6 Ornithology

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6 Ornithology

6.1 Executive Summary

6.1.1 Following consultation with Scottish Natural Heritage, a suite of ornithological surveys was adopted for the purposes of assessing the avian baseline conditions for the Proposed Development. The surveys included: 24 months of vantage point surveys between April 2016 and March 2018 (updating earlier surveys carried out in 2011-2014), while breeding bird surveys, breeding raptor surveys and winter walkover surveys were all undertaken between 2012-2016.

6.1.2 Five species of high conservation value raptor and owl, and four species of common raptor and owl were registered during the breeding season. None were assessed as breeding within the site or within the 2 km survey area. Greylag goose was recorded during the non-breeding season. Five species of gull were recorded during both the breeding and non-breeding seasons. Three species of waders were recorded during all surveys, two of which were assessed as probably or possibly breeding within the Study Area and the third (golden plover) was a brief winter visitor. Black grouse lek surveys were completed in 2013 confirming no birds within the development area and 1.5 km survey buffer. As none of the other ornithological surveys registered any black grouse, they have been assessed as absent from the Study Area.

6.1.3 The levels of recorded flight activity are considered to be relatively low and recorded at risk flight time facilitated collision risk modelling for one target species only: osprey. In addition, due to close proximity of the Renfrewshire Heights Special Protected Area (SPA) which is designated for its breeding population of hen harrier, scenario modelling was undertaken in order to assess the potential impacts on the SPA population if breeding returned to levels recorded at the point of citation (i.e. 10 breeding pairs) as compared to the current situation where no breeding pairs have been recorded.

6.1.4 The results of earlier surveys undertaken for the Proposed Development at the same location (although for a larger study area) were compared with current survey results. It was concluded that there has been very little change in baseline conditions at the site since the earlier surveys were conducted.

6.1.5 An assessment of ornithology effects arising from the construction, operation and decommissioning of the Proposed Development was undertaken, based on the proposed layout and turbine dimensions. Through a standardised evaluation method, Important Ornithological Features were identified and brought forward for assessment. These features include two designated sites (Renfrewshire Heights SPA/SSSI; Renfrewshire Heights Important Bird Area) and five species and species groups (curlew, osprey, hen harrier, gull species and other (passerine) species).

6.1.6 In line with industry guidelines and best practice, the impact assessment process assumes the application of standard mitigation measures. With these in place, predicted effects are considered to be barely perceptible and therefore not significant for all Important Ornithological Features. With further specific mitigation, residual effects for the construction and operation phases are considered to be barely perceptible, i.e. not significant. Given the Site's proximity to the adjacent SPA (and the unfavourable declining status of the qualifying feature), a "shadow" Habitats Regulations Appraisal was undertaken, based on a theoretically recovered population, which concludes that the operation of the Proposed Development would not adversely affect the integrity of the SPA or it's conservation objectives.

6.1.7 Likely cumulative effects of nearby operational developments, as well as those currently consented or at application stage of planning, were also considered and no significant cumulative effects are anticipated as a result of the Proposed Development.

6.1.8 The assessment concludes that the Proposed Development would not result in significant adverse effects on any of the ornithological interests within the study area.

6.2 Introduction

Scope of Study

6.2.1 This chapter considers and provides an assessment of the likely effects of the Proposed Development on the ornithological interests both within the development boundary (i.e. 'the site') and the surrounding area.

6.2.2 This chapter of the EIA Report presents the baseline ornithological interests and considers the potential impacts of the Proposed Development on notable species, while focusing on Important Ornithological Features (IOFs).

6.2.3 Potential ornithological effects are outlined and an assessment is provided based on the value of the receptor and the magnitude of the impact giving the significance of the effect. Where appropriate, mitigation measures to enhance, prevent, minimise or control identified ornithological effects are presented and residual ornithological effects following the adoption of those measures are assessed.

6.2.4 This chapter (and its associated figures and appendices) is not intended to be read as a standalone assessment. As such, reference should be made (where applicable) to ornithological Technical Appendices 6.1 and 6.2, as well as other chapters of this EIA Report, as referenced appropriately.

6.2.5 Potential ornithological effects associated with the development of a wind farm can occur throughout the three main phases of a wind farm's lifespan (construction, operation and decommissioning) and may include: direct habitat loss and indirect effects on habitat quality, mortality from collision with turbines and disturbance and displacement impacts.

Description of the Site

6.2.6 The Proposed Development site is located east of Skelmorlie, in North Ayrshire. It comprises of the western extent of Ferret of Keith Moor, the upper part of Skelmorlie Glen. The central grid reference for the site is BNG (221492, 666156) and it occupies an area of approximately 332 hectares (ha). The site location and boundary are shown in Figure 6.1.

6.2.7 The site comprises largely of open upland. Skelmorlie Glen Site of Special Scientific Interest (SSSI), which carries Skelmorlie Water, lies along an east-to-west valley and splits the site from north to south and is designated for upland mixed ash woodland (refer to Chapter 7 Ecology for further details). The Skelmorlie Water also bisects the site, entering the Proposed Development boundary at its north-eastern extent and exiting at its south-western extent.

6.2.8 There are a number of minor watercourse and drainages ditches which cross the site and flow into Skelmorlie Water and Outerwards Reservoir including Rigghill Burn, Fank Burn and numerous un-named watercourses (refer to Chapter 10 Geology, Peat, Hydrology and Hydrogeology for further details).

6.2.9 There is one residential property located within the turbine development area, Fardens, which will be uninhabited for the lifetime of the Proposed Development.

6.2.10 The site is within the Clyde Muirshiel Regional Park. On the north-eastern boundary lies Renfrewshire Heights Special Protection Area (SPA) and SSSI, which is designated under Article 4.1 by regularly supporting (at the time of citation) a breeding population of European importance of the Annex 1 species hen harrier (*Circus cyaneus*) (i.e. on average 2% of the UK breeding population).

6.2.11 To the west of the site runs the North Ayrshire coastline. The coastline has been heavily industrialised in the past and contains a number of coastal communities, including Greenock, approximately 9.6 km to the north, and Largs approximately 4.7 km to the south. To the west is the Firth of Clyde, leading to the Irish Sea, and the Isle of Bute. The village of Skelmorlie is to the west of the site. Weymss Bay merges with Skelmorlie to the north, and it is to here that the train line from Glasgow terminates. Weymss Bay also contains the port for the ferry between Rothesay on the Isle of Bute and the mainland.

Statement of Competence

6.2.12 The assessment has been carried out in accordance with the Code of Professional Conduct of the Chartered Institute of Ecology and Environmental Management (CIEEM) by Allan Taylor (BA (Hons), MSc. ACIEEM) and Richard King (BSc (Hons), MSc., MCIEEM), ecologists and ornithologists with over 18 combined years' experience.

6.3 Legislation, Policy and Guidelines

6.3.1 Relevant legislation documents have been taken into account as part of this ornithological assessment. Of particular relevance are:

- Council Directive 2009/147/EC on the conservation of wild birds (i.e. the "Birds Directive");
- The Ramsar Convention on Wetlands (1975);
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended);
- The Wildlife and Countryside Act (WCA) 1981 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011 (as amended);
- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Scottish Biodiversity Strategy, with Scottish priority species and habitats listed on the Scottish Biodiversity List (SBL), is also pertinent and is based on the former UK Biodiversity Action Plan (UK BAP), and regional biodiversity targets defined through the North Ayrshire Local Biodiversity Action Plan (LBAP) (North Ayrshire Council, 2015); and
- Eaton *et al* (2015), Birds of Conservation Concern (BoCC) 4: the Population Status of Birds in the United Kingdom, Channel Islands and the Isle of Man.

Planning Policy

6.3.2 Chapter 16 of this EIA Report sets out the planning policy framework that is relevant to the EIA process. The policies set out include those from the North Ayrshire Local Development Plan (North Ayrshire Council, 2019), those relevant aspects of Scottish Planning Policy (SPP), Planning Advice Notes and other relevant guidance. In addition to policies within SPP and the LDP relevant to ornithology and nature conservation, regard has been had to the Planning Advice Note (PAN) 60: Planning for Natural Heritage (amended in 2008).

Best Practice Ornithological Guidance

6.3.3 As well as detailed consultation with Scottish Natural Heritage (SNH), current best practice guidance on assessing ornithological interests in relation to onshore wind farm developments was followed. A full description of relevant guidance is presented in Appendix 6.1; however, of particular relevance to ornithology are the following:

- Guidelines for Ecological Impact Assessment in the UK and Ireland (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018);
- Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment (IEMA), 2005);
- Survey Methods for Use in Assessing the Impacts of Onshore Wind Farms on Bird Communities (SNH, 2017);
- Windfarms and Birds: Calculating a Theoretical Collision Risk Assuming No Avoiding Action (SNH, 2000);
- Use of Avoidance Rates in the SNH Wind Farm Collision Risk Model (SNH, 2018);

- Developing field and analytical methods to assess avian collision risk at wind farms (Band *et al*. 2007); and
- Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2012).

6.4 Consultation

6.4.1 Details of consultees and the applicant's action are provided in Table 6.1. For the purposes of brevity, comments made with reference to terrestrial ecology are not included but can be found in Chapter 7: Ecology.

Table 6.1 – Consultation Responses

Consultee Details	Consultation Response	Applicant Action
Senior Planning Services Manager, North Ayrshire Council, 17/09/2019	"The EIA report should also include an assessment of potential impacts on the Skelmorlie Glen SSSI, the Skelmorlie Glen & Fardens Glen Local Nature Conservation Site and an assessment of potential impacts on the Renfrewshire Heights SPA. Any identified impacts on the SPA should be detailed in enough information to allow an appropriate assessment of the impacts to be made. This should form a distinct section of the EIA."	Impacts on the Skelmorlie Glen SSSI, the Skelmorlie Glen & Fardens Glen Local Nature Conservation Site are covered in Chapter 7 – Ecology and Nature Conservation. The potential impacts on hen harrier / Renfrewshire Heights SPA are detailed in both this chapter and Appendix 6.2.
SNH Area Officer in email to ITPEnergised, 02/05/2019	"Birds - We are satisfied that bird survey good practice guidelines have been followed and that you will have gathered enough data to inform our response."	No action required.
Scottish Natural Heritage, Area Officer, 30/08/2019	"I can confirm that I have reviewed the report and I trust that the following comments will be helpful: - The baseline ornithological studies have been undertaken to a recognised methodology and the resulting data remains valid."	No action required.
Scottish Wildlife Trust, 30th September 2019.	"The site is also adjacent to the Renfrewshire Heights SPA which was designated for its breeding Hen Harriers. These have not been doing well recently but the current situation will need to be assessed; as will the effect the wind farm might have on the chances of a recovery of the harrier population in the area. "	Hen harriers and the proximity of the Renfrewshire Heights SPA have been fully considered within the assessment, including theoretical modelling of impacts on a healthy, recovered SPA population are considered.

Consultee Details	Consultation Response	Applicant Action
	According to paragraphs 6.5.8 and 6.5.9 of the scoping request, the information on Black Grouse and owls is out of date. The current situation regarding these species should be surveyed.	Black grouse were not recorded during all black grouse surveys, breeding bird and raptor walkover surveys or during 3 years of vantage point survey completed between 2011-2014 so further survey work was not deemed necessary. Searches for barn owl were undertaken during breeding raptor walkover surveys and short-eared owl records covered during vantage point watches. Nocturnal owl surveys were not repeated due to a lack of records from the initial 2013 survey and due to the fact that the latest SNH guidance outlines the need to prioritise 'target' species and common nocturnal owls, such as tawny and long-eared owl, are not considered target species.

6.5 Assessment Methodology and Significance Criteria

6.5.1 This section identifies the 'key ornithology and nature conservation issues' which have been considered as part of the Ornithological Impact Assessment, describes the methods used to establish baseline conditions and assess the magnitude and significance of the potential ornithological effects of the Proposed Development.

Design Iteration

6.5.2 It should be noted that the Proposed Development has gone through a number of iterative design changes since the commencement of survey work in September 2011. The present design was used for all surveys undertaken between April 2016 and March 2018. Whereas earlier surveys were conducted according to larger design iterations, extending further west and east from the final design boundary (refer to Chapter 2 for further details).

6.5.3 The following assessment is based on the final site layout, although any records relevant to the current assessment from the earlier, wider survey area have been included and referenced accordingly for clarity. The figures accompanying this chapter show the final, smaller application area.

Desk Study

6.5.4 A desk study was undertaken of web-based resources to identify baseline data for the Proposed Development site and wider area. Where relevant, the desk study was supplemented by consultation with relevant non-statutory organisations for a 5 km radius of the Proposed Development. Specific details of the parameters of the desk study are included in Appendix 6.1.

Site Scoping

6.5.5 The scope of the ornithology surveys, including field survey methods and vantage point (VP) locations, were developed and agreed with SNH, taking cognisance of current best practice guidance (SNH, 2014, and subsequent 2017).

Field Studies

6.5.6 Vantage point surveys for the current Proposed Development were carried between April 2016 and March 2018. Surveys were carried out at a variety of times and in different weather conditions to ensure data were collected that were fully representative of a range of behaviour patterns. All surveys were undertaken by suitably qualified and experienced ornithologists.

6.5.7 SNH (2017) guidance indicates that wind farm assessments should focus on 'target species'. SNH defines ornithological target species as:

- Those protected under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended);
- Those listed on Annex 1 of the Council Directive 79/409/EEC on the Conservation of Wild Birds;
- Regularly occurring migratory species which are either rare, vulnerable or warrant species consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas is relation to the proposed wind farm; and
- Species occurring at the site in nationally or regionally important numbers.

6.5.8 SNH guidance goes on to note that consideration should be given to species of local conservation concern (i.e. those listed in Local Biodiversity Action Plans), but that target species should be restricted to those likely to be affected by wind farms. Pre-scoping consultation with SNH, combined with the results of the data study, identified that survey work to inform the assessment should account for the potential presence of 'scarce' diurnal raptors, geese and wading bird species within and adjacent to the site.

6.5.9 A summary of the ornithological methods adopted is provided in this Ecological Impact Assessment (EcIA) report, however please refer to Appendix 6.1 for full details.

Study Area

6.5.10 Appropriate study areas for each survey were derived from best practice guidance (SNH, 2017) and are provided below:

- Flight activity VP surveys: the Proposed Development site boundary plus 500 m;
- Breeding birds walkover survey: the Proposed Development site boundary plus 500 m;
- Wintering bird walkover survey: the Proposed Development site boundary plus 500 m and
- Breeding raptor survey: the Proposed Development site boundary plus 2 km.

Vantage Point surveys

6.5.11 SNH guidance advises that VP locations should be selected to achieve maximum visibility from the minimum number of survey locations. An arc of up to 180 degrees extending to 2 km from the observer can be effectively surveyed from each VP (subject to topography, vegetative screening and any other constraints to effective survey). A minimum of 36 hours of survey effort should be completed at each VP during both the breeding season and winter periods, and the timing of VP watches should be varied to ensure that all times of day are appropriately covered.

6.5.12 Two VP's locations were selected from the original design iteration which were had previously been ground-truthed and known to give full coverage of the site. The locations of the VPs and the respective viewsheds are presented in Figure 6.1.

6.5.13 VP surveys were completed over two survey years between April 2016 and March 2018. A total of 72 hours was undertaken at each VP during across both breeding seasons and 84 hours at each VP

during the non-breeding seasons. VP watches were conducted for periods of no longer than 3 hours in a single watch and a minimum 30 minute break was observed between consecutive watches to allow the observer an adequate rest time between VP watches.

Breeding Raptor surveys

6.5.14 Surveys were conducted for breeding raptors and owls, including hen harrier, merlin (*Falco columbarius*) and peregrine (*Falco peregrinus*), between April and July in both the 2016 and 2017 breeding seasons. The survey methods followed Hardey *et al.* (2013) and involved four survey visits in each year (minimum of two weeks apart) walking transect routes focusing on suitable habitat and any prominent features such as rock outcrops or fence lines within the site and a 2 km survey buffer. The breeding raptor walkover survey area is shown in Figure 6.1.

Breeding Bird surveys

6.5.15 A breeding bird walkover method based on the Brown & Shepherd (1993) method was employed and covered the site and a further 500 m survey buffer. The method involved approaching within 100 m of all parts of the survey area to record the presence of waders. Four survey visits were conducted during the period mid-April to early July in 2013 and 2014, with a minimum two week gap between each of the survey visits. This approach follows SNH guidance (2014, and subsequent 2017) which recommends that four survey visits should be completed over the breeding season, based on recommendations set out in Calladine *et al*. (2009).

6.5.16 In addition to recording evidence of breeding waders, the survey method was modified slightly, in terms of timings and the species recorded, to also account for identifying breeding passerine territories as well. This provides contextual information regarding the breeding bird assemblage within the survey area. The breeding bird survey area is shown in Figure 6.1.

Wintering Bird Walkover survey

6.5.17 The wintering bird walkover survey comprised three visits between November 2011 and March 2012 with a further three visits of the extended site between November 2012 and March 2013. The survey area covered the site and a further 500 m survey buffer. All parts of the survey area were approached to within 200 m to record use of the site and surrounding areas by wildfowl and geese, waders, raptors, and gulls. The wintering bird walkover survey area is shown in Figure 6.1.

Other surveys

6.5.18 It should be noted that dedicated black grouse (*Tetrao tetrix*) surveys were undertaken in 2013 and due to a lack of recorded observations during that survey and all subsequent breeding walkover and VP surveys, as well as a lack of suitable habitat for this species, the conclusion was that further surveys were not required.

6.5.19 Dedicated red-throated diver (*Gavia stellata*) surveys were not undertaken due to a lack of suitable breeding lochans noted for this species within the site and immediate surrounds. However, if they did occur, any potential commuting flights to/from breeding lochans in the wider area would have been registered during the VP survey.

Survey Limitations

6.5.20 All surveys were carried out according to current recommended guidelines and took place during the appropriate time of year and under appropriate weather conditions. As such, there are considered to be no limitations to the results.

Assessment of Potential Effect Significance

Evaluation Methods for Ornithological Features

6.5.21 Table 6.2 lists the criteria used to determine the value of ornithological features in a geographical context.

Table 6.2 - Geographical Evaluation Criteria

Scale of Ornithological Value	Criteria	Examples
International	Nature conservation resource, i.e. designated nature conservation area, habitat or populations of species, of international importance. N.B. For designations, such as a Special Protection Area (SPA), this may also include off-site features on which the qualifying population(s) are considered, from the best available evidence, to depend.	International nature conservation areas: – Any Special Protected Area (SPA); – Any potential SPA (pSPA); and – Any Ramsar wetland. Significant numbers of a designated population outside the designated area. Any species listed on Annex 1 of the Birds Directive. A site supporting more than 1% of the EU population of a species
National (Scotland)	Nature conservation resource, i.e. site or population of species, of national importance. NB. Includes designated sites, but may also include off-site ornithological receptors on which the qualifying population(s) of designated sites are considered, from the best available evidence, to depend.	National nature conservation areas: – Any Site of Special Scientific Interest (SSSI) or National Nature Reserve (NNR) designated for ornithological feature(s). – A site supporting more than 1% of the UK population of a species. – Nationally important population / assemblage of a species listed on Schedule 1 of the WCA.
Council area (North Ayrshire)	Nature conservation resource, i.e. nature conservation designation, habitat or species, of importance on a county scale	Statutory and non-statutory nature conservation designations: – Any Local Nature Reserve (LNR); – Any Local Nature Conservation Site (LNC); – Any Scottish Wildlife Trust (SWT) reserve; – A council-scale important population / area of a species listed on the Scottish Biodiversity List (SBL) (Scottish Government, 2013) as requiring conservation action. A county-scale important population/area of a species listed on the LBAP. A county-scale important population / assemblage of species listed on Schedule 1 of the WCA

Scale of Ornithological Value	Criteria	Examples
Local (i.e. within 2km of the site)	Nature conservation resource, e.g. a habitat or species of importance in the context of the local district	A breeding population of a species or a viable area of a habitat that is listed in a Local BAP because of its rarity in the locality. An area supporting 0.05-0.5% of the UK population of a species. Any species included on the Birds of Conservation Concern (BoCC) Red List (Eaton *et al*., 2015). A council-scale important population of an amber-listed species on the BoCC. A breeding population of a species on the SBL. All breeding populations of Schedule 1 species not captured in higher scale categories.
Less than local	Unremarkable, common and widespread habitats and species of little/no intrinsic nature conservation value.	Common, widespread, agricultural and/or exotic species (such as escapees).

6.5.22 Where a feature qualifies under two or more criteria, the higher value is applied to the feature.

6.5.23 In the context of this EcIA report, any ornithological feature of local or higher value is considered an Important Ornithological Feature (IOF).

Impact Assessment Methods

6.5.24 The approach to the EcIA follows the CIEEM guidelines (CIEEM 2018) and considers the factors described below.

Ornithological Zone of Influence

6.5.25 The Ornithological Zone of Influence (OZoI) is defined as the area within which there may be ornithological features subject to effects from the Proposed Development. Such effects could be direct, e.g. habitat loss resulting from land-take or removal of a building occupied by breeding birds, or indirect, e.g. noise or visual disturbance causing a species to move out of the OZoI. The OZoI is determined through:

- review of the existing baseline conditions based on desk study results, field surveys and information supplied by consultees;
- identification of sensitivities of ornithological features, where known;
- the outline design of the Proposed Development and approach to construction; and
- through liaison with other technical specialists involved in the assessment, e.g. hydrologists and noise specialists.

Temporal Scope

6.5.26 Potential impacts on ornithological features have been assessed in the context of how the predicted baseline conditions within the OZoI might change between the surveys and the start of construction.

Characterising ornithological impacts and effects

6.5.27 In accordance with the CIEEM guidelines, the following definitions are used for the terms 'impact' and 'effect':

- Impact – Actions resulting in changes to an ornithological feature. For example, the construction activities of a development removing of woodland; and
- Effect – Outcome to an ornithological feature from an impact. For example, the effects on a species population from loss of woodland.

6.5.28 In accordance with the CIEEM guidelines, when determining impacts on IOFs, reference is made to the following:

- Beneficial or adverse – i.e. whether the impact has a beneficial or adverse effect in terms of nature conservation objectives and policy;
- Magnitude – i.e. the size of an impact, in quantitative terms where possible;
- Extent – i.e. the area over which an impact occurs;
- Duration – i.e. the time for which an impact is expected to last;
- Timing and frequency – i.e. whether impacts occur during critical life stages or seasons; and
- Reversibility – i.e. a permanent impact is one that is irreversible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A temporary impact is one from which a spontaneous recovery is possible.

6.5.29 For the purposes of this assessment, the predicted impacts on an ornithological feature are categorised as 'no impact', 'barely perceptible, 'low', 'medium' or 'high', based on the definitions in Table 6.3.

Table 6.3 - Levels of impact

Level of impact	Definition
No impact	No detectable impacts on the ornithological resource, even in the immediate term
Barely perceptible	Detectable impact but reversible within 12 months. Not expected to affect the conservation status of the nature conservation designation, habitat or species under consideration
Low	Detectable impacts, and may be irreversible, but either of sufficiently small scale or of short-term duration to have no material impact on the conservation status of the nature conservation designation, habitat or species population
Medium	Detectable impact on the status of the nature conservation designation, habitat or species population in the medium term but is reversible / replaceable given time, and not a threat to the long-term integrity of the feature
High	Irreversible impact on the status of the nature conservation designation, habitat or species and likely to threaten the long-term integrity of the feature. Not reversible or replaceable. Will remain detectable in the medium and long term
The following definitions have been applied in respect to timescales: Immediate: Within approximately 12 months; Short term: Within approximately 1-5 years; Medium term: Within approximately 6-15 years; and Long term: More than 15 years.	

6.5.30 The magnitude of any impact on IOFs was categorised according to the criteria outlined in Table 6.3, which is based on a table presented in the CIEEM (2018) guidelines. The concept of integrity refers to coherence of ecological structure and function and includes both temporal and spatial considerations.

6.5.31 Both direct and indirect impacts are considered: Direct ornithological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ornithological impacts are attributable to an action but affect ornithological resources through effects on an intermediary ecosystem, process or feature, e.g. fencing of a development site and subsequent lack of grazing may create suitable grassland for ground nesting birds.

6.5.32 The assessment is undertaken in relation to the baseline conditions that would be expected to occur if the Proposed Development were not to take place, and therefore may include possible predictions of future changes to baseline conditions, such as environmental trends and other completed or planned development. Both adverse and beneficial impacts are possible. It is important to appreciate that this approach is not a rigid framework for assessment and the assessment of impact categories is a matter of professional judgement.

Limitations to Assessment

6.5.33 The surveys were undertaken at the appropriate times of year, under favourable survey conditions and generally with full access to all of the survey areas. As such, no significant limitations are associated with the baseline data obtained.

6.6 Baseline Conditions

Desk Study Results

Designated Sites

6.6.1 As described in Appendix 6.1 and shown on Figure 6.2, the Renfrewshire Heights SPA and SSSI is located adjacent to the north and north-east of the Site boundary. The SPA is designated for supporting breeding populations of hen harrier. The Renfrewshire Heights is additionally listed as an Important Bird Area (IBA) by BirdLife International and RSPB for breeding hen harriers. The extents of the IBA are larger than those for the SPA and overlap the site.

6.6.2 No other sites, both statutory and non-statutory, designated for birds, were recorded within 10 km of the Proposed Development.

Species Records

6.6.3 As described in Appendix 6.1, a desk study search for historical records of bird species recorded within 2 km of the Proposed Development within the last 10 years was undertaken. The search highlighted historical records of 27 species listed on Annex 1 of the Birds Directive and 29 species listed on Schedule 1 of the WCA; of these species twelve are listed on both. An additional 38 bird species are listed on the BoCC Red List and 55 on the BoCC Amber List (Eaton *et al*., 2015).

Field Survey Results And Receptor Evaluation

6.6.4 Full details of the field survey results are provided in Appendix 6.1 with a summary of relevant results used to inform the assessment of potential ornithological impacts provided below. Details of flight lines of target species are presented in Appendix 6.1 and are shown on Figures 6.3 to 6.6.

Raptors and Owls

Hen harrier

6.6.5 Hen harrier were recorded from VP surveys on a total of 14 occasions (see Figure 6.3), all the records were registered during the winter period in either between September and December or in March. The total flight time recorded was 1,215 seconds all recorded below potential collision risk height (see Table 10, Appendix 6.1).

6.6.6 For comparison, in terms of flight activity over time, a total of 53 hen harrier flights were recorded during the earlier VP surveys completed on the original larger site iteration between 2011 and 2014. The total flight time recorded was 4,109 seconds. All of these 53 flights were recorded during the non-breeding winter season. For comparison, the number of hen harrier flights registered and the

flight time recorded has remained constant across all survey years, with an average of one flight recorded every 21.7 hours of VP survey effort between 2011 and 2014 and every 22.3 hours between 2016 and 2018.

6.6.7 Renfrewshire Heights SPA is designated for supporting a breeding population of hen harrier and was assessed as averaging 10 breeding females annually between 1998 and 2004, representing 2 % of the UK breeding population, at the time of citation in 2007. Hen harrier is a Schedule 1, Annex 1 and SBL-listed species, as well as considered to be a species at risk from wind farm developments (SNH, 2018), and therefore receives special protection at a national and international level.

6.6.8 The timing of the observed flights (mid-August to early April) indicates that the birds recorded within the site were not breeding in the immediate area. Male hen harriers typically forage up to and beyond 2 km from nest sites in search of food for the brooding female and the breeding raptor surveys which extend 2km from the site didn't not find any evidence of hen harrier or record any breeding activity.

6.6.9 The site itself has a limited amount of suitable habitat for breeding hen harrier, for example sloping areas of dense heather moorland. However, the surrounding area, most notably north of the site (and within the SPA), contains good habitat for both breeding and foraging hen harrier and may be utilised by this species at some time again in the future.

6.6.10 The results of the surveys indicate that despite the direct proximity of the SPA for breeding hen harrier and suitable habitat directly north of the site for breeding, hen harrier only use the site for foraging during the non-breeding season. The majority of the site is rough pasture which provides good habitat for foraging for hen harriers, with a good density of prey species such as meadow pipit (*Anthus pratensis*) and small mammals such as field vole (*Microtus agrestis*).

6.6.11 Given their regular presence during the non-breeding season and the direct proximity of the Renfrewshire Height SPA, hen harrier are assessed as **Council** importance.

Merlin

6.6.12 An individual merlin flight was recorded 8th February 2018 during VP survey (see Figure 6.4); The breeding raptor and breeding bird surveys recorded no additional evidence of breeding activity by this species.

6.6.13 Merlin are an Annex 1 and Schedule 1 listed species and are also listed on the SBL, BoCC Red list and considered to be a species at risk from wind farm developments (SNH, 2018b). As such, merlin receive protection at both an international and national level, accordingly.

6.6.14 The low level of flight activity suggests that merlin did not breed or overwinter on or adjacent to the site. As such, the site is not considered to support breeding merlin and is rarely utilised by this species. The level of activity within the airspace over the site is insufficient to run collision risk modelling. Therefore, despite the national status of merlin, the importance of the site for this species is considered to be **Less than Local**.

Osprey

6.6.15 An individual osprey (*Pandion haliaetus*) was recorded three times on 15th and 16th August 2016 (see Figure 6.4). One flight, during VP surveys, registered that the bird was carrying a fish; the three observations had a total flight time of 645 seconds, all of which was recorded at PCH. The breeding raptor and breeding bird surveys recorded no additional evidence of breeding activity by this species.

6.6.16 Osprey are an Annex 1 and Schedule 1 listed species, and are also listed on the SBL and are BoCC Amber listed as well as considered to be a species at risk from wind farm developments (SNH, 2018b). As such, osprey receive special protection at both an international and national level, accordingly

6.6.17 Osprey are known to breed within the council area, although not within 5 km of the site boundary, and given the timing of the observed flights (i.e. all within two days and in mid-August) and the lack of records of breeding activity suggests that the bird was on passage, post breeding, and did not breed on or adjacent to the site. As such, the site is not considered to support breeding osprey and

is rarely utilised by a small number of birds. Therefore, given the national status of osprey, the fact that the species has been recorded as foraging in the local area and the flight time of 645 seconds, osprey is considered as of **Local** importance.

Peregrine

6.6.18 Individual peregrine were recorded four times (see Figure 6.4) during VP surveys; with a total flight time of 462 seconds, 392 seconds of which was recorded at PCH. The breeding raptor and breeding bird surveys recorded no additional evidence of breeding activity by this species between 2016-2018.A historic breeding attempt was recorded outwith the site boundary in 2013 and 2014.

6.6.19 Peregrine are an Annex 1 and Schedule 1 listed species, peregrine are also listed on the SBL list as well as considered to be a species at risk from wind farm developments (SNH, 2018b). As such, peregrine receive protection at both an international and national level, accordingly

6.6.20 The breeding raptor walkover survey did not record any presence of peregrine within 2 km of the site, although the presence of records of hunting peregrine records during late May indicates that a breeding pair may remain in the area. Peregrines can travel up to 6 km to hunt during the breeding the season, although are known to take larger prey mostly within a core 2 km range of nest locations (Hardey *et al.*, 2013). The evidence indicates that a breeding pair of peregrine use the site for hunting on an occasional basis. The level of activity within the airspace over the site is insufficient to run collision risk modelling and therefore, despite the national status of peregrine, the importance of the site for this species is considered to be **Less than local** importance.

Red kite

6.6.21 An individual red kite (*Milvus milvus*) was recorded in the north-east of the site on 28th November 2017 during VP survey (see Figure 6.4). The breeding raptor and breeding bird surveys recorded no additional evidence of activity by this species.

6.6.22 Red kite are an Annex 1, Schedule 1 and SBL listed species as well as considered to be a species at risk from wind farm developments (SNH, 2018b). As such, red kite receive protection at both an international and national level, accordingly.

6.6.23 The low level of flight activity suggests that red kite did not breed or overwinter on or adjacent to the site. As such, the site is not considered to support breeding red kite and is rarely utilised by this species. The level of activity within the airspace over the site is insufficient to run collision risk modelling. Therefore, despite the national status of red kite, the importance of the site for this species is considered to be **Less than Local**.

Long-eared owl

6.6.24 An individual long-eared owl (*Asio otus*) was recorded outwith the site on 20th July 2017 during VP survey. The breeding raptor and breeding bird surveys, as well as owl specific transects in 2014, recorded no additional evidence of breeding activity by this species.

6.6.25 Long-eared owl are considered to be a widespread and common breeding species in the UK, considered alongside the low level of flight activity recorded at the site mean the importance of the site for this species is considered to be **Less than Local**.

Wildfowl

Greylag goose

6.6.26 Greylag goose (*Anser anser*) were registered infrequently during VP surveys, with a total of three flights consisting of seven birds recorded (see Figure 6.5). The total flight time recorded was 405 seconds, of which 355 seconds was recorded at potential collision height (PCH).

6.6.27 The fact that the flights recorded were infrequent and linear in nature indicates that the importance of the site for this species is considered to be **Less than Local**.

Waders

6.6.28 Three wader species were recorded from VP surveys: curlew (*Numensis arquata*), golden plover (*Pluvialis apricaria*) and snipe (*Gallinago gallinago*). Breeding bird walkover surveys recorded evidence of breeding curlew (assessed as three probable and one possible territories) and snipe (three probable and one possible territories) within the site boundary and 500 m survey buffer.

Golden Plover

6.6.29 Golden plover were recorded on four occasions during the VP survey, with 33 individuals recorded, including a group of 25 on 28th February 2017, six on 20th of March 2018 and individual birds in August 2016 and January 2018 (see Figure 6.5). The total flight time recorded was 241 seconds of which 201 seconds was recorded at PCH. No evidence of breeding activity was recorded during the breeding bird walkover surveys.

6.6.30 Golden plover is listed as Annex 1 as well as a SBL species and is considered to be a species at risk from wind farm developments (SNH, 2018b). The four flights of 33 birds were recorded within the site between August and February and therefore considered to consist of non-breeding birds in passage across the site. Given the low flight activity and lack of breeding records, despite the conservation status of this species, means the importance of the site for this species is considered to be **Less than local** importance.

Curlew

6.6.31 Curlew was recorded utilising the site as a breeding, feeding and roosting and also passing through the airspace above for commuting, with a total of seven flights recorded during the VP surveys (see Figure 6.5). The total flight time for curlew was 237 seconds of which 170 seconds was recorded at PCH. Much of the site and surrounding area is considered to be suitable breeding habitat for curlew and three probable and one possible breeding territories were recorded during the 2013 and 2014 breeding bird survey: three of which are located within the current site boundary.

6.6.32 The site lies in the Natural Heritage Zone 17 (NH17), West Central Belt (WCB). The current WCB breeding curlew population estimates are 2,303 pairs (Wilson *et al.*, 2015). Taking a maximum of four breeding territories, this comprises 0.17% of the WCB population.

6.6.33 Curlew is red-listed and an SBL species, as well as considered to be a species at risk from wind farm developments (SNH, 2018b) as a result of its declining population. The presence of curlew throughout the survey period is considered to increase the biodiversity at a local level and this considered with the presence three probable and one possible breeding territories mean that curlew are considered to be of **Local** Ornithological Value.

Snipe

6.6.34 Snipe were recorded utilising the airspace above the site for commuting, with a total of four flights totalling eleven individuals recorded throughout the VP survey (see Figure 6.5). Three probable breeding territories were recorded north of the original survey area, none within the current site boundary and one possible breeding territory was recorded in the east of the site.

6.6.35 The Proposed Development lies in the NH17, WCB). The current WCB breeding snipe population estimates are 568 pairs (Wilson *et al*, 2015). Taking a maximum of five breeding territories, this comprises 0.88% of the WBC population.

6.6.36 Snipe is BoCC Amber listed as a result of its historic declining population. As only a single possible breeding snipe territory was recorded during the breeding bird survey within the final site boundary and only four flights in passage across the site were registered for this species, they are not considered to use the site regularly and are therefore considered to be of **Less than Local** Ornithological Value.

Gulls

6.6.37 Four species of gull were frequently recorded from VP surveys, including common gull (*Larus canus*), great black-backed gull (*Larus marinus*), herring gull (*Larus argentatus*) and lesser black-backed gull

(*Larus fuscus*), as well as one unspecified gull species. A gull roost was noted in fields in the south-west of the site and wider survey buffer, which peaked at 600 herring gulls in January 2017. The majority of individuals were noted as flying to roost from the site west towards the coast and not flying over the majority of the site. No breeding was noted within the site for any of the four species during breeding bird walkover surveys.

6.6.38 All four gull species are of conservation concern as a result of their inclusion in the BoCC Red and Amber lists. Flights of gulls through the survey area were infrequently recorded, with the exception of larger movements of birds to and from the roosting fields. The dusk and dawn movement of gulls was noted to be west of the site to and from the coast. Further to this, the site was not observed to be used for breeding or foraging by gulls. Due to the presence of the gull roost within the site, which is utilised by all gull species, it is considered that their presence increases the biodiversity resource of the site and wider environs and therefore these species are considered to be of **Local** Ornithological Value.

Common Raptors and Raven

6.6.39 Buzzard (*Buteo buteo*), sparrowhawk (*Accipter nisus*), kestrel (*Falco tinnunculus*) and raven (*Corvus corax*) have all been recorded utilising the site in all seasons and evidence was recorded of breeding for all four species outwith the site but within the wider survey buffer. Buzzard, raven and sparrowhawk are considered to have a stable population. Kestrel is, however, BoCC Amber listed and is also an SBL species. Although these species are afforded no specific legal protection beyond that of all birds under the WCA, their presence enriches the biodiversity of the wider ornithological area, but in the context of the site they are considered to be of **Less than Local** Ornithological Value.

Other species

6.6.40 A small number of species of conservation concern were recorded during the breeding bird walkover survey and included nine BoCC red-listed species: house sparrow (*Passer domesticus*), song thrush (*Turdus philomelos*), skylark (*Alauda arvensis*), grasshopper warbler (*Locustella naevia*), lesser redpoll (*Carduelis cabaret*), tree pipit (*Anthus trivialis*), linnet (*Linaria cannabina*), whinchat (*Saxicola rubetra*) and starling (*Sturnus vulgaris*). In addition, there were seven BoCC amber-listed species were also recorded: meadow pipit (*Anthus petrosus*), mallard (*Anas platyrhynchos*), house martin (*Delichon urbicum*), swallow (*Hirundo rustica*) and dunnock (*Prunella modularis*).

6.6.41 Meadow pipit and skylark, both important prey species of target raptors, were noted as ubiquitous throughout the grassland fields within the survey area.

6.6.42 These species are typical of these habitats within upland sites in southern Scotland. Their presence does enrich the biodiversity of the local area and therefore are considered to be of **Local** Ornithological Value.

Summary of evaluation of Recorded Features

Table 6.4 - Summary of Evaluation of Ornithological Features

Feature	Summary	Level of Importance
Renfrewshire Heights SPA / SSSI	Located directly north-east of Proposed Development, designated for hen harrier. Due to the direct proximity from the site there is considered to be potential for connectivity with this designated site.	**International**
Renfrewshire Heights IBA	Overlaps the site, designated for hen harrier. Due to the fact this IBA overlaps the whole of the site there is considered to be potential for connectivity with this designated site.	**Council**

Feature		Summary	Level of Importance
Greylag Goose		Infrequently recorded, no evidence of breeding attempts. BoCC Amber listed species.	**Less than Local**
Curlew		Commonly recorded in in Proposed Development and as a breeding species. SBL / BoCC Red listed.	**Local**
Golden plover		Infrequently recorded. Muirkirk & North Lowther Uplands SPA qualifying species, Annex 1 species, BoCC Amber listed species.	**Less than Local**
Snipe		Infrequently recorded over site, single breeding record in site, BoCC Amber listed species.	**Less than Local**
Gulls	Great black-backed gull	Infrequently recorded. BoCC Amber listed species.	**Local**
	Lesser black-backed gull	Commonly recorded, roost in site in small number. BoCC Amber listed species.	
	Herring gull	Commonly recorded, roost, occasionally large (up to 600) in site and 500 m survey buffer. BoCC Red and SPL listed species.	
	Common gull	Infrequently recorded. BoCC Amber listed species.	
Hen harrier		Regularly recorded in non-breeding season; Renfrewshire Heights SPA qualifying species, Schedule 1, Annex 1, BoCC Red listed and SBL species.	**Council**
Long-eared owl		Recorded once; BoCC Amber listed species.	**Less than Local**
Merlin		Recorded once; Schedule 1, Annex 1, BoCC Red listed and SBL species.	**Less than Local**
Osprey		In-frequently recorded; Schedule 1, Annex 1, BoCC Red listed and SBL species.	**Local**
Peregrine		In-frequently recorded, no breeding attempts within the Proposed Development. Historic breeding location within 2 km as Schedule 1, Annex 1 and an SPL species.	**Less than Local**
Red kite		Recorded once; Schedule 1, Annex 1 and SBL species.	**Less than Local**
Common raptors & raven	Buzzard	Commonly recorded, locally breeding.	**Less than local**
	Kestrel	Commonly recorded, locally breeding, BoCC Amber listed species.	**Less than local**
	Sparrowhawk	Infrequently recorded, locally breeding.	**Less than local**
	Raven	Frequently recorded, locally breeding.	**Less than local**
Other Species		Commonly recorded, BoCC Red listed, BoCC Amber listed, SBL species	**Local**

6.7 Receptors Brought Forward for Assessment

6.7.1 As noted in Section 6.5 under Evaluation Methods for Ornithological Features, ornithological features of local and higher value are considered IOFs and are to be taken forward to assess potential impacts. Due to a range of factors, some of these IOFs can be scoped-out of further consideration:

- Species (scoped out of further assessment due to level of importance as described above and summarised in Table 6.4):
  - greylag goose;
  - golden plover;
  - snipe;
  - long-eared owl;
  - merlin;
  - peregrine;
  - red kite; and
  - common raptors and raven.

6.7.2 The remaining IOFs of Local value or higher, and therefore taken forward for further assessment, are:

- Designated sites
  - Renfrewshire Heights SPA/SSSI
  - Renfrewshire Heights IBA
- Species
  - curlew;
  - gull species;
  - hen harrier;
  - osprey; and
  - other species.

6.8 Identification and Evaluation of Key Impacts

Standard Mitigation

6.8.1 As already noted, following CIEEM guidance, the assessment process assumes the application of standard mitigation measures. This section of the assessment details the mitigation measures that are recommended to ameliorate identified effects associated with the construction and operational phase of the Proposed Development. These measures are aimed to prevent, reduce or offset any likely significant effects of the Proposed Development on identified ornithological receptors. This approach is in accordance with best practice guidance and UK, Scottish and Local Government environmental, planning and sustainability policies.

6.8.2 The principles and objectives for mitigation associated with the Proposed Development have been developed through an iterative process with the Applicant's design team and through discussion with SNH and other stakeholders.

6.8.3 Mitigation includes best practice methods and principles applied to the Proposed Development as a whole (generic measures) as well as site specific mitigation measures applied to individual locations (specific measures).

6.8.4 All ornithological mitigation will be incorporated into a Construction Environmental Management Plan (CEMP). This CEMP will outline all required mitigation and provide details on timelines for undertaking mitigation for each identified ornithological receptor. This CEMP will also outline timetable of actions and form part of the contract documents to ensure delivery of mitigation specified in this chapter. In addition, the CEMP should incorporate the provision of an Ecological Clerk of Works (ECoW) to oversee the implementation of recommended mitigation.

Generic/Embedded Mitigation

6.8.5 Generic mitigation measures that apply to all ornithological receptors across the Proposed Development, and which are considered as embedded in the site development proposals and therefore assumed to be the case for the purposes of assessing potential impacts, are outlined below:

- Not more than 12 months prior to construction of the Proposed Development, the Applicant will engage a Suitably Qualified Ecologist (SQE) to undertake a series of repeat ornithological surveys to update the baseline information reported in this chapter. The aim of these surveys would be to provide up to date information in order to finalise the mitigation proposals. This would be in addition to completing a final check prior to construction for protected species (see Chapter 7 of this EIA Report) and would be discussed and agreed with SNH.
- Further to or incorporated into the update surveys above, protection of breeding bird nests from damage and/or destruction during the breeding season will need to be ensured. Wherever possible, all vegetation clearance should occur outside the breeding season (i.e. between September – March inclusive), to ensure that no active nests are damaged or destroyed by the proposed works. This would include any areas of shrub clearance and vegetation removal for access tracks, compounds or turbine bases due to the populations of ground nesting birds on and around the site. Any tree felling should also occur entirely outwith the breeding season; this work and any other vegetation clearance which is unavoidable during the breeding season will be subject to pre-clearance checks and monitoring by the appointed ECoW, who will identify nesting locations and ensure implementation of appropriate mitigation measures to protect nest sites.
- Removing vegetation from working areas outside the breeding season, wherever possible, would also reduce the attractiveness of those areas to breeding birds the following season, which means that birds are less likely to breed in those areas.
- Avoidance of unnecessary disturbance to habitats by minimising the extent of ground clearance and other construction practices as far as practicable.
- Plant and personnel will be constrained to a prescribed working corridor through the use of temporary barriers, thereby minimising damage to habitats and potential direct mortality and disturbance to species.
- Works compounds, storage sites and access tracks will avoid, as far as practicable, areas of woodland and wetland or any other habitat identified as being of ecological value by the appointed ECoW.
- An ecological toolbox talk will be given to all construction personnel as part of site induction on the potential presence of ornithological species and any measures that need to be undertaken should such species be discovered during construction activities. The toolbox talk will also include the requirement to report and log any bird casualties (including any carcasses found

beneath the temporary met mast) at the Proposed Development during construction and operation of the site.

6.8.6 As part of the Proposed Development proposals it will be necessary to develop and implement a Site Restoration Plan (SRP) as part of the CEMP to ensure the regeneration of those areas of habitat that have been temporarily lost through construction.

6.8.7 In order to facilitate restoration, disturbed ground will be restored as soon as practicably possible using materials removed during the construction of access tracks, excavation of cable trenches and turbine foundations. To achieve this, any excavated soil will need to be stored in such a manner that is suitable to facilitate retention of the seed bank. This will aid site restoration and help conserve the pre-construction floristic interests at the site.

6.8.8 Additional, specific mitigation measures are discussed in Section 0.

6.9 Potential Effects

Description of the Proposed Development

6.9.1 As described in Chapter 3, the Proposed Development will consist of ten wind turbines with a maximum blade tip height of up to 149.9 m. The specific turbine manufacturer and model has not yet been selected, as this will be subject to a pre-commencement tendering exercise and will be confirmed post-consent.

6.9.2 The proposed final locations of the turbines have been defined, in order to enable the EIA to fully describe the Proposed Development for which permission is being sought. The British National Grid coordinates denoting where each of the turbines are proposed to be located are listed in Chapter 3, Table 3.1.

6.9.3 The main elements of the Proposed Development which have the potential to impact on IOFs, both during construction, operation and decommissioning are:

- cut track construction, including bridging/culverting of watercourses (there are a number of watercourses which cross the turbine development area, including Skelmorlie Water, Rigghill Burn and Fank Burn) and mobile plant traffic movements;
- turbine foundation creation (including excavation, steel work and concrete pouring, pile-driving of anchors, piling if required, etc.);
- crane pad construction;
- cable-laying and grid connection infrastructure (including substation);
- temporary lay-down and construction compound areas;
- temporary materials storage (soils);
- site water management; and
- site restoration (track batters, compounds, etc.).

Construction Impacts

6.9.4 The above activities have the potential to cause the following construction impacts to the IOFs identified for the site:

- Direct loss of habitat;
- direct loss of foraging habitat and/or breeding habitat for protected species;
- indirect loss of foraging habitats and/or breeding habitat for species, through displacement; and

- disturbance and displacement to habitats and species (including noise, vibration, pollution), due to track and turbine base construction, as well as turbine erection, heavy machinery, noise and human activity on the site. Disturbance of ground vegetation and ground-nesting birds may affect a 5 m zone around all infrastructure.

Operational Impacts

6.9.5 The potential operational impacts have been identified as:

- habitat change (modification) over time (N.B. operation phase drying of peaty or marshy substrates may affect up to 5 m around cut track);
- direct and indirect loss of foraging or breeding habitat due to displacement or avoidance;
- mortality resulting from collision with turbines; and
- cumulative impacts of the Proposed Development in the context of other nearby wind farms (operational, consented and schemes in planning are considered).

Construction Effects

Designated Sites

<u>The Renfrewhire Heights SPA/SSSI</u>

6.9.6 The Renfrewhire Heights SPA/SSSI is important at the International level. Impacts on habitats within designated sites have been considered unlikely to occur and effects on habitats will be assessed in detail in Chapter 7: Ecology and Nature Conservation. In addition, significant residual hydrological effects are unlikely to occur (see Chapter 10: Geology, Peat, Hydrology and Hydrogeology). Impacts are, therefore limited to those affecting populations of hen harrier the qualifying feature of the SPA. Impacts on hen harrier during construction and operation phases of the Proposed Development are provided in the species accounts below.

<u>The Renfrewhire Heights IBA</u>

6.9.7 The Renfrewhire Heights IBA is a non-statutory designation, although it is important at the Council level. Renfrewhire Heights IBA overlaps the whole site and is designated for breeding hen harriers. As discussed in the paragraph above impacts on the qualifying species of the IBA, hen harrier, are provided in the species account below. Given the IBA overlaps the whole site there will be habitat loss from the Proposed Development which could provide suitable foraging habitat for hen harrier. The total loss of habitat from the footprint of the Proposed Development is 9.09 ha which accounts for 0.03 % of the 28,121 ha which makes up the IBA, meaning the effects are considered to be a permenant **barely perecptible** adverse at a council area scale and therefore not significant.

Species

<u>Curlew</u>

6.9.8 The Proposed Development site is considered to be of Local importance for curlew. Curlew were recorded using the survey area for breeding, foraging and roosting with a total of four territories recorded, three within the Proposed Development boundary.

6.9.9 Potential impacts on curlew during construction include mortality as a result of construction activities, temporary disturbance as a result of soil stripping and increased noise and vibration and temporary habitat loss. Mortality may result from construction activities undertaken during the bird breeding season where unidentified nests and chicks may be destroyed or abandoned. In order to avoid the abandonment of nests or breeding territories as a result of construction-related disturbance, the mitigation outlined in paragraphs in 6.8.1 - 6.8.8, including the pre-construction checks and ECoW supervision, will identify active nesting locations prior to any works taking place. If active nest sites are identified then appropriate mitigation measures to ensure their protection will be implemented.

6.9.10 The overall effects on curlew during construction are considered to be temporary and of **low** adverse impact and therefore not significant effects at the council area scale.

Gull species

6.9.11 There a number of closely cropped grassland fields in the west and south-west of the site used by gulls to roost, with the larger roosts generally located south and east of Barr Farm and north of Dykes, and gulls are considered to be of Local importance. Potential impacts on gull species during construction would be limited to temporary disturbance as a result of land clearance and increased noise and vibration. Given the distance from key infrastructure, the magnitude of the potential habitat loss impact is barely perceptible. These effects would be temporary and a **barely perceptible** adverse impact at a local area scale and therefore not significant.

Hen harrier

6.9.12 The Proposed Development site is considered to be of Council importance for hen harrier. Hen harrier were recorded using the survey area for hunting with a total of 14 flights recorded during the VP survey between September and March, nine records were of a male bird, four of a female while one was unsexed. Although disturbance and habitat loss are unlikely to have any significant direct impacts on foraging hen harrier, indirect impacts in the form of the disturbance of prey species such as meadow pipit may lead to some temporary displacement. It should be acknowledged, however, that the wider landscape also supports habitats considered suitable for hen harrier and their prey species.

6.9.13 No evidence of breeding was recorded within the site and 2 km survey area. Hen harrier utilise the site for intermittent foraging in the non-breeding season and have historically bred within the Renfrewshire Heights SPA which is directly north of the site (although there have been no breeding records in the previous 10 years) and some of the habitat surrounding the site may present some opportunity for nesting habitat.

6.9.14 As such, impacts on hen harrier during construction are considered to be immediate for of a short-term, temporary duration and a **barely perceptible** adverse impact and therefore not significant.

Osprey

6.9.15 The Proposed Development site is considered to be of Local importance for osprey. Osprey utilised the waterbodies in the area surrounding the site for foraging and utilised the airspace above the Proposed Development infrequently for commuting during August. Construction would lead to temporary disturbance effect as an increase in noise and vibration. The effects on osprey during construction are considered to be immediate and a **barely perceptible** adverse impact and therefore not significant.

Other Species

6.9.16 Potential impacts on the woodland, grassland and farmland bird assemblage during construction may include potential mortality as a result of felling activities, temporary disturbance as a result of land clearance and increased noise and vibration as well as temporary habitat loss. Mortality may result if clearance of grassland areas is undertaken within the breeding bird season. However, the mitigation outlined in paragraphs in 6.8.1 - 6.8.8, including the pre-construction checks and the appointed ECoW, will identify nesting locations during any works taking place in the breeding season and appropriate mitigation measures are implemented to ensure their protection..

6.9.17 Construction disturbance/displacement effects may result in the displacement of these species of bird from areas of clearance and the immediate vicinity. Additionally, if the disturbance occurs during the breeding season this may result in the abandonment of nests or breeding territories. The disturbance impact would be of low magnitude. Although some grassland breeding species (such as skylark and whinchat) may lose some breeding habitat, there remains large areas of similarly suitable habitat within the site and wider area.

6.9.18 As such, construction phase impact on other species is considered to be of short-term duration and **low** magnitude at a local area scale and therefore considered not significant.

Operational Effects

6.9.19 Effects of land take (i.e. decreased resource availability) on birds are likely to be low given the small percentage (3 %) of the site that will be occupied by the footprint of the Proposed Development (9.09 ha). There is the potential for a component of the Proposed Development infrastructure to be sited on, or close to, a specific type and area of habitat used by one or more bird species carried through in this assessment. That potential effect is assessed, where relevant, in the species text that follows.

6.9.20 The two main ways in which birds can be affected by operational wind farms are: through displacement due to ongoing disturbance caused by wind turbine structures and associated equipment (and by periodic servicing), and potential mortality through collision with moving blades or associated infrastructure.

Displacement

6.9.21 A range of studies have concluded that most bird species are not significantly affected by operational wind farms (e.g. Vauk, 1990; Percival, 2005; Devereux *et al.,* 2008; Winkelmann, 1994; Langston and Pullan, 2003; Hotker *et al.,* 2006). This is reflected, in part, by SNH Guidance (2017) on birds and wind farms which does not, for example, normally recommend surveys for breeding passerines. SNH Guidance, which is considered the UK standard, indicates that effort should focus on species and/or species groups that are thought to be susceptible to the effects of wind farms or highly protected species on which potential effects remain unclear.

6.9.22 Turbines may also present a barrier effect to the movement of birds across a site, restricting them from accessing wider areas. The effect this would have on a population is difficult to predict. If birds have to regularly fly over or around an array this may result in greater energy expenditure, while birds displaced into other, suboptimal habitats may experience reduced foraging potential and increased energy expenditure. Such impacts could effectively limit birds being able to build energy reserves, potentially affecting survival and/or breeding success.

6.9.23 Of those species identified as IOFs that use the site and are carried forwards in this assessment, only curlew have been recorded breeding within the study area and would therefore be impacted by displacement.

Curlew

6.9.24 As outlined in Table 6.4, the site is considered to be important for curlew at the Local level.

6.9.25 The operation of turbines and associated human activities for maintenance purposes has the potential to disturb birds and displace them from the site. Existing information (e.g. de Lucas *et al*., 2007; Douglas *et al*., 2011; Haworth and Fielding, 2012) and reviews of effects (e.g. Madders and Whitfield, 2006; Hötker *et al.,* 2006; Gove *et al.,* 2013; Harrison *et al.,* 2017) suggest that most birds are affected only slightly, if at all, although these effects require further study. Other studies involving long-term monitoring of golden plover (Fielding and Haworth 2010, 2012, 2013, Douglas *et al.,* 2011) and curlew (Whitfield *et al.,* 2010), found no evidence of displacement due to wind farm infrastructure for either species. In addition, in their study of the effects of wind turbines on the distribution of wintering farmland birds Devereux *et al*. (2008) did not find any effect on four species groups (seed-eaters, corvids, gamebirds and Skylark), except for pheasant (*Phasianus colchicus*) an introduced species.

6.9.26 However contradictorily in other studies, breeding birds have been found to be displaced within 300 m from a turbine (e.g. Gill *et al*., 1996; Percival, 1998; Hötker *et al*., 2006), with some studies suggesting some potential for partial displacement effects at greater distances (Pearce-Higgins *et al.,* 2009). Wind turbines might also displace birds from much larger areas if they act as a barrier to bird movements, or if availability of suitable habitat is restricted.

6.9.27 The evidence suggests that impacts vary between species and sites (Madders and Whitfield, 2006). There is potential for some disruption of feeding and nesting due to increased human activity for maintenance purposes, although this infrequent maintenance is unlikely to create any increased disturbance as compared to current farming practices which sees daily activity of workers using

quad bikes and other farm vehicles, working dogs, as well as disturbance pressures resulting from grazing livestock, and would be restricted to areas of the site accessible by tracks. Therefore, the overriding source of disturbance and displacement of birds during the operational period is considered to be the turbines operating (Pearce-Higgins *et al*., 2009) rather than human operational activities.

6.9.28 Curlew are considered to potentially be most affected by operational displacement, based on the recent study by Pearce-Higgins *et al*. (2012). Populations of curlew appear to decline by up to 40% during the construction phase within a 620 m area around the outermost turbines of a wind farm. The authors state that (non-significant) increases in numbers have been noted at reference sites which may indicate these birds also move into the wider areas to breed as opposed to being lost to the population. However, there is no clear evidence to support this assertion at present.

6.9.29 Any initial displacement of curlew during the operational phase will likely lead to birds using other similar areas of breeding habitat within the site and wider areas in the immediate surrounding the site boundary. Additionally, it is likely over time that the birds will habituate to the presence of turbines and return to breeding locations close to site infrastructure.

6.9.30 Despite the uncertainty in the impacts of operational turbines on breeding species of birds, using a precautionary approach it is possible that the Proposed Development will impact on three curlew territories. However, given the availability of alternative breeding habitat directly adjacent to the site and in the wider area, as well as the proposed mitigation as outlined in Section 6.8, the potential effects on curlew are considered to be of a **low** adverse level and of medium-term duration and therefore **not significant**.

Other Species

6.9.31 Potential impacts on the other woodland, moorland, grassland and farmland bird species during operation would be limited to permanent habitat loss, although there is no requirement for any woodland clearance. Species such as skylark, whinchat and meadow pipit have territories within habitats that will be lost due to permanent access tracks and turbine platforms. The impact of permanent habitat loss is considered to be **low** adverse impact on low value receptors and therefore **not significant** at a local scale.

Collision

6.9.32 Birds that utilise the airspace within the windfarm area at potential collision heights would be at risk of collision with wind turbines. The risk of collision with moving wind turbine blades is presumed to be related (although not necessarily linearly) to the amount of flight activity over the site, the topography of the site, species' behaviour and the ability of birds to detect and manoeuvre around rotating turbine blades. Collision risk may also be greater under certain environmental conditions causing reduced visibility, such as low cloud and mist. Birds that collide with blades are likely to be killed or fatally injured.

6.9.33 SNH recommend that collision risk of birds at wind farms is calculated using the model developed by Bill Band of SNH (in de Lucas et al, 2007). The methodology quantifying potential bird collisions with onshore wind turbines by calculating the flight activity rate per unit area per season, extrapolated from a representative sample of observations and the likelihood that a flight through the rotor swept area would result in a collision before an 'avoidance rate' is applied to account for behavioural adaptation of birds to the presence of wind turbines.

6.9.34 The resultant figure which is used to assess the potential losses to a species in respect to species relevant population and the extent to which the outcomes of the modelling reflect observed mortality rates has been debated since its inception, and is the subject of academic debate (Chamberlain et al., 2005; Chamberlain et al, 2006; Madders & Whitfield, 2006; Drewitt & Langston, 2006).

Hen harrier

6.9.35 Hen harrier were recorded using the site for foraging during the non-breeding season (late august to early April), with a total of 15 flights recorded throughout the duration of the VP surveys. None

of the flight activity was recorded at potential collision height, with all flights registered as taking place below 35 m and all bar 30 seconds of the 1,215 seconds recorded noted as below 10 m. This type of flight activity typical for hunting hen harrier and given the lack of flight time at collision height, no collision risk modelling was undertaken for this species.

6.9.36 The Renfrewshire heights SPA lies directly north of the site boundary, and was designated for hen harrier in 2007, with a citation population of 10 breeding females (the average between 1998 and 2004). In 2010 the population status was described by SNH as 'Unfavourable Declining' with pressures on the site are described as burning, illegal persecution, over grazing and fox predation (SNH, 2019, JNCC, 2011).

6.9.37 In order to assess the likely impacts of the Proposed Development on the adjacent SPA it was then required to calculate how the impacts would differ if the population were to return to 'favourable condition', as defined at the point of citation as 10 breeding pairs. The scenario modelling, outlined in detail in Appendix 6.2 produced a collision risk value of **0.0005 per year** which is considered to be a **barely perceptible** figure and would not be considered to be detrimental to the conservation objectives of the SPA (see paragraphs 6.9.42 to 6.9.50 for Habitats Regulations Appraisal considerations).

Osprey

6.9.38 An analysis of collision risk was undertaken following best practice guidance (SNH, 2013 and SNH, 2017). The collision risk analysis was informed by the recorded VP survey flight lines (Figure 6.4); full details of the calculations are provided in Appendix 7.3.

6.9.39 It is predicted that **0.0001** collisions will occur annually and that over a period of 30 years (which is the time period used for comparison within the cumulative section of the report) this will result in **0.002** collisions. The breeding population on NHZ 17 is estimated at 5 pairs (Wilson *et al.*, 2015). The mortality predicted represents 0.014% of the NHZ 17 population and is therefore not considered to be significant. Therefore, direct mortality impacts as a result of turbine collision are of **barely perceptible** level and the effects considered to be **not significant**.

6.9.40 There are no waterbodies for foraging osprey within the site or suitable nesting habitat so the impact of permanent habitat loss is considered to be **barely perceptible** and therefore not significant at a local scale.

Decommissioning

6.9.41 The consent being sought for the Proposed Development is for 30 years. In the event of the development being decommissioned, the effects arising from decommissioning are considered to be the same or less potentially significant than those arising from the construction phase.

"Shadow" Habitats Regulations Appraisal

6.9.42 The Habitats Regulations Appraisal (HRA) will be carried out by the Competent Authority (in this case, North Ayrshire Council) with advice provided by SNH as the Statutory Nature Conservation Agency. However, the information to enable the Appropriate Assessment (AA) stage of the HRA should be provided by the Applicant as a "shadow" HRA. With this objective in mind, to summarise the information gathered to make it easier to be compiled into an HRA is presented here, with the details of the SPA hen harrier modelling presented in full in Appendix 6.2.

6.9.43 The conservation objectives of the SPA are:

- To avoid deterioration of the habitats of the qualifying species *(i.e. breeding hen harrier)* or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
- To ensure for the qualifying species that the following are maintained in the long term:
    - population of the species as a viable component of the site;
    - distribution of the species within site;

- distribution and extent of habitats supporting the species;
- structure, function and supporting processes of habitats supporting the species; and
- no significant disturbance of the species.

6.9.44 As part of the HRA, considertation of whether there will be any Likely Significant Effects (LSEs) which could threaten the integrity of the SPA being maintained must be made. If LSEs are identified then they are taken to the next stage to be further considered at the AA stage.

6.9.45 The Proposed Development is located adjacent to the SPA, with the nearest turbine approximately 75 m away from the designation boundary, so cannot directly or indirectly affect the habitats within the SPA, and it cannot directly affect the distribution of hen harrier within the SPA. However, increased mortality as a result of collisions with wind turbines can potentially adversely affect the population of the species. As such, these are the potential adverse significant effects which will be examined in greater detail.

6.9.46 As discussed in Section 6.6, very little activity was recorded for hen harrier and all of the registrations made were recorded during the non-breeding season and no breeding has been recorded within the last 10 years within the SPA. As a result, historical data were obtained through SNH and the South Strathclyde Raptor Study Group (RSG) who monitor the hen harrier population within the designated sites throughout much of the region.

6.9.47 This historical data shows that during the most successful breeding year (2002) all of the ten registered breeding attempts was more than 1.5 km from the Proposed Development boundary. While there is no certainty that a recovery of the population would have a similar distribution to that observed previously, in the absence of any other evidence it is a reasonable assumption to make that any future nest locations would closely mirror that of previous locations.

6.9.48 As such, the Proposed Development lies towards the outer extent of or beyond the species' foraging ranges (SNH, 2016) and with no evidence for strong disturbance/displacement of these species this would indicate that the Proposed Development would not have an adverse effect the integrity of the SPA even when the SPA populations recover.

6.9.49 Despite the distance to the nearest historical nest location, collision modelling was completed based on flight activity determined through theoretical "banding" of foraging time spent away fom a given nest site. All parameters and modelling are provided in Appendix 6.2, but in summary two of the historical nest sites in 2002 may have supported males foraging in their outer bands that meant they could potentially enter airspace within the Proposed Development boundary. Following this hen harrier modelling, a flight activity time at potential collision height of 259.5 seconds per annum was derrived. This was then used, following Band *et al.*(2007), to make an estimate of collisoin risk presented by the Proposed Development whihc equeated to an annual collision risk of **0.0005** collisions. This collision risk equeates to **0.0125** birds being lost as a result of the Proposed Development every 25 years. This is not sufficient to have an adverse effect on the theoretically recovered SPA population.

6.9.50 As such, the operation of the Proposed Development would not affect the integrity of the SPA even should the hen harrier population recover.

6.10 Additional Mitigation and Enhancement

Hen harrier

6.10.1 The site is located adjacent to the Renfrewshire Heights SPA and overlaps with the IBA. It is predicted that given the current status of the SPA and IBA breeding population has been reduced to zero pairs that the impacts on both the SPA and IBA will be limited to a barely perceptible loss of hen harrier foraging habitat.

6.10.2 As discussed above, in 2010 the population status of the SPA was described by SNH as 'Unfavourable Declining' with the identified negative pressures on the site described as burning, illegal persecution, over grazing and fox predation (SNH, 2019, JNCC, 2011). There have been no breeding attempts recorded during monitoring surveys in the last 10 years within the SPA by the RSG.

6.10.3 As outlined above, the loss of hen harrier as a breeding species from the SPA is considered to be a result of a combination of factors, although they are regularly recorded within the SPA in winter months and we propose to outline two strategies to encourage breeding birds to remain in the area throughout the year. It is proposed that this is achieved through:

- Monitoring and protection of winter roost sites: and
- Monitoring and protection of breeding sites.

Winter roost protection

6.10.4 Hen harriers are known to congregate around site-faithful roost sites in winter which this makes them vulnerable to targeting for persecution (DEFRA, 2016). By monitoring hen harriers during the winter months and identifying their roost sites and actively monitoring these roost sites it is possible to deter persecution attempts.

6.10.5 It is proposed to engage the South Strathclyde RSG to continue to locate and monitor winter roost sites. By ensuring wintering hen harrier remain safe in winter months in the area of the SPA it is hoped that these birds will remain through to spring and early summer and once again breed within the area of the SPA.

Nest protection

6.10.6 The hen harrier is a ground nesting bird and its nests and eggs are vulnerable to both disturbance and destruction (DEFRA, 2016).

6.10.7 It is proposed to engage the South Strathclyde RSG to continue to locate and monitor any breeding sites as and when they are found. Monitoring of the SPA, in particular during the early breeding season, will be undertaken and should any breeding sites be located then a strategy similar to that outlined in the hen harrier action plan by DEFRA (2016) will be followed.

6.10.8 Once it is known harriers have nested, the Applicant and SNH will work together the local RSG to monitor nest activity and support as necessary. It may be more appropriate for raptor groups and other volunteer bodies to assist in monitoring action in order to reduce the potential for disturbance to any nesting birds.

6.11 Residual Effects

6.11.1 Following the application of mitigation measures, residual effects of the Proposed Development on ornithological interest are as follows:

6.11.2 During the construction phase the following impacts may occur:

- Disturbance and displacement of curlew (one territory direct displacement, up to 3 territories disturbance) may occur but this will be minimised through the sensitive timing of construction works, pre-construction surveys and the use of buffer/exclusion zones.

6.11.3 Pre-development surveys and the adoption of habitat management measures will ensure that death or injury of any bird will not occur as a result of the construction phase.

6.11.4 During operation, the following impacts may occur due to the proximity of turbines:

- Displacement of curlew (up to 3 territories); and
- Collision with turbines of osprey (1 bird every 17,392 years) and (theoretical) hen harrier collision (1 bird every 1,921 years).

6.11.5 Collision-related mortality is predicted to be barely perceptible for all species and of a magnitude where it is expected that there will be no discernible population-level effect above natural mortality levels.

6.11.6 Taking into account the proposed mitigation measures, it is concluded that the Proposed Development will not have a significant adverse effect at greater than the Local level for any species

using the site and immediate surrounding area and, in fact, will have a barely perceptible/low beneficial impact on ground nesting waders and hen harrier.

6.11.7 It is also assessed that the operation of the Proposed Development would not affect the integrity of the SPA even should the hen harrier population recover.

6.11.8 Taking into account the proposed mitigation measures, it is concluded that the Proposed Development will not have a significant adverse effect on the integrity of any of the statutory designated sites identified as having potential connectivity with the Proposed Development.

6.12 Cumulative Assessment

6.12.1 The cumulative assessment of effects to receptors takes into consideration other operational, under construction and in planning developments. The assessment does not include for developments at the scoping stage, in accordance with SPP and given the lack of detailed information on such Proposed Developments. The assessment takes into account all types of developments considered to be relevant in the context of the assessed impacts, not just wind farm developments.

6.12.2 The assessment of ornithological effects associated with the Proposed Development alone predicted no significant effects for every IOF due to the low suitability of habitat within the site, lack of breeding records, and the relatively low activity levels of IOFs recorded during baseline surveys.

6.12.3 The Proposed Development lies in the west of Natural Heritage Zone: NHZ 17. It is considered that the magnitude of impacts of the Proposed Development on IOFs would contribute very little to the overall cumulative effect for each potential impact at an NHZ level. An NHZ-level cumulative assessment is therefore not considered necessary. The Proposed Development may however affect IOFs at a local level, and so a qualitative cumulative assessment of the potential effects of local wind farm projects (within a 20km zone of influence) as shown in Table 6.6, on local IOF populations, is considered more relevant.

6.12.4 The cumulative assessment has been limited to disturbance-displacement and collision risk, with barely perceptible effects predicted for habitat loss or lighting effects associated with the Proposed Development.

6.12.5 A total of three installed and three approved wind farms were recorded within 20 km of the site and although present on the planning portals, there was almost no associated documentation (e.g. Environmental Statements) held on the planning portal which would enable a cumulative assessment to be completed.

6.12.6 Extremely low collision rates were predicted for osprey and hen harrier at the site and it is deemed likely the Proposed Development would likely contribute a zero, or negligible magnitude to cumulative collision rates, with the site currently not utilised as breeding habitat. The site is home to a low number of breeding curlew and it is predicted, with mitigation, that there will be a low/barely perceptible net gain for curlew and therefore the Proposed Development will contribute a zero or negligible / low net gain for breeding curlew.

Table 6.5 - Cumulative Assessment of Potential Ornithological Effects: Wind Farm Development within 20 km of the Proposed Development

Site Name	Distance from Proposed Development	Stage	Details / Description of Significant Residual Effects
Underheugh	8.2km north	Approved	No evidence of Environmental Statement found on planning portal.
Auld Clay Wind Farm	19 km south	Application	4 wind turbines. No evidence of Environmental Statement found on planning portal.
Wardlaw Wood (Dalry Windfarm)	12.4 km south	Installed	6 turbines. No evidence of Environmental Statement found on planning portal.
Blackcraig	11.8 km north-west	Approved	19 then 16 turbines. SNH and RSPB outline concerns for ornithological reasons, specifically black grouse and golden eagle. No evidence of Environmental Statement found on planning portal.
Kelburn Estate	9 km south	Installed	24 turbines. No evidence of Environmental Statement found on planning portal.
Ardrossan	18km south	Installed	15 turbines - No evidence of Environmental Statement found on planning portal.

6.13 Summary

6.13.1 Baseline ornithological surveys were undertaken at the Proposed Development site in order to inform this EIA Report. Ornithology study areas and survey periods vary depending on the bird survey undertaken, however all surveys were carried out in accordance with relevant best practice and guidelines.

6.13.2 The following species were recorded on site:

- Wildfowl and divers – one species of goose and one species of duck during the non-breeding season, one species of duck was recorded during the breeding season.
- Gull – four species registered during both the breeding and non-breeding seasons and a mixed roost located to the southwest of the site boundary.
- Raptors and owls - six species of scarce raptors and owls and three species of common raptor during the year, although none were recorded breeding in the site and wider 2 km survey buffer. One species recorded historically.
- Wader - three species of waders were recorded, two were recorded as holding (possibly and probably) breeding territories.
- Other grassland and moorland birds - species of conservation concern recorded during breeding surveys included nine red-listed species.

6.13.3 An assessment of likely effects on ornithological receptors identified no predicted significant effects.

6.13.4 An ECoW will oversee the implementation of mitigation measures, including the application of best practice during the construction phase and the avoidance, where possible, of site clearance during the bird breeding season. Should nests be discovered then they will be clearly demarcated and suitable exclusion zones established around nest sites to prevent potential damage to the nests and disturbance of adults caring for young.

6.13.5 Once all mitigation measures are implemented, negligible effects on birds are anticipated due to the Proposed Development.

Table 6.6 - Summary of Effects

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Construction					
Curlew disturbance and displacement.	Low	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Barely Perceptible	Adverse
Gull species disturbance and displacement.	Barely Perceptible	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Barely Perceptible	Adverse
Hen harrier disturbance and displacement.	Low	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Barely Perceptible	Adverse
Osprey disturbance and displacement.	Barely Perceptible	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Barely Perceptible	Adverse
Other species disturbance and displacement.	Low	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Barely Perceptible	Adverse
Operation					
Curlew (and snipe) displacement.	Low	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Low / Barely Perceptible	Adverse
Hen harrier displacement and collision mortality.	Barely Perceptible	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Low / Barely Perceptible	Beneficial

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
			Management plan to safeguard winter roosting and summer breeding locations.		
Osprey displacement and collision mortality.	Barely perceptible	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Barely Perceptible	Adverse

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