
Scattered trees	Scattered trees are common locally on semi-urban and industrial sites. The trees on the site are not mature enough to support nesting birds but do provide habitat for invertebrates and foraging birds.	Local / low
Buildings	Buildings can support roosting bats and nesting birds. In this instance the structures are of negligible value to bats or birds. This is due to the limited roosting or nesting potential within the buildings due to their construction and existing state. Bat roosting is associated with either crevice or void features with a relative thermostable state. The buildings on site were characterised for the potential based on the presence of these features and none were found.	Local / low

Table 13.4: Level of value of habitats recorded within the site

Fauna

Badger

13.40 The Phase 1 survey recorded no evidence of badger within the proposed development site and therefore badgers are given no further consideration.

Bats

13.41 The three buildings and scattered trees within the proposed development area were surveyed for their potential to support roosting bats and were all assessed as having negligible potential. No evidence of roosting bats was encountered. The habitats within the proposed development area are of negligible value to foraging bats due to their small size and isolated nature. Habitats adjacent to the site are largely open and of low value to foraging bats. There is poor connectivity between the site and the wider landscape.

Dormice

13.42 The only habitat suitable to support the hazel dormouse within the proposed development site is the non-native hedgerow which is of negligible value. Furthermore, the hedgerow is isolated from any other suitable habitat that maybe present nearby. Dormice are not present within the proposed development site and are given no further consideration.

Great crested newt

13.43 Although there are 58 records (between 2010-2017) of great crested newt within 2 km of the site and small areas of low value, suitable terrestrial habitat for great crested newt are present within the proposed development site, its isolation from other suitable habitats and the lack of suitable breeding ponds within 500 m makes it highly unlikely that great crested newt are present. Great crested newts are not present within the proposed development site and are given no further consideration.

Breeding birds

13.44 Suitable habitat for breeding birds is present within the proposed development site in the form of bramble scrub, buildings and a non-native hedgerow. These are relatively small areas of habitat but are likely to support a range of common and widespread breeding bird species, as well as some declining species. During the Phase 1 survey, five species of bird were recorded and these are shown in table 13.5, along with their UK status. It is not possible to say if these species breed at the site due to the timing of the Phase 1 survey, but suitable breeding habitat was present for all species recorded, except black-headed gulls (*Chroicocephalus ridibundus*).

Species	Scientific name	NERC S41 species	Birds of conservation concern
Blackbird	*Turdus merula*	No	Green
Black-headed gull	*Chroicocephalus ridibundus*	No	Amber
Dunnock	*Prunella modularis*	No	Amber

Herring gull	*Larus argentatus*	Yes	Red
House sparrow	*Passer domesticus*	Yes	Red
Wren	*Troglodytes troglodytes*	No	Green

Table 13.5: Conservation status of breeding bird species

Reptiles

13.45 There is a limited amount of suitable reptile habitat within the proposed development site, (i.e. poor semi-improved grassland and scrub). The small areas of habitat and the isolated nature of the site make it highly unlikely that reptiles are present. Reptiles are therefore not considered to be present within the proposed development site and are given no further consideration.

Invertebrates

13.46 No invertebrate species were recorded during the Phase 1 survey, although this is likely to be due to the seasonal timing of the survey. The habitats present within the proposed development site are likely to support a range of common and widespread invertebrate species.

13.47 Table 13.6 summarises the protected species assessment.

Receptor	Evaluation rationale	Value of receptor
Bats	A total of 10 confirmed bat species were returned from the SxBRC data request for all bat species within 2 km of the proposed development area. These included, barbastelle (*Barbastella barbastellus*), serotine (Eptesicus serotinus), myotis bat (*Myotis sp*.), Daubenton's bat (*Myotis daubentonii*), whiskered/ Brandt's bat (*Myotis mystacinus/brandtii*), natterer's bat (*Myotis nattereri*), leisler's bat (*Nyctalus leisleri*), noctule (*Nyctalus noctule*), nathusius's pipistrelle (*Pipistrellus nathusii*), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), long-eared species (*Plecotus sp*.), and brown long-eared (*Plecotus auritus*). No evidence of roosting bats was recorded in buildings or trees on site. The habitats present within the proposed development site are of low value to foraging and commuting bats. Habitats surrounding the site are also of low value to foraging and commuting bats. The site is isolated from habitat of high value to bats.	Local / low
Breeding birds	A total of five bird species were recorded on site during the Phase 1 survey. These included two red listed species and two amber listed species, of which two are also NERC S41 listed. No evidence of breeding birds was found due to the seasonal timing of this survey, although suitable nesting habitat is present for four out of the five species recorded and a wide variety of other common and widespread species not recorded during the Phase 1 survey. Areas of suitable nesting habitat are present in small amounts at the proposed development site but are not likely to support large numbers of nesting birds.	Local / low
Invertebrates	Suitable habitat is present to support common and widespread invertebrate species, however, the small amounts of relatively low value habitat present are not likely to support diverse communities of invertebrates that include rare and scarce or protected species.	Local / Low

Table 13.6: Level of value of protected species recorded on site

Future baseline

13.48 In the absence of the development, habitats within the proposed development site would likely to remain broadly the same, or semi-natural habitats would decline with increased site use and therefore the overall biodiversity value of the site would remain of local / low value.

Effects during construction

Off site

13.49 All statutory protected sites identified during the desktop search, including the Arun Valley and Duncton to Bignor Escarpment international sites, are located a significant distance from the proposed development site and the likely road access route to the site. Therefore, no effects on statutory protected sites from the construction phase are predicted.

13.50 Ford Ancient Woodland is located approximately 1.3 km to the north of the proposed development site. The woodland is a sufficient distance from the proposed development site and main access routes for there to be no effects from the construction phase.

On site

Vegetation

13.51 During the construction period, the primary impacts will be direct loss of habitat, disturbance (both visual and from noise) and the creation of dust.

Direct impacts - habitat loss

13.52 During the construction phase of the proposed development all habitats present will be lost, with the exception of the scattered trees which line the access road to the site. Habitats lost include colonised hardstanding, poor semi-improved grassland, scrub, a non-native hedgerow and three buildings. The approximate areas of the habitats to be lost are shown in table 13.7.

Habitat	Extent of habitat loss (approximate)
Colonised hardstanding	4.64 ha
Poor semi-improved grassland	0.15 ha
Scrub	0.12 ha
Buildings	0.97 ha
Non-native hedgerow	120m

Table 13.7: Extent of habitat loss

13.53 Site preparation work will result in the loss of approximately 4.64 ha of colonised hardstanding. This is of negligible biodiversity value and considered to be of low importance. The magnitude of change is negligible, and the unmitigated effect is assessed as being negligible and not significant.

13.54 Approximately 0.15 ha of poor semi-improved grassland will be lost during the construction phase. This small area of low biodiversity value is of low

importance. The magnitude of change is negligible, and the unmitigated effect is assessed as being negligible and not significant.

13.55 Approximately 0.12 ha of bramble scrub will be lost during the construction phase. The scrub is of moderate biodiversity value due to its potential to support nesting birds, although it is of low importance given its small area of coverage. The magnitude of change is small, and the unmitigated effect is assessed as being slight and not significant.

13.56 Three buildings covering 0.97 ha will be lost during the construction phase. These were not identified as being used by roosting bats or nesting birds and are therefore of negligible biodiversity value. The magnitude of change is negligible, and the unmitigated effect is assessed as being negligible and not significant.

13.57 The approximately 120 m long non-native hedgerow along the western boundary of the proposed development site will be removed during the construction phase. This hedgerow is of low biodiversity value due to its potential to support a small number of nesting birds and is of low importance. The magnitude of change is small, and the unmitigated effect is assessed as being slight and not significant.

13.58 Overall there will be a total loss of habitats present within the proposed development area. The overall magnitude of change is small, and the unmitigated effect is assessed as being slight and not significant.

13.59 The loss of these habitats has the potential to impact on bats, breeding birds and invertebrates. The potential effects on fauna are discussed as follows.

Fauna

13.60 The site is likely to be used occasionally by common and widespread bat species for foraging over suitable habitats including the scrub. The removal of these habitats during the construction phase will result in the loss of a small and low value resource for bats. If construction was to operate after dusk and through the night during the summer months, this may lead to increased disturbance on local bat populations through increased noise and light. The site is of low importance to local bat populations, the magnitude of change is small, and the unmitigated effect is assessed as being slight and not significant.

13.61 Habitats within the proposed development site, including a non-native hedgerow, small areas of scrub and buildings provide habitat for nesting birds. Red and amber listed bird species, including two NERC S41 species were identified on site during the Phase 1 survey. The construction phase will result in the loss of a small area of potential nesting habitat for the species identified and a range of other bird species that may be present. The site is of low importance for nesting birds, the magnitude of change is small, and the unmitigated effect is assessed as being slight and not significant.

13.62 Habitats within the proposed development site are likely to support common and widespread invertebrate species, which provide a foraging resource for bats and birds. The construction phase will result in the loss of all habitats where invertebrates may be present. The site is of low importance for invertebrates, the

magnitude of change is small, and the unmitigated effect is assessed as being negligible and not significant.

Grid connection

13.63 In order to connect the proposed ERF to the National Grid, a grid connection cable route is required. As shown in figure 5.1 (chapter 5) the cable route would route from the proposed development site, along the access road and then north along Ford Road as far as the junction with Ford Lane. The cable would run west all the way along Ford Lane, then north along North End Road / B2132 / Yapton Lane until it joins the A27 / Arundel Road. The cable would then route for approximately 5.5 km westwards along the A27 / Arundel Road, as far as Eartham Lane at Crockerhill. From the junction of Arundel Road and Eartham Lane, the cable would route approximately 300m north and the Crockerhill sub-station is just on the left.

13.64 Currently the proposed route of the cable is all down paved roads and lanes and it would only require micro-siting for installation in a trench. This will not impact on any habitats of biodiversity value. There will be no significant effects on any ecological receptors from the proposed cable installation works.

Effects post-construction

Off site

13.65 Potential effects on ecological receptors post construction are likely to relate to the following factors:

- Emission of pollutants from the ERF that negatively impact on protected habitats and species
- Increased levels of noise and light disturbance from the site

13.66 Some habitats and species are vulnerable to increased levels of pollutants that may be deposited because of certain developments. This includes facilities that emit certain pollutants from the burning of waste materials. These pollutants include oxides of nitrogen, sulphur dioxide and ammonia. Fichtner Consulting Engineers Ltd has carried out detailed modelling of the emissions from the proposed ERF and assessed the impacts on nearby sensitive receptors. This includes modelling the distance of dispersal and concentrations at those distances. No mitigation has been proposed in relation to preventing impacts on protected sites and therefore assessment of impacts on ecological receptors is fully in the absence of mitigation.

13.67 The internationally protected sites considered for potential impacts from air quality issues include Duncton to Bignor Escarpment SAC, designated for the Annex I habitat *Asperulo-Fagetum* beech forests and the Arun Valley SAC, designated for the Annex II species ramshorn snail and the Ramsar and SPA sites, designated for wetland habitats and winter bird assemblages.

13.68 A habitats regulations assessment (HRA) has been carried out to assess the potential impacts of air quality changes from pollutants on the Duncton to Bignor Escarpment SAC, which, at 9.5 km away, is just within the standard 10 km

consultation zone for internationally protected sites. Using data from the Fichtner air quality assessment and standard baseline critical level and load thresholds for the protected site, the HRA concluded that there would be no likely significant effects on the interest features of the protected site relating to air quality from the proposals, due to the extremely low contribution of pollutants at this distance.

13.69 Natural England requested (during EIA Scoping) that the Arun Valley protected sites were also assessed. These sites are 10.17 km north east of the proposed development. At this distance, the deposition of pollutants will be similar to those at the Duncton to Bignor Escarpment site and therefore also below threshold deposition levels. No likely significant effects on the interest features of these sites are predicted from air quality issues.

13.70 The proposed development is sufficient distance from the internationally protected sites to not cause direct disturbance on the interest features. Furthermore, the development type will not lead to an increase in recreational activities at the protected sites. The in-combination effects of the proposals, including air quality, in the absence of mitigation, are assessed to be slight and not significant. At the identified locally designated site (the Ford Ancient Woodland), the process contribution for all pollutants is less than 1% of the long-term and 10% of the short-term Critical Level and Critical Loads, with the exception of annual mean impacts of the following pollutants:

- Oxides of nitrogen - 1.25% of the Critical Level;
- Airborne ammonia – 3.1% of the Critical Level; and
- Nutrient nitrogen deposition on a broadleaved deciduous woodland habitat – 3.18% of the lower Critical Load function (10-20 kgN/ha/yr).

13.71 Elevated levels of nitrogen deposition have been identified as driving biogeochemical responses in woodlands leading to reductions in soil carbon-nitrogen ratio, acidification and increased nitrate leaching. However, the impact of nitrogen deposition on woodland vegetation composition is poorly understood due to the strong influence the tree canopy structure has on ground flora through intercepting light, rainfall and pollution. Woodland management also has a significant influence on ground flora.

13.72 A study of mixed woodlands around four intensive livestock units in Scotland found marked changes in species composition within 300m (downwind) of the units (Pitcairn el al, 2009) with increase abundance of wavy hair-grass and Yorkshire fog recorded, along with stinging nettle and raspberry. Species such as wood sorrel, sweet woodruff, tormentil and common spotted orchid were less abundant as were moss species.

13.73 A much more wide-ranging survey of 103 woodlands surveyed in 1971 and revisited in 2001 found that overall species richness was unaffected by nitrogen but individual species showed differing responses to nitrogen which lead to changes in the composition of communities (Kirby et al, 2005). Species that responded positively to increased nitrogen included cleavers, lady fern, pendulous sedge and stinging nettle. Those that responded negatively included wavy hair grass and Yorkshire fog (the opposite relationship to the one described by Pitcairn.

13.74 The lack of overall changes in species richness were considered to be because much woodland flora tends towards the upper and middle of the Ellenberg spectrum for nitrogen. Observable impacts on woodland flora may be as a result of the influence from localised sources of ammonia (as in the study by Pitcairn) and not apparent at a national level. The influence of canopy shading was also considered to be a factor in dampening responses of lower plants to nitrogen.

13.75 The lack of an overall relationship between species richness and nitrogen deposition makes it difficult to assume a dose-response relationship to broad-scale nitrogen deposition in woods over a national scale. It is considered more likely that the edges of woodlands are likely to be affected by a nearby pollutant source such as intensive livestock farms, but the effect of nitrogen deposition from diffuse sources is less apparent.

13.76 For small isolated ancient woodland sites such as Ford Wood the effects of nitrogen additions will be compounded by the edge effect. Studies have suggested that species-richness is greater around the fringes of ancient woodland and a number of factors have been suggested that may influence plant distribution and abundance such as air temperature, light intensity, exposure and greater resource availability.

13.77 Edge effects are considered by foresters to extend into woodland by approximately three times the canopy height of the woodland. This means for very small woodland site with a canopy of mature trees the edge effect can influence the ground flora throughout much of the woodland. This is likely to be the case within Ford Ancient Woodland where the maximum width of the woodland is approximately 130-160 m

13.78 Studies have also shown that nitrogen applications on farmland adjacent to ancient woodland has a detectable influence on soil pH and Ellenberg nitrogen up to 30 m from the woodland edge. Nutrient demanding species such as bramble, cleavers and stinging nettle were all more abundant on woodland edges adjacent to arable farmland than those woodlands with edges adjacent to semi-natural habitats (Bateman et al, 2004).

13.79 Ford Ancient Woodland is located approximately 1.3 km to the north of the site. Analysis of aerial photos show that it is surrounded by agricultural grassland, highly likely to be the subject of additions of artificial fertilizers. APIS gives a background rate of nitrogen deposition of 20.72kg/N/ha/yr for this woodland which exceeds the upper end of the critical load range given for broad-leaved deciduous woodland.

13.80 The influences of edge effects and diffuse nitrogen inputs from agriculture are considered likely to be more significant factors affecting the composition of woodland flora within Ford Ancient Woodland than the levels of deposition predicted to occur as part of these proposals.

13.81 The baseline conditions are likely to be favouring more nutrient demanding species due to the small size of the woodland and its location (surrounded by agricultural fields). Small additions of nitrogen from the proposed scheme are unlikely to lead to significant changes in the woodland flora at such a small site.

13.82 Studies of the levels of additional nitrogen deposition required to affect the loss of a single species from measured species richness across a range of habitats (lowland heath, upland heath, sand dunes and acid grassland) have all demonstrated a clear relationship: sites with high levels of background nitrogen deposition can tolerate larger increases in additional nitrogen deposition before a further species is lost. For sites with background levels of nitrogen deposition of 20kg/N/ha/yr increased deposition in the region of 1.3kg/N/ha/yr or greater could result in the loss of a single species.

13.83 Given the high rates of background nitrogen deposition, the small size of the woodland, the prevalence of nutrient demanding species in woodlands and the small increase in nitrogen deposition predicted on this receptor, no significant effects on this site, in terms of species composition are expected

13.84 The PC for airborne ammonia and nitrogen oxides exceeds 1% of the relevant critical level. However, in both cases the overall PEC is below the relevant threshold set for the protection of vegetation. No adverse impacts on Ford Ancient Woodland are anticipated from the increase in NOx and NH_3 predicted to occur as a result of the operation of the facility. None of the information collected as part of the baseline indicated that Ford Ancient Woodland supports lichen or bryophyte assemblages of any significance, therefore the critical level of ammonia set for lower plants has not been used for the assessment of impacts. The woodland is sufficient distance from the local road network for NOx and NH_3 emissions from road traffic not be a significant issue.

13.85 Other habitats immediately surrounding the site are largely agricultural and of low value for biodiversity. Potential negative effects on ecological receptors are restricted to excess noise and lighting that may be emitted from the development and disturb protected species.

13.86 Habitats surrounding the site are of low biodiversity value. There are likely to be low numbers of common and widespread bat species using habitats surrounding the site for commuting and foraging. No other protected species issues are likely due to the distance that suitable habitats are from the proposals.

13.87 Landscape and lighting schemes have been produced for the site. These include light modelling for levels emitted from the site and proposals to minimise noise levels. The lighting scheme shows that 0.1 lux will be the maximum level experienced on the majority of the site boundary, with the exception being the southern site boundary, where levels vary between 0.5-5 lux. The western, northern and eastern boundaries are where mitigation and enhancement habitats are located for wildlife. Lux levels are below guideline levels for ensuring no lighting disturbance on the behaviour of bats and other wildlife on all of these features. The southern boundary does not face onto habitat of value to bats and other wildlife and newly planted trees and fencng are likely to provide additional buffering of light spill from the site. Therefore, no negative impacts from lighting are likely along this boundary. The red safety light on the stack is not of a specification considered to be disruptive to bat species due to the wavelength of the light emitted and the expected light spill within the vertical and horizontal plane. The effects of the proposed lighting scheme on bats in the absence of mitigation, are assessed to be slight and not significant.

13.88 The proposed development includes landscaping of bunding on the western, northern and eastern sides, with vegetation on the southern boundary. All boundaries also have an acoustic fence proposed. These landscape proposals and the isolation of the site from noise sensitive ecological receptors will ensure that there are no significant effects from noise disturbance.

On site

Habitats

13.89 No habitats will remain on site post-construction (as assessed previously) and therefore, no effects are considered.

Fauna

13.90 In the absence of mitigation and enhancements, the increased built up nature of the site will be largely unsuitable for roosting, foraging and commuting bats, nesting birds and invertebrates, compared to pre-construction levels. Considering the low importance of the site for these species pre-construction, the effects are considered to be slight and not significant.

Mitigation and monitoring

Construction phase

Off site receptors

13.91 There are no predicted impacts on off site ecological receptors during the construction phase, however, following a standard safe working plan for the works is good general practice. This prevents any impacts on adjacent and nearby receptors, even if of low value. The following methods will be employed as good working practice:

- Cover, seed or fence stockpiles to prevent wind whipping
- Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site
- Avoid site run-off of water or mud
- Ensure an adequate supply of water on site for dust suppression
- Ensure the use of quiet working methods, the most suitable plant and reasonable hours of working for noisy operations, where reasonably practicable
- Screen plant to reduce noise by increasing the distance between the source and the receiver
- Close acoustic covers to engines when they are in use or idling
- Protect storage areas and vehicle refuelling / maintenance areas with an impervious base and provide impermeable bunds of an adequate capacity around tanks containing potential pollutants
- Use drip trays and regular maintenance checks for construction plant
- Avoid working at night during the summer months

On site receptors

Vegetation

13.92 The construction phase will result in the loss of approximately 0.15 ha of poor semi-improved grassland, 0.12 ha of bramble scrub and 120 m of non-native hedgerow. This equates to a loss of 0.27 ha of habitats with biodiversity value and 120 m of hedgerow with biodiversity value. Table 13.8 shows the habits that will be created on site to mitigate for the loss of existing habitats.

13.93 The scrub and hedgerow provide habitat for nesting birds, which are protected during the breeding bird season from March to September inclusive. The mitigation for protecting nesting birds during site clearance is specified in the fauna, breeding bird mitigation section below.

Receptor lost	Mitigation habitat proposed	Area of habitat
Poor semi-improved grassland	Conservation grassland will be sown on the bunds surrounding the development. Emorsgate EH1 and EG1will be used. EH1 contains wild flowers and grasses that are tolerant of semi-shade and is suitable for sowing beneath newly planted or established hedges and on woodland edges, rides and glades. In this instance it will be sown below newly created scrubby areas. EG1 will be sown into open meadow areas due to its mix favouring sunny and dry conditions.	0.60 ha
Scrub	Scrub will be planted on the bunds surrounding the development. The planting mix will include, 15% Guelder rose (*Viburnum opulus*), 20% Wayfaring tree (*Viburnum lantana*), 15% elder (*Sambucus nigra*), 5% *Rubus fruticosus*, 5% dog rose (*Rosa canina*), 20% blackthorn (*Prunus spinosa*) and 20% spindle (*Euonymus europaeus*).	0.09 ha
Non-native hedgerow	A native species-rich hedgerow will be planted along the base of the northern site bund with the planitng consisting of the following native species- 15% hazel (*Corylus avellana*), 65% hawthorn (*Crataegus monogyna)*, 5% crab apple (*Malus sylvestris*), 5% blackthorn, 5% dogrose and 5% guelder rose.	360 m

Table 13.8: Habitats to be planted as mitigation for habitats lost on site

13.94 The proposed habitat mitigation planting scheme for the site, will result in the creation of an additional 1.66 ha of habitat compared to baseline levels. Furthermore, the habitats created will be of higher biodiversity value than the existing habitats. This will reduce the overall magnitude of change from the total loss of habitats to negligible and the effects to slight and not significant.

Fauna

13.95 The only specific mitigation required for protected species related to the proposed development, is the consideration of nesting birds during the removal of on-site vegetation. To prevent the disturbance of nesting birds, the following methods for site clearance should be employed:

- Vegetation should be removed outside of the breeding bird season, between October and February, or

- Vegetation can be removed during the breeding bird season if preceded by a nesting bird check by a suitably experienced ecologist. Any nests that are recorded must be left with a 5 m exclusion zone around them until all of the chicks have fledged. For some species this may be up to five weeks

13.96 Using these mitigation methods will ensure no nests are disturbed or lost to the clearance works. The site is of low importance for nesting birds, the magnitude of change remains small, and the effect is reduced to slight and not significant.

Enhancements

13.97 In addition to the mitigation habitats to be created on site, additional habitat and species-specific features will be created and installed to provide enhancements for the site. These are summarised in table 13.9, with locations shown in figure 13.6.

Feature to be created	Description	Area/amount of habitat
Pollinator rich grassland	BFS 14- Brownfiled site mix to be sown along northern access track to provide a native species rich mix of flowering plants for pollinator species.	0.37 ha
Native mixed woodland (young trees planted)	Woodland planting of young trees. Includes a native woodland mix and species to form screening of the building in strategic areas. Mix consists of- 5% field maple (*Acer campestre*), 20% alder (*Alnus glutinosa*), 12.5% silver birch (*Betula pendula*), 2.5% hornbeam (*Carpinus betulus*), 2.5% dogwood (*Cornus sanguinea*), 17.5% hazel, 6% hawthorn, 2.5% crab apple, 12.5% aspen (*Populus tremula*), 2.5% blackthorn, 5% English oak (*Quercus robur*), 1.5% dog rose, 5% crack willow (*Salix fragilis*) and 5% rowan (*Sorbus aucuparia*).	0.83 ha
Ground based green walls	Gabion walls to be planted up with 25% ivy (*Hedera helix*).	360 m
Specimen tree planting	The following tree species will be planted along the southern boundary and in the eastern end of the site- Callery pear (*Pyrus Chanticleer*) x10, English oak 'Koster' (*Quercus robur* 'Koster') x14 and another 27 standard English oak.	0.1 ha
Wildlife pond	A wildlife pond will be installed in the centre of the western boundary of the site. This serves dual purpose, paying reference to the canal that used to run through the site and providing a water resource for a variety of species. The pond will be planted with native aquatic vegetation.	0.01 ha
Bat boxes	A total of five bat boxes will be integrated into the walls of site buildings. Schwegler 2FR connected tubes will be the most likely model.	5 boxes
Bird boxes	A total of fifteen bird boxes will be installed around the site. These will include swift (*Apus apus*) boxes, house sparrow (*Passer domesticus*) terraces, grey and pied wagtail boxes on gabion walls and boxes for a variety of passerines integrated into the buildings and installed on trees.	15 boxes
Bug hotels	Five bug hotels will be installed on site. These will be installed in sunny locations along the eastern boundary of the site.	5 Hotels

Table 13.8: Enhancement features to be created and installed on site

13.98 All mitigation and enhancement habitat will be included in a landscape and ecological management plan (LEMP) for the site, which will specify the long term

management strategy for the proposed habitats, to ensure they reach their target condition and are maintained at that condition. It is anticipated that the LEMP would be secured through condition.

Biodiversity net gain

13.99 Under the requirements of the NPPF in relation to development and biodiversity, there should always be a net gain from any new development and under the forthcoming Environment Bill, all developments will be required to seek a minimum 10% net gain from existing levels on site. To help quantify this, a metric has been designed and released by DEFRA, which places a value on existing habitats in relation to the proposed development scheme.

13.100 This scheme was placed through the metric, with all habitats lost and their condition entered, and then all proposed habitats and their time to reach a suitable condition entered. Habitats and hedgerows are given a value based on units. The change in these is calculated using a percentage to reflect either a positive or negative change. The metric provided the figures shown in table 13.9.

Baseline units	Post development units	Total net % change
Habitat units- 1.08	Habitat units- 8.42	+763.12%
Hedgerow units- 0.52	Hedgerow units- 2.03	+390.34%

Table 13.9: Enhancement features to be created and installed on site

13.101 Table 13.9 shows that there will be a 763.12% net gain in the biodiversity value of habitats at the site post-development and a 390.34% net gain in the biodiversity value of the hedgerow units post development. These figures do not consider non-habitat creation measures such as the proposed bird, bat and bug boxes. Therefore, the proposed development is calculated to have significant positive impact on the biodiversity value of the site compared to baseline levels.

Residual effects

13.102 None of the expected effects on ecological receptors on or off site were assessed to be significant and therefore no residual effects are considered.

Cumulative effects

13.103 Although the proposed development is unlikely to have any significant effects on ecological receptors in isolation, there are other developments proposed nearby, that in combination may lead to an effect. There are a total of eighteen proposals within 2 km of the proposed development. These include twelve proposed / allocated housing developments, a secondary school (at the strategic allocation stage), Ford Airfield Market, a small inert waste recycling facility, a concrete batching plant, council salt storage building and a horticultural development on existing agricultural land.

13.104 The housing developments / allocations (see table 5.5 and figure 5.2 in chapter 5) represent the largest potential effect on local biodiversity, due to the total number of houses proposed and the area that this will cover, which includes the habitats adjacent to the four boundaries of the proposed ERF and WSTF site. The majority of these habitats are currently intensive agriculture, with features of

biodiversity value being limited to hedgerows and blocks of woodland. Significant green infrastructure is proposed as part of the housing development and it is likely that landscape scale connectivity will improve post development. In combination with the ERF and WSTF proposals, there are not likely to be any significant cumulative effects on local ecological receptors retained as part of development.

13.105 None of the cumulative schemes listed in chapter 5 include point source emissions, so there is no potential for cumulative effects with the stack emissions from the ERF. However, a number receptor points have been included in the dispersion modelling to represent the proposed or allocated residential developments identified as being within the modelling domain. The impact of process emission on these receptor points has been assessed as part of the main assessment. All of the identified internationally protected sites are located at a significant distance away from the proposed development and cumulative schemes and there is unlikely to be an effect on these sites relating to air quality. Ford Ancient Woodland priority habitat is however within 2 km of the proposals and has a road (Ford Road) that provides access to the A27, approximately 225 m to the east of it. The woodland is sufficient distance from the local road network for nitrogen oxides and ammonia emissions from road traffic to not be a significant issue.

13.106 Proposals WSCC/037/19, CM/6/18/PL, F/4/18/PL and F/30/18/P, for a new inert waste recycling facility, concrete batching plant, council highway maintenance building and a new horticulture complex are small proposals and significantly isolated from the proposed ERF and WSTF for there to be no cumulative effects on local ecological receptors.

13.107 Overall, there are unlikely to be any significant cumulative effects on the ecological receptors identified as part of this study, including internationally protected sites and local priority habitats.

Fall-back position

13.108 An application for a waste treatment facility on part of the proposed development site was previously made in 2013 and approved in 2015 (WSCC/096/13/F). The previous proposal would have resulted in a complete loss of habitats at the site and baseline conditions were broadly similar, with slightly less established habitats. The overall impacts of the waste treatment facility proposals on statutory protected sites, habitats and species in the absence of mitigation were assessed as very minor and not significant. Proposed mitigation and enhancements for the 2013 project were significantly less than the current proposals for the ERF and WSTF, although the project was, overall, of smaller scale than the current proposal.

13.109 Comparatively, there is no difference in the significance of effects on ecological receptors, however, the current proposals will result in a significantly higher biodiversity gain for the site post-construction.

Sensitivity of receptor – Natural heritage

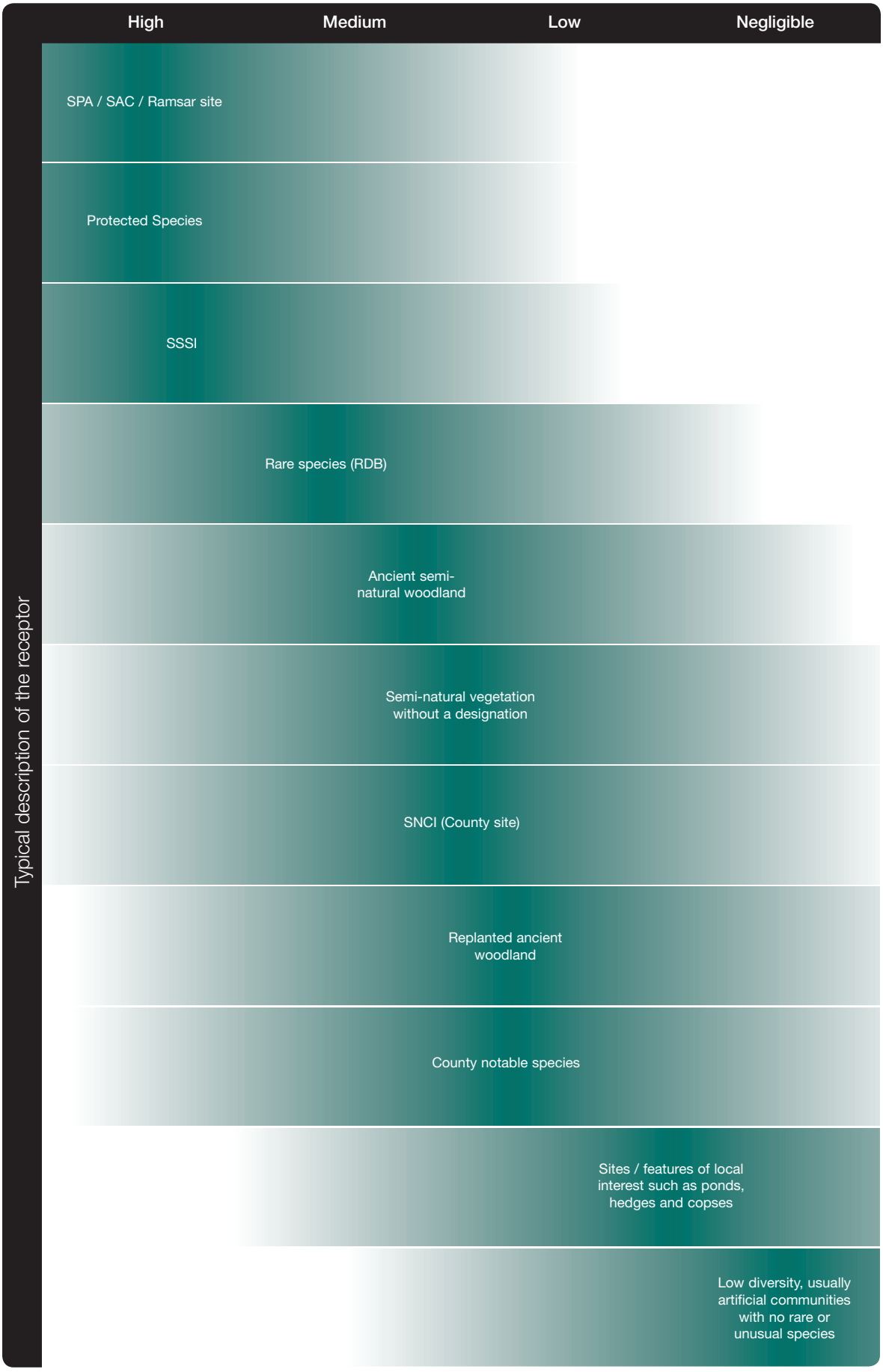
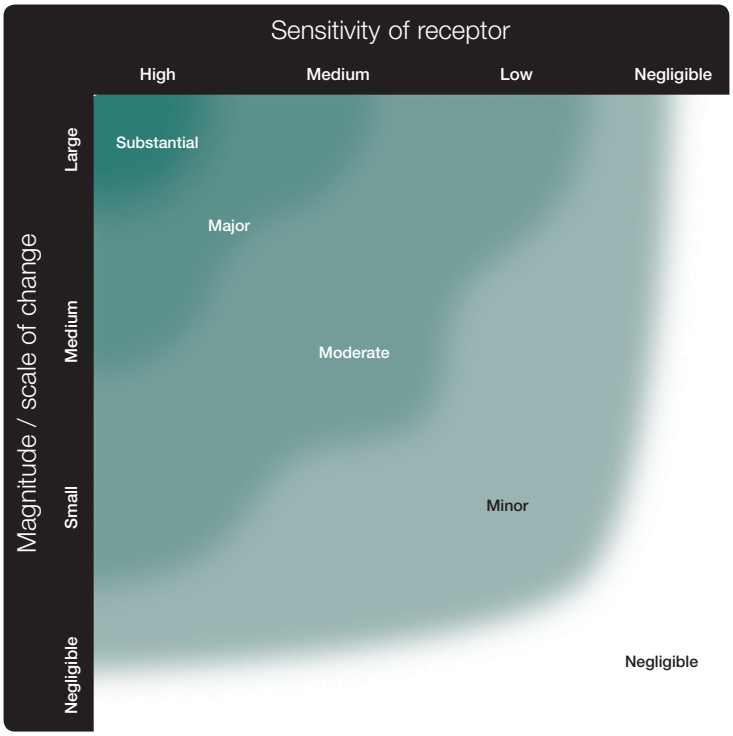


Figure 13.1 Receptor sensitivity (natural heritage)

Magnitude of change – Natural heritage

Figure 13.2 Impact magnitude (natural heritage)

Determination of effect matrix – Biodiversity



Professional judgement can be used to vary the category where specific circumstances dictate, for example due to the vulnerability or condition of the receptor.

For example, woodlands that are important for their breeding bird interest may be vulnerable to noise and visual disturbance, while woodlands that are important for their botanical interest will not. The reason for and nature of any variation will be made clear in the assessment.

Degrees of effect

Substantial:
A major change in the numbers of one or more very important species or the composition or extent of very important communities, or those which support beneficial or very important species. This might be a reduction or complete eradication of a species, which for some organisms could lead to a negative effect on the functioning of the particular ecosystem and/or other connected ecosystems.

Major:
A marked change in the numbers of one or more important or very important species or the composition or extent of important or very important communities, or those which support beneficial or important species.

Moderate:
A marked change in population densities or community composition or extent, but not a change which results in total eradication of a species or community or which has any marked effect on important or beneficial species, or important communities.

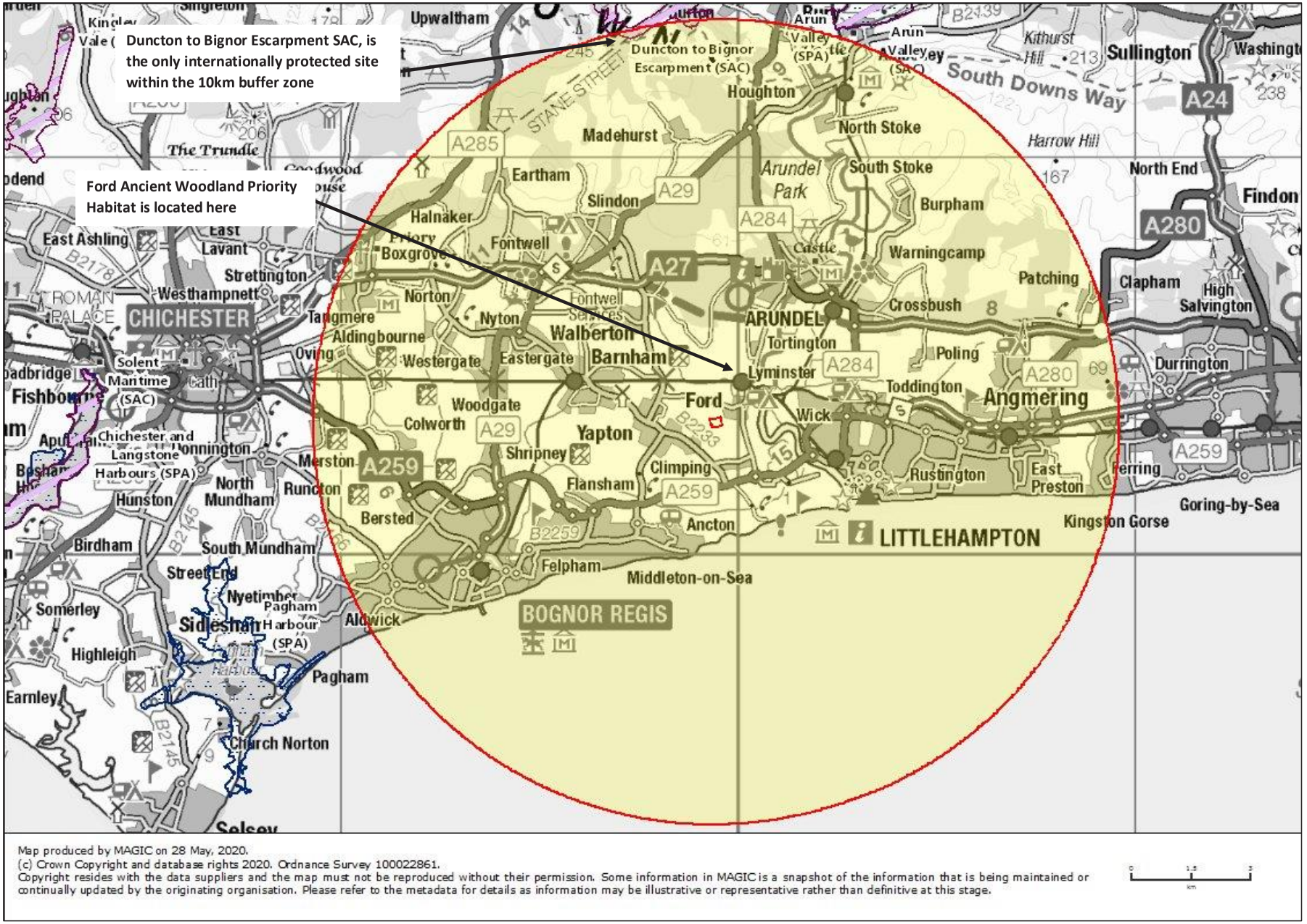
Minor:
Some change in the population densities or community composition or extent, but without total eradication of any species or community, and with no effects on important species or communities, or ecosystem function.

Negligible:
No marked changes in any of the populations in the environment or in any ecosystem functions.

Significance

If the degree of effect is moderate or above, then the effect is considered to be significant.

Figure 13.3 Degree of effect matrix (natural heritage)



Proposed development

10km site buffer

Figure 13.4
Designated sites

Figure 13.5
Phase 1 survey results

KEY:

- Site Boundary
- Indicative Existing Vegetation
- Gabion Wall
- 1.1m Guard Rail
- Concrete Retaining Wall
- Proposed Contours
- Proposed Spot Heights
- Sloped Landform
- 2.4m Acoustic Fencing
- 2.4m Acoustic Fencing
- Former Canal
- Loose Gravel
- Pastel Blue Block Paving to indicate former Canal Alignment
- Proposed Benches
- Proposed Pond
- Hedge
- Proposed Semi-Mature Trees
- Proposed Heavy Standard Trees
- Woodland
- Feathers Visual Screening Woodland
- Scrub
- Meadow Grass Mix
- Low Vigor Grass Sward
- Wildflower Mix
- Marginal Planting

landscape scheme by axis

based on site layout by GSDA

Figure 13.6
Location of proposed habitat and species-specific enhancement features