



# Chapter 6 – Ecology and Ornithology

## Dupplin Solar EIA Report

### TRIO Dupplin Solar LLP

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## **Supporting Technical Appendices (EIA Report Volume 4)**

Technical Appendix 6.1 Preliminary Ecological Appraisal

Technical Appendix 6.2 Baseline Ornithology Report

Technical Appendix 6.3 Shadow Habitats Regulations Appraisal (sHRA)

Technical Appendix 6.4 Outline Biodiversity Enhancement Management Plan (OBEMP).



## Acronyms and Abbreviations

AWI	Ancient Woodland Inventory
BoCC	Birds of Conservation Concern
BTO	British Trust for Ornithology
CBC	Common Birds Census
DEMP	Decommissioning Environmental Management Plan
EclA	Ecological Impact Assessment
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
ESA	Environmentally Sensitive Area
GLTA	Ground Level Tree Assessment
HRA	Habitat Regulations Assessment
IEFs	Important Ecological Features
IOFs	Important Ornithological Features
LBAP	Local Biodiversity Action Plan
LBS	Local Biodiversity Site
LDP	Local Development Plan
LNCS	Local Nature Conservation Site
LNR	Local Nature Reserve
NBN	National Biodiversity Network
NNR	National Nature Reserve
NPF4	National Planning Framework 4
PPP	Pollution Prevention Plan
PRA	Preliminary Roost Assessment
PRF	Potential Roost Feature
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SEPA	Scottish Environment Protection Agency
sHRA	Shadow HRA
SINC	Site of Interest for Nature Conservation
SPA	Special Protection Area
SQE	Suitably Qualified Ecologist
SSSI	Site of Special Scientific Interest
SuD <sub>s</sub>	Sustainable Urban Drainage Systems
SWTR	Scottish Wildlife Trust Reserve
UKHab	UK Habitat Classification
WANE	Wildlife and Natural Environment (Scotland) Act



AWI	Ancient Woodland Inventory
WCA	Wildlife and Countryside Act 1981 (as amended)
Zoi	Zone of Influence



## 6. Chapter 6 – Ecology and Ornithology

### 6.7 Non-Technical Summary

- 6.7.0 This Chapter sets out the methods used to describe and evaluate the potential significant effects on the ecological, ornithological, and nature conservation interests arising from the Proposed Development.
- 6.7.1 Statutory and non-statutory sites for nature conservation are present within 10 km of the Site, and 20 km in the context of Special Protection Areas (SPAs) with geese and / or swan populations. This includes potential connectivity of foraging resources associated with South Tayside Goose Roosts, Firth of Tay and Eden Estuary and Loch Leven SPA / Ramsar sites.
- 6.7.2 The Site primarily consists of arable fields. The Site is bordered by hedgerows, and coniferous woodland. Evidence of protected species was recorded across the Study Area, including evidence of badger, red squirrel, pine marten, bats and breeding birds. In addition, there is suitable habitat for herptiles and wintering birds, including pink-footed goose.
- 6.7.3 Potential impacts associated with the construction phase include: habitat loss and/ or fragmentation, potential disturbance, injury or death to protected species, and construction related pollution impacts. Potential impacts associated with the operational phase include: disturbance due to vegetation management required for routine maintenance, infrastructure maintenance activities, displacement of species due to loss of habitat and displacement due to glint and glare from panels.
- 6.7.4 The Proposed Development has been designed to avoid and minimise impacts on important habitats and protected species where practicable. This has been achieved through an iterative design process and commitment to embedded mitigation. This process is combined with further commitments to the implementation of mitigation measures both prior to construction and throughout the construction period.
- 6.7.5 The ecological impact assessment (EcIA) concluded that following the successful implementation of mitigation measures, guided by the development of Species Protection Plans, (SPPs), an Outline Biodiversity Enhancement Management Plan (OBEMP), and Construction Environmental Management Plan (CEMP), there will be no residual effects anticipated on Important Ecological Features (IEFs) arising from the Proposed Development, either alone or in combination with other plans or projects. Successful implementation of mitigation measures and those included as part of the OBEMP will be assessed by operational monitoring.
- 6.7.6 A detailed assessment of the impacts on the qualifying features of the River Tay SAC and South Tayside Goose Roosts and Loch Leven SPA / Ramsar sites has been undertaken in a **shadow Habitats Regulations Appraisal (sHRA) (Technical Appendix 6.3)** for the Proposed Development to meet the requirements of the Conservation of Habitats and Species Regulations (the 2017 Habitat and Species Regulations).



## 6.8 Introduction

- 6.8.0 This Chapter considers the likely effects on ecology and ornithology from the construction and operation of the Proposed Development, with a particular focus on Important Ecological (IEFs) and Ornithological (IOFs) Features identified within the application boundary (i.e. the 'Site') and the wider survey buffers (i.e. the 'Study Area'). The Ecology Chapter should be read with reference to the project description in **Chapter 3**, as well as other Environmental Impact Assessment (EIA) chapters as referenced throughout.
- 6.8.1 This Chapter is supported by the following figures, which are presented in **EIA Report Volume 3a**:
- **Figure 6.1: Site Location and Survey Area;**
  - **Figure 6.2: Designated Sites within 2 km;**
  - **Figure 6.3: Designated Sites with Ornithological Interests within 20 km;**
  - **Figure 6.4: UK Habitat Survey Results.**
- 6.8.2 This Chapter is supported by the following Technical Appendices, which are presented in **EIA Report Volume 4**:
- **Technical Appendix 6.1: Preliminary Ecological Appraisal;**
  - **Technical Appendix 6.2: Baseline Ornithology Report;**
  - **Technical Appendix 6.3: Shadow Habitats Regulations Appraisal (sHRA); and**
  - **Technical Appendix 6.4: Outline Biodiversity Enhancement Management Plan (OBEMP).**
- 6.8.3 This Chapter was written by Molly Turner of SLR Consulting Limited. Molly is a senior ecologist with over five years' professional experience in the environmental sector, specialising in protected mammals and environmental impact assessment. She is a Full Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) and has authored numerous ECIAs and Environmental Impact Assessments (EIAs) relating to ecology and ornithology for a range of developments. Molly has robust experience in project managing the delivery of ecological and ornithological outputs for energy infrastructure, built environment, and nature restoration and specifically, in delivering large-scale onshore renewable projects. Molly holds personal NatureScot licences for badger, otter, and Schedule 1 birds.
- 6.8.4 Ornithology input was provided by Daniel Piec, Senior Ornithologist with over 20 years' experience in managing large conservation and ecology projects in the UK and abroad. He has contributed to the development of a number of EIA documents such as Habitats Regulations Appraisal (HRA) screening reports,



ornithology chapters and technical appendices, and Reports to Inform Appropriate Assessment (RIAA).

6.8.5 The Chapter was reviewed by Alison Hood in respect of ecology. Alison is an experienced Ecological Consultant with over 12 years' experience working in the consultancy sector. She is based in the SLR Consulting Edinburgh office and leads the Scotland ecology team. Alison is an experienced project manager and team leader and has managed the ecological input on a variety of projects of varying scales. Her portfolio of work includes for renewable energy projects (wind, solar, BESS, grid connection), infrastructure, housing and commercial developments. Alison is experienced in producing technical outputs and has completed numerous Preliminary Ecological Appraisals, Ecological Impact Assessments, Habitat Regulations Assessments, mitigation design and biodiversity enhancement plans, and is proficient in Biodiversity Net Gain assessments. Alison holds a number of protected species licenses and is skilled in undertaking a variety of habitat and protected species surveys.

6.8.6 The Chapter was reviewed by Michael Austin, MCIEEM, in respect of ornithology. Mike is an Associate Consultant specialising in ornithology. Mike has spent his entire career (over 30 years) working within conservation and more recently consultancy. Mike is a leading ornithology team member in Scotland for SLR with technical expertise in a wide range of onshore survey techniques - in lowland, upland and inter-tidal environments. He undertakes technical reporting and assessment, including Collision Risk Modelling, Ecological Impact Assessments (EclA) and Habitats Regulations Assessment screening. He holds a Schedule 1 licence for survey work in Scotland, under which other SLR surveyors working in Scotland act as agents.

## 6.9 Legislation, Policy & Guidance

6.9.0 The ecology assessment has been written with reference to relevant legislation, policy and guidance, notably the following:

### Legislation

- European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive');
- Council Directive 2009/147/EC on the conservation of wild birds (the "Birds Directive")<sup>1</sup> as transposed into Scots law by The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)<sup>2</sup>;
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) ('the Habitats Regulations')<sup>3</sup>;

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<sup>1</sup> Available online at: <https://eur-lex.europa.eu/eli/dir/2009/147/oj/eng>

<sup>2</sup> Available at: <https://www.legislation.gov.uk/uksi/1994/2716/contents>

<sup>3</sup> UK Government, 1994. *The Conservation (Natural Habitats, &c.) Regulations 1994*. Available at: <https://www.legislation.gov.uk/uksi/1994/2716/contents> [Last accessed 17/07/2025].



- Environmental Impact Assessment Directive 2014/52/EU<sup>4</sup>;
- The Ramsar Convention on Wetlands (1975)<sup>5</sup>;
- The Wildlife and Countryside Act 1981 (as amended) (WCA)<sup>6</sup>;
- The Nature Conservation (Scotland) Act 2004 (as amended)<sup>7</sup>;
- The Wildlife and Natural Environment (Scotland) (WANE) Act, 2011 (as amended)<sup>8</sup>;
- The Protection of Badgers Act 1992, as amended by the Wildlife and Natural Environment (Scotland) Act (2011)<sup>9</sup>;
- The Water Environment and Water Services (Scotland) Act 2003<sup>10</sup>;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017<sup>11</sup> ('the EIA Regulations'); and
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011<sup>12</sup>.

## Amendments Post EU Exit

- 6.9.1 Post-Brexit, the Habitats Regulations, S36 Habitats Regulations, and the Offshore Habitats Regulations remain in force, with the same protections retained, but UK sites are no longer part of the EU's Natura 2000 network, instead forming a national network of protected sites. Key terminology is primarily unchanged, with the terms 'European site', 'European marine site', 'European offshore marine site', 'Special Area of Conservation (SAC)' and 'Special Protection Area (SPA)' all being retained.
- 6.9.2 In cases where no 'adverse effect on integrity' can be screened out the competent authority (i.e., ECU/PKC for a projects of this type) would previously have been required to seek the opinion of the European Commission on whether the plan or project should be carried out for 'imperative reasons of overriding public interest'. Since exiting the European Union, this now falls under the remit of the Scottish Ministers, who must seek the opinion of the Secretary of State, the Joint Nature

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<sup>4</sup>UK Government, 2014. Environmental Impact Assessment Directive 2014/52/EU. Available at: <https://www.legislation.gov.uk/eudr/2014/52/contents>

<sup>5</sup> The Ramsar convention on wetlands, 1975. [Online] Available at: <https://www.ramsar.org/>

<sup>6</sup> UK Government, 1981. The Wildlife and Countryside Act 1981 (as amended) Available at: <https://www.legislation.gov.uk/ukpga/1981/69/contents/> .

<sup>7</sup> Scottish Government, 2004. Nature Conservation (Scotland) Act 2004. [Online] Available at: <https://www.legislation.gov.uk/asp/2004/6/contents>

<sup>8</sup> Scottish Government, 2011. The Wildlife and Natural Environment (Scotland) (WANE) Act, 2011. Available at: <https://www.legislation.gov.uk/asp/2011/6/contents>

<sup>9</sup> Scottish Government, 2011. The Protection of Badgers Act 1992. As amended by the Wildlife and Natural Environment (Scotland) Act, 2011. Available at: <https://www.legislation.gov.uk/ukpga/1992/51/contents>.

<sup>10</sup> Scottish Government, 2003. The Water Environment and Water Services (Scotland) Act 2003. Available at: <https://www.legislation.gov.uk/asp/2003/3/contents>

<sup>11</sup> HM Government, 2017. The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents/made>.

<sup>12</sup> Scottish Government, 2011. The Water Environment (Controlled Activities) (Scotland) Regulations 2011. Available at: <https://www.legislation.gov.uk/ssi/2011/209/contents>



Conservation Committee (JNCC), and any other person the Scottish Ministers consider appropriate.

## Planning Policy and Guidance

6.9.3 The Planning Statement associated with this Section 36 application sets out the planning policy framework that is relevant to the EIA. This section considers the relevant aspects of National Planning Framework 4 (NPF4), Planning Advice Notes, the Perth and Kinross Council Local Development Plan 2 (LDP2) and other relevant guidance. Of relevance to the assessment presented within this chapter, this chapter takes account of the following planning policy and guidance:

- National Planning Framework 4 (NPF 4)<sup>13</sup>;
- Planning Advice Note (PAN) 60<sup>14</sup>;
- Scottish Biodiversity Strategy to 2045<sup>15</sup> Scottish Biodiversity List (SBL)<sup>16</sup>;
- Tayside Biodiversity Action Plan (LBAP) 2016-2026<sup>17</sup>;
- Perth and Kinross Council Local Development Plan 2 (LDP2)<sup>18</sup>;
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Marine. Chartered Institute of Ecology and Environmental Management (CIEEM)<sup>19</sup>;
- Goodship and Furness (2022)<sup>20</sup>. Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species;
- NatureScot (2024). Standing Advice for Planning Consultations – Birds<sup>21</sup>;
- NatureScot (2025). NatureScot pre-application guidance for solar farms<sup>22</sup>;

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<sup>13</sup> Scottish Government, 2023. National Planning Framework 4. [Online]

Available at: <https://www.gov.scot/publications/national-planning-framework-4/documents/>

<sup>14</sup> Scottish Government, 2000. Planning for Natural Heritage: Planning Advice Note 60. [Online] Available at:

<https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2000/01/pan-60-natural-heritage/documents/planning-advice-note-60-planning-natural-heritage-pdf/planning-advice-note-60-planning-natural-heritage-pdf/govscot%3Adocument/Planning%2BAdvice%2BNote%2B60%2BPlanning%2Bfor%2BNatural%2BHeritage.pdf>

<sup>15</sup> Scottish Government, 2023. Scottish Biodiversity Strategy to 2045 [Online] Available at [Tackling the Nature Emergency - Scottish biodiversity strategy to 2045 - gov.scot](https://www.gov.scot/publications/scottish-biodiversity-strategy-to-2045/documents/)

<sup>16</sup> NatureScot (2020) Scottish Biodiversity List. Available at: <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list> [Last accessed 22/10/2025]

<sup>17</sup> Tayside Biodiversity Partnership. (2016) Tayside Local Biodiversity Action Plan 2016-2026. Tayside Biodiversity Partnership. Available at:

[https://www.angus.gov.uk/sites/default/files/Tayside%20Local%20Biodiversity%20Action%20Plan%202016\\_2026.pdf](https://www.angus.gov.uk/sites/default/files/Tayside%20Local%20Biodiversity%20Action%20Plan%202016_2026.pdf) [Accessed: 11 November 2025].

<sup>18</sup> Perth & Kinross Council. (2019) Perth & Kinross Local Development Plan 2 (LDP2). Perth & Kinross Council. Available at: <https://www.pkc.gov.uk/article/15042/Adopted-Local-Development-Plan-LDP2> [Accessed: 11 November 2025].

<sup>19</sup> CIEEM, 2024. Available at: <https://cieem.net/wp-content/uploads/2018/08/EcIA-Guidelines-v1.3-Sept-2024.pdf> [Last accessed October 2025].

<sup>20</sup> NatureScot (2022) Disturbance Distances in selected Scottish Bird Species – NatureScot Guidance. Available online: <https://www.nature.scot/doc/disturbance-distances-selected-scottish-bird-species-naturescot-guidance> [Accessed: October 2025]

<sup>21</sup> NatureScot (2024). Standing Advice for Planning Consultations – Birds. Available online: <https://www.nature.scot/doc/standing-advice-planning-consultations-birds> [Accessed: October 2025]

<sup>22</sup> NatureScot (2025). NatureScot pre-application guidance for solar farms. Available online: <https://www.nature.scot/doc/naturescot-pre-application-guidance-solar-farms#birds> [Accessed: October 2025]



- Scottish Natural Heritage (SNH) (now NatureScot) (2016a). Assessing Connectivity with Special Protection Areas (SPAs)<sup>23</sup>;
- SNH (2016b). Environmental Statements and Annexes of Environmentally Sensitive Bird Information<sup>24</sup>;
- SNH (2017). Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms, Version 2<sup>25</sup>;
- Stanbury, *et al.* (2021). The Status of our Bird Populations: the Fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and Second IUCN Red List Assessment of Extinction Risk for Great Britain<sup>26</sup>; and
- Stanbury, *et al.* (2024). The status of the UK's breeding seabirds: an addendum to the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain<sup>27</sup>.

## 6.10 Consultation

6.10.0 **Table 6-1** provides details of consultation undertaken with relevant regulatory bodies, together with actions undertaken by the Applicant in response to consultation comments.

**Table 6-1: Consultation Responses**

Consultee	Summary of Consultation Response	Ecological Response
Perth and Kinross Council (PKC) Pre-Application Consultation (17/07/2025)	Under NPF4 Policy 4 (Natural Places), detailed ecological survey in the form of an Ecological Impact Assessment (EclA) is required, covering habitats, protected species, trees, and artificial lighting impacts. Submissions must evidence application of the mitigation hierarchy (avoid, reduce, compensate, enhance) and demonstrate avoidance of adverse impacts wherever possible, in line with PKC Planning for Nature Guidance: <a href="https://www.pkc.gov.uk/planning-guidance">Planning Guidance - Planning &amp; Biodiversity - Perth &amp; Kinross Council (pkc.gov.uk)</a>	Ecological Impact Assessment is provided in <b>Section 6.15</b> of this Chapter. Embedded mitigation and good practice measures are discussed within <b>Section 6.13</b> of this Chapter.  <b>Technical Appendix 6.1: PEA</b> , details results of the

<sup>23</sup> NatureScot (2016). Assessing Connectivity with Special Protection Areas (SPAs). Available online: <https://www.nature.scot/sites/default/files/2022-12/Assessing%20connectivity%20with%20special%20protection%20areas.pdf> [Accessed: October 2025]

<sup>24</sup> NatureScot (2016). Environmental Statements and Annexes of Environmentally Sensitive Bird Information Available online: <https://www.nature.scot/doc/environmental-statements-and-annexes-environmentally-sensitive-bird-information> [Accessed: October 2025]

<sup>25</sup> SNH (2017). Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms, Version 2. Available online: <https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms> [Accessed: October 2025]

<sup>26</sup> Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. 2021. The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds* 114: 723-747.

<sup>27</sup> Stanbury, A. J., Burns, F., Aebischer, N. J., Baker, H., Balmer, D., Brown, A., Dunn, T., Lindley, P., Murphy, M., Noble, D. G., Owens, R. & Quinn, L. (2024). The status of the UK's breeding seabirds: an addendum to the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, 117, 471–487.



Consultee	Summary of Consultation Response	Ecological Response
	<p>NPF4 Policy 3 (Biodiversity) requires that national and major developments deliver significant biodiversity enhancements, contributing to nature networks and habitat connectivity. The EclA findings and PKC guidance should inform a Site Biodiversity Action Plan (BAP) detailing enhancement measures, locations, timescales, monitoring, and species record submission to the NBN Gateway.</p> <p>Under NPF4 Policy 6 (Forestry, Woodland and Trees), development will not be supported where it would result in the loss or degradation of ancient woodland, veteran trees, or high-biodiversity-value woodland and hedgerows. Tree and woodland surveys, a clear impact assessment, and compensatory planting at a 1:3 ratio are required, following PKC Planning for Nature Guidance Annex 1 (see link above).</p> <p>Applicants are encouraged to refer to Annex 4 of the PKC guidance for a biodiversity information checklist to minimise delays.</p>	<p>UK Habitat Classification and protected species walkover surveys.</p> <p>Biodiversity enhancements are considered within <b>Technical Appendix 6.4: OBEMP</b>.</p> <p>Potential significant impacts on ancient woodland are considered within this Chapter.</p>
<p>NatureScot (08/08/2025)</p>	<p>Consultation undertaken regarding the proposed scope and methodology for ecology and ornithology surveys.</p> <p>NatureScot advised that the Site lies adjacent to Dupplin Lakes SSSI and the South Tayside Goose Roosts (STGR) SPA/Ramsar, which support foraging geese. In addition to the proposed desk-based assessment, goose foraging surveys should be undertaken to provide up-to-date data to inform the HRA, in line with their wind farm bird survey guidance: <a href="https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms#7-8-wintering-and-migratory-waterfowl-especially-geese-and-swans">https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms#7-8-wintering-and-migratory-waterfowl-especially-geese-and-swans</a>. A shadow HRA should accompany any future application.</p> <p>For bats, NatureScot agreed that the proposed assessment is reasonable and proportionate and referred to their updated pre-application guidance for solar farms: <a href="https://www.nature.scot/doc/naturescot-pre-application-guidance-solar-farms">https://www.nature.scot/doc/naturescot-pre-application-guidance-solar-farms</a>, which includes reference to bird and bat survey requirements.</p>	<p>Four goose surveys were completed in September and October 2025 and results are presented in <b>Section 6.12</b> of this Chapter.</p> <p>A shadow Habitats Regulations Appraisal (sHRA) is provided within <b>Technical Appendix 6.3: Shadow Habitats Regulations Appraisal (sHRA)</b>.</p> <p>Appropriate surveys for roosting potential and an appraisal of foraging and commuting habitat for bats have been undertaken and results are presented in <b>Technical Appendix 6.1: PEA</b>. An assessment of potential impacts and mitigation for bats is detailed in <b>Sections 6.13 and 6.14</b> of this Chapter.</p>



Consultee	Summary of Consultation Response	Ecological Response
<p>NatureScot (7/11/2025)</p>	<p>Further consultation with NatureScot was sought with regards of goose surveys following four feeding goose distribution and roost survey visits undertaken in September and October 2025. In response to the results of the desk study and field surveys, NatureScot concluded that <i>“the Site is suitable habitat for geese associated with the SPA/Ramsar and the reduced survey effort has indicated SPA/Ramsar geese are using the site. NatureScot advises the proposed development is therefore likely to have a significant effect on the SPA/Ramsar due to the loss of habitat supporting the species. The proposed desk-based assessment would be appropriate to assess the impacts and should include information to demonstrate that the proposed development will not have an adverse effect on the integrity of the SPA/Ramsar”</i>.</p>	<p>A desk-based Assessment of Likely Significant Effects (ALSEs) and Appropriate Assessment of integrity of the selected SPA/ Ramsar site with goose qualifying interests is presented in <b>Technical Appendix 6.3: Shadow Habitats Regulations Appraisal (sHRA)</b></p>



## 6.11 Assessment Methods & Significance Criteria

### Ecological Desk Study

- 6.11.0 An ecological desk study (**Technical Appendix 6.1: Preliminary Ecological Appraisal**) was carried out using a range of publicly available information sources to provide an understanding of the ecological context of the study area.
- 6.11.1 In terms of statutory nature conservation designations, the desk study identified any international and national designations, such as Ramsar sites, Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) or Local Nature Reserves (LNRs) within 10 km of the application boundary (extended to 20 km for designations with goose features). Only ecological and ornithological (biological) features were considered relevant to the present study. Any non-statutory designations, such as Local Biodiversity Sites (LBSs), Sites of Interest for Nature Conservation (SINCs), Royal Society for the Protection of Birds (RSPB) Important Bird Areas, Scottish Wildlife Trust Reserves (SWTRs) or woodlands included on the Ancient Woodland Inventory (AWI), were identified within 2 km of the application boundary. Designated sites within these specified buffers are presented on **Figures 6.2** and **6.3** for non-avian and ornithological sites, respectively.
- 6.11.2 Existing records for protected or otherwise notable species (e.g. SBL/ LBAP priority species) were identified within 2 km of the Site boundary. Only records from the last 10 years were considered relevant to the study.
- 6.11.3 Data sources included the following organisations and online databases:
- NBN Atlas<sup>28</sup>;
  - Goose and Swan Monitoring Programme (GSMP)<sup>29</sup>;
  - Scotland's Environment Map<sup>30</sup>; and
  - NatureScot Site Link<sup>31</sup>.

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<sup>28</sup> <https://nbnatlas.org/>

<sup>29</sup> <https://www.bto.org/get-involved/volunteer/projects/goose-and-swan-monitoring-programme>

<sup>30</sup> <https://map.environment.gov.scot/sewebmap/>

<sup>31</sup> <https://sitelink.nature.scot/map>



## Field Surveys

- 6.11.4 The area within which field surveys were undertaken varied depending on the feature. Specific details of the extent of the study area are presented below in **Table 6-2** with full details provided in **Technical Appendix 6.1: PEA**.
- 6.11.5 Field study areas were designed to take into account appropriate buffers required for habitat and protected species survey methodologies as detailed below:
- UK Habitat Classification (UKHab) surveys: undertaken within the Site; and
  - Protected Species Surveys (PSS): undertaken within 50 m of the application boundary, though this was extended to 200 m upstream and downstream of watercourses to survey for the presence of otter *Lutra lutra*.

**Table 6-2: Field surveys undertaken as part of the assessment**

Survey Type	Extent of Study Area	Survey Date	Surveyor
UK Habitat Classification Surveys	The Site	31 March 2025 and 27 June 2025	SLR
Protected Species Surveys	Daytime bat walkover (DBW): 200 m buffer from application boundary.	31 March 2025	SLR
	Ground Level Tree Assessment (GLTA): 50 m buffer from application boundary.	27 June 2025	
	Further bat tree inspection: potentially suitable trees within 30 m of proposed infrastructure and 20 m of proposed fences and access tracks.	29 July 2025	
	Otter and water vole <i>Arvicola amphibius</i> : 200 m and 50 m, respectively, upstream and downstream of any watercourses.	31 March and 27 June 2025	
	Additional protected species: pine marten <i>Martes martes</i> , red squirrel <i>Sciurus vulgaris</i> , badger <i>Meles meles</i> , brown hare <i>Lepus europaeus</i> , and herptiles: 50 m buffer from application boundary.	31 March 2025 and 27 June 2025	
Ornithological Surveys	Breeding Bird Surveys: 100 m buffer from application boundary	Six visits between 8 April and 1 July 2025	SLR
	Goose distribution and roost surveys: 500 m buffer from application boundary.	Four visits between 8 September and 25 October 2025	

### UK Habitat Classification Survey

- 6.11.6 A UK Habitat Classification (UKHab) survey was completed following the standard methods described by UKHab guidance (2023) and provided in **Technical Appendix 6.1: PEA**. Standard habitat types were assigned, and ecological notes



were recorded for each habitat type, recording dominant, typical and notable plant species, and relevant ecological characteristics. Floral nomenclature followed Stace (2019), with results reflecting the conditions at the time of survey. The habitat survey area is shown on **Figure 6.1 Site Location and Survey Area**.

### Protected Species Surveys

6.11.7 In addition to ad-hoc species observations during the extended habitat surveys to inform route and alignment selection, dedicated protected mammal surveys were undertaken concurrently for terrestrial mammals, and riparian species. Full details are provided in **Technical Appendix 6.1: PEA**. Survey methods for bat, otter, water vole and badger are summarised below. However, an assessment of habitat suitability and an active search of evidence for other protected species - including red squirrel, pine marten, brown hare, and herptiles was also conducted.

#### **Bats**

6.11.8 An initial Ground Level Tree Assessment (GLTA) of trees within the survey area was carried out to assess suitability for supporting roosting bats in line with Bat Conservation Trust (BCT) guidance<sup>32</sup>.

6.11.9 The suitability of trees to support roosting bats was assessed in accordance with the criteria set out in the BCT guidelines which were categorised as follows:

- FAR: Further assessment required to establish whether potential roost features (PRFs) are present in the tree.
- PRF-I: PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats.
- PRF-M: PRF is suitable for multiple bats and may therefore be used by a maternity colony.

#### **Otter**

6.11.10 An otter survey was undertaken of all watercourses on Site and within 200 m to identify otter spraints, feeding remains, footprints, slides, resting places and potential holt / natal den sites, and included a survey buffer of 20 m along the riparian zone where suitable habitat was present. Throughout the survey, overhanging banks, cavities, bankside vegetation and riparian features, such as boulders and mud, were searched for signs of otter use, broadly in accordance with the approach described by NatureScot (2024) and Chanin (2003).

#### **Water Vole**

6.11.11 A water vole survey was conducted on all suitable watercourses on Site and within 50 m to identify latrines, burrows, feeding stations, paths / runs at the waters edge, and footprints. The search was undertaken in the riparian zone and

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<sup>32</sup> (Collins, J (ed) 2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition. Bat Conservation Trust (BCT). Available at: <https://www.bats.org.uk/resources/guidance-for-professionals/bat-surveys-for-professional-ecologists-good-practice-guidelines-4th-edition> [Last accessed 05/08/2025.]



up to 20 m away from the water's edge for evidence of water voles. Cognisance was taken of the 'Water Vole Mitigation Handbook' (Strachan *et al.*, 2016) with additional reference to the 'Water Vole Conservation Handbook' (Strachan *et al.*, (2011)).

### **Badger**

- 6.11.12 A badger survey was conducted of the Site and 50 m buffer. The survey comprised a search for setts and other signs of badger activity, e.g. latrines, dung pits, pathways, snagged hair and signs of foraging in line with NatureScot guidance (NatureScot, 2020). Where setts were identified within the study area, each sett entrance was mapped and photographed. Sett entrances were grouped as appropriate and the status of the sett was classified as a main sett, annex sett, subsidiary sett or outlier sett.

### **Breeding Birds**

- 6.11.13 Breeding bird surveys followed the methodology described by the Bird Survey Guidelines<sup>33</sup>, which is based on the Common Bird Census (CBC) methodology developed by Marchant (1983)<sup>34</sup> and described in Gilbert *et al.* (1998)<sup>35</sup>. This involved the surveyor walking a survey route at a slow, ambling pace, ensuring all accessible land within the Site plus a 100m buffer (Survey Area) was covered. The adapted method assumed six visits taking place between April and early July 2025. Further details of territory analysis can be found in **Technical Appendix 6.2: Ornithology Baseline Report**.

### **Wintering Birds**

- 6.11.14 Four goose feeding distribution and roost surveys were conducted fortnightly within the Site and 500 m buffer, and at Dupplin Lakes between September and October 2025. Target species were greylag *Anser anser* and pink-footed geese *Anser brachyrhynchus*, although any waterbird species encountered was recorded. The survey followed an adapted methodology based on NatureScot guidance which recommends that feeding distribution surveys of geese and swans should be carried out on a fortnightly basis where species are likely to be wintering or on a weekly basis for sites where birds are likely to be present in the migration period only. Feeding distribution surveys were undertaken from road/

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<sup>33</sup> Bird Survey and Assessment Steering Group. 2025. Bird Survey Guidelines for assessing ecological impacts, <https://birdsurveyguidelines.org/> [Accessed September 2025]

<sup>34</sup> Marchant, J.H. (1983) BTO Common Birds Census instructions. BTO, Tring.

<sup>35</sup> Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods: A Manual of Techniques for Key UK Species. RSPB, Sandy.



track transects where the road network is suitable, or by observations from vantage points to ensure that all potential feeding habitat was surveyed.

## Assessment Methodology and Significance Criteria

### Evaluation Methods for Ecological Features

- 6.11.15 The assessment presented within this Chapter follows the principles set out in the CIEEM Guidelines (CIEEM, 2024), with impact significance determined on the basis of the sensitivity of ecological features and the magnitude of change. **Table 6-3** below lists the criteria used to determine the value of ecological features in a geographical context.
- 6.11.16 Both direct and indirect impacts to IEFs/ IOFs are considered. Direct ecological impacts are changes that are directly attributed to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to actions that affect ecological resources through effects on an intermediary ecosystem, process or feature, e.g. fencing of a development site may cause scrub to invade marshy grassland.
- 6.11.17 In assigning a level of value to the population of bird species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Reference has therefore been made to published lists and criteria where available. Examples of relevant lists include:
- species of European conservation importance (as listed on Annex I of the Birds Directive);
  - species with enhanced legal protection (as listed on Schedule 1 of the Wildlife and Countryside Act (as amended in Scotland); and
  - species considered to be of principal importance for biodiversity in Scotland, as listed on the SBL.
- 6.11.18 Criteria for the evaluation include the SPA and SSSI selection guidelines published by the Joint Nature Conservation Committee (JNCC)<sup>36</sup>. Reference has also been made in particular to published bird population estimates such as

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<sup>36</sup> JNCC Selection guidelines for SPAs. Available online: [https://jncc.gov.uk/our-work/special-protection-areas/?utm\\_source=chatgpt.com#spa-classification-selection-guidelines-for-spas](https://jncc.gov.uk/our-work/special-protection-areas/?utm_source=chatgpt.com#spa-classification-selection-guidelines-for-spas)



Wilson et al. (2015)<sup>37</sup> for Natural Heritage Zones (NHZs) within Scotland and Woodward et al. (2020)<sup>38</sup> for Great Britain.

- 6.11.19 Where appropriate, the value of species populations has been determined using the standard ‘1% criterion’ method (e.g. Holt *et al.*, 2012)<sup>39</sup>. Using this, the presence of >1% of the international population of a species is considered internationally important; >1% of the national population is considered nationally important; etc.
- 6.11.20 Categories of geographical importance (from international to less than local level) which relate to ecological or nature conservation importance, together with examples and criteria of how to place a site – defined by its ecological attributes – are set in the CIEEM guidance.

**Table 6-3: Geographical Evaluation Criteria**

Ecological Importance	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 SAC or Ramsar, this may also include off-site features on which the qualifying population(s) or habitat(s) are considered, from the best available evidence, to depend. This is referred to as Functionally Linked Land (FLL).	International nature conservation areas: <ul style="list-style-type: none"> <li>• Any SAC;</li> <li>• Any candidate SAC (cSAC);</li> <li>• Any SPA; and</li> <li>• Any Ramsar wetland.</li> </ul> Significant numbers of a designated population outside the designated area. A site supporting more than 1% of the EU population of a species. A bird species which is either unique or sufficiently unusual (in terms of distribution and/or abundance) to be considered as being a population of the highest quality example in an international/national context that the site is likely to be designated as an SPA.
National (i.e. Scotland)	Nature conservation resource, i.e. designated nature conservation area, habitat or populations of species of national importance.	National nature conservation areas: <ul style="list-style-type: none"> <li>• Any SSSI or NNR designated for biological feature(s).</li> </ul>

<sup>37</sup> Wilson, M. W., Austin, G. E., Gillings S. and Wernham, C. V. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG\_1504. pp72.

<sup>38</sup> Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. *British Birds* 113: 69–104.

<sup>39</sup> Holt, B.G., Lessard, J.P., Borregaard, M.K., Fritz, S.A., Araújo, M.B., Dimitrov, D., Fabre, P.H., Graham, C.H., Graves, G.R., Jønsson, K.A., Nogués-Bravo, D., Wang, Z., Whittaker, R.J., Fjeldså, J. and Rahbek, C., 2012. An update of Wallace’s zoogeographic regions of the world. *Science*, 339(6115), pp.74–78.  
<https://doi.org/10.1126/science.1228282>



Ecological Importance	Criteria	Examples
	<p>N.B. For designations, such as a Site of Special Scientific Interest (SSSI) or a National Nature Reserve (NNR), this may also include off-site features on which the qualifying population(s) or habitat(s) are considered, from the best available evidence, to depend.</p>	<p>A site supporting more than 1% of the UK population of a species.</p> <p>Nationally important population/assemblage of a European Protected Species (EPS) or species listed on Schedule 5 of the WCA.</p> <p>A population of a bird species which is either unique or sufficiently unusual (in terms of distribution and/or abundance) to be considered as being of nature conservation value at up to a country context. This includes WCA Schedule 1 (as amended in Scotland) species, a red- or amber- listed species (as in Birds of Conservation Concern) and a priority Scottish species.</p>
<p>Region (Perth and Kinross and NHZ 16 Eastern Lowlands)</p>	<p>Nature conservation resource, i.e. nature conservation designation, habitat or species, of importance on a regional scale.</p>	<p>Statutory and non-statutory nature conservation designations:</p> <ul style="list-style-type: none"> <li>• Any Local Nature Reserve (LNR);</li> <li>• Any Scottish Wildlife Trust (SWT) reserve;</li> <li>• Any Local Biodiversity Site (LBS); and</li> <li>• Ancient Woodland listed on the NatureScot Ancient Woodland Inventory (NatureScot, 2025).</li> </ul> <p>A regional-scale important population/area of a species or habitat listed on the Scottish Biodiversity List (SBL) as requiring conservation action.</p> <p>A regional-scale important population / area of a species or habitat listed on the BAP (local BAP).</p> <p>A regional-scale important population / assemblage of an EPS or species listed on Schedule 5 of the WCA.</p> <p>Sites supporting a regularly occurring, regionally significant number of internationally or nationally important bird species in the context of NHZ 16 Eastern Lowlands.</p>
<p>Local (i.e. within 2 km of the Proposed Development)</p>	<p>Nature conservation resource, e.g. a habitat or species of importance in the context of the local district.</p>	<p>A breeding population of a species on the SBL.</p> <p>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.</p>



Ecological Importance	Criteria	Examples
		An area supporting 0.05%-0.5% of the UK population of a species.
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 non-native escapees).

6.11.21 Where an ecological feature (i.e. a habitat or species) qualifies under two or more importance criteria, the higher value is applied to the feature. Within this Chapter, any feature of local or higher value is considered an IEF or IOF.

### Criteria for Assessing Magnitude of Change

6.11.22 CIEEM guidelines state that impacts should be quantified, if possible, and expressed in absolute or relative terms (e.g. the amount of habitat lost, percentage change to habitat area, or percentage decline in a species population). This approach has been followed here, where possible. Magnitude refers to size, amount, intensity and volume. However, following the terminology in other chapters in the EIA Report, impact magnitude has also been characterised with reference to the definitions in **Table 6-4**.

### Ecological Zone of Influence

6.11.23 The Ecological Zone of Influence (EZoI) is defined as the area within which there may be ecological 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 roosting bats, or indirect, e.g. noise or visual disturbance causing a species to move out of the EZoI. The EZoI 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 ecological features, where known;
- the outline design of the Proposed Development and approach to construction; and
- liaison with other technical specialists involved in the assessment, e.g. hydrologists, hydrogeologists and landscape architects.

### Characterising Ecological Impacts and Effects

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

- **Impact** – actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow.
- **Effect** – outcome to an ecological feature from an impact. For example, the effects on a species population from loss of a hedgerow.



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

- **Beneficial or adverse** – i.e. whether the impact has a beneficial (positive) or adverse (negative) 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. Where possible, defined in relation to ecological characteristics i.e. species lifetimes, habitat recoverability.
- **Timing and frequency** - i.e. whether impacts occur during critical life stages or seasons, or how many times the IEF may be impacted by an activity.
- **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.

**Table 6-4: Level of Impact**

Level Of Impact	Definition
No Impact	No detectable impacts on the ecological resource, even in the immediate term.
Negligible	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.
<p>The following definitions have been applied in respect to timescales:</p> <ul style="list-style-type: none"> <li>• Immediate: Within approximately 12 months</li> <li>• Short term: Within approximately 1-5 years</li> <li>• Medium term: Within approximately 6-15 years</li> <li>• Long term: More than 15 years.</li> </ul>	



### Criteria for Assessing Sensitivity of Receptors

6.11.26 The sensitivity of an ecological receptor is a measure of the receptor’s tolerance to disturbance, resilience, ecological service and conservation importance. These factors are reflected through legislation and policies, and geographical importance criteria (**Table 6-3**). Determination of the level of sensitivity of an IEF/ IOF is based on a combination of its geographical importance criteria and conservation status. The importance of an ecological receptor can be due to a variety of reasons, for example, importance can be as a result of the quality or extent of designated habitats or areas, habitat or species rarity, or the extent of the species range and/or decline. For the purposes of the assessment, the predicted sensitivity of an ecological feature is categorised as ‘negligible’, ‘low’, ‘medium’, ‘high’ and ‘very high’, based on definitions in **Table 6-5**.

**Table 6-5: Definitions of Terms Relating to the Sensitivity of the IEF**

Level Of Impact	Definition
Negligible	Locally important ecological feature with low vulnerability and very high recoverability. Ecological feature is not vulnerable to impacts regardless of value/importance.
Low	Nationally and internationally important ecological features with low vulnerability and high recoverability. Regionally important ecological feature with low vulnerability and medium to high recoverability. Locally importance ecological feature with medium to high vulnerability and low to medium recoverability.
Medium	Nationally and internationally important ecological feature with medium vulnerability and medium recoverability. Regionally important ecological feature with medium to high vulnerability and low recoverability. Locally important ecological feature with high vulnerability and no ability to recover.
High	Regionally important ecological feature with high vulnerability and no ability to recover. Nationally and internationally important ecological feature with high vulnerability and low ability to recover.
Very High	Nationally and internationally important ecological feature with high vulnerability and no ability to recover.

### Criteria for Assessing Significance

6.11.27 An EclA is undertaken in relation to the baseline conditions that would be expected to occur in the absence of a proposed development and, therefore, may include possible predictions of future changes to baseline conditions, such as



- environmental trends and other completed or planned developments. Both adverse and beneficial impacts/effects are possible.
- 6.11.28 A significant effect, in ecological terms, is defined as an effect (whether adverse or beneficial) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area, including cumulative and in-combination impacts. In accordance with CIEEM guidelines, a significant effect is an effect that supports or undermines biodiversity conservation objectives for IEFs, or for biodiversity in general.
- 6.11.29 For the purposes of the ornithology assessment, in accordance with CIEEM guidelines, under the EIA Regulations, a “significant effect” is “*one that is sufficiently important to require assessment and reporting so that the decision-maker is adequately informed as to the environmental consequences of permitting the project*”. Effects can be considered significant at a wide range of scales from international to local. For example, a significant effect on a regionally important population of a species is likely to be of regional significance. They are also significant if they do not comply with legal and policy protection. Consideration of conservation status is important for evaluating the effects of impacts on bird species and assessing their significance. Conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area (which, for the purposes of the Birds Directive, is the network of European sites).
- 6.11.30 The approach adopted in the Chapter aims to determine if the effect of an impact is significant or not based on a discussion of the factors that characterise it, i.e. significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystem and the conservation status of habitats and species (including extent, abundance and distribution). Additionally, significant effects should be determined with reference to an appropriate geographic scale.
- 6.11.31 For the purposes of the ornithology assessment, disturbance should be judged as significant if an action (alone or in combination with other effects) impacts on (water)birds in such a way as to be likely to cause impacts on populations of a species through either (i) changed local distribution on a continuing basis; and/or (ii) changed local abundance on a sustained basis; and/or (iii) the reduction of ability of any significant group of birds to survive, breed, or rear their young<sup>40</sup>.
- 6.11.32 The predicted significance of the effect has been determined through a standard method of assessment based on professional judgement and a combination of IEF sensitivity and magnitude of change. Significance levels are defined in **Table 6-6** and **Major and Moderate** effects are considered significant in the context of the EIA Regulations.
- 6.11.33 In accordance with the current CIEEM guidelines, effects of impacts on IEFs / IOFs are assessed on the basis of standard mitigation and good practice

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<sup>40</sup> Fox, A.D. and Madsen, J. (1997) Behavioural and distributional effects of hunting disturbance on waterbirds in Europe: implications for refuge design. *Journal of applied ecology*, pp.1-13.



measures (as set out in **Section 6.12**) being in place. Additional mitigation may be identified where it is required to reduce a significant effect: mitigation will be consistent with the geographic scale at which an effect is deemed significant.

6.11.34 A sequential process has been adopted to avoid, mitigate and compensate for impacts on IOFs. This is referred to as the ‘mitigation hierarchy’. The differences between avoidance, mitigation, compensation and enhancement are defined here as follows:

- Avoidance is used where an impact such as disturbance or displacement of breeding IOFs is averted e.g., through changes in scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact in situ i.e., direct habitat loss which may reduce a breeding or foraging range;
- Compensation describes measures taken to offset residual effects, i.e., where mitigation in situ is not possible; and
- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary. Such measures can be set out in species specific biodiversity action plans.

6.11.35 Any significant effects remaining post-mitigation (the residual effect), together with an assessment of the likelihood of success of the mitigation, are the factors considered against ecological objectives (legislation, policy and development control) in determining the application.

6.11.36 In addition to determining the significance of effects on valued ecological features, this Chapter also identifies any statutory requirements in relation to wildlife, to ensure legal compliance of the Proposed Development during both construction and operation.

**Table 6-6: Significance of Effect**

Level of Impact	Definition
<b>Major</b>	Significant effect, as the impact is likely to result in a long term significant negative effect on the conservation status of the feature.
<b>Moderate</b>	Significant effect, as the impact is likely to result in a medium term or partially significant negative effect on the conservation status of the feature.
<b>Minor</b>	The impact is likely to have a negative effect on the feature at an insignificant level by virtue of its limited duration and/ or extent, but there will probably be no effect on its conservation status. The level of effect would be Minor and Not Significant.
<b>Negligible</b>	No material effect. The effect is assessed to be Not Significant.



### Assessment of Cumulative Effects

- 6.11.37 The main reason for assessing cumulative impacts is to identify whether effects, which may not be significant from individual developments, are likely to be significant when combined with nearby existing or proposed schemes. These may be additive/ incremental (from multiple projects/activities) or synergistic. Cumulative effects are particularly important in EclA as ecological features may already be exposed to background levels of pressure, where further impact may cause irreversible decline or make IEFs more vulnerable or sensitive to change. As assessment of cumulative effects is provided in **Section 6.18**.
- 6.11.38 Projects at the scoping or pre-application stage are typically scoped out of the cumulative assessment due to insufficient information on the project or likely effects being available. Projects that have been refused or withdrawn are also scoped out. However, pre-application developments under the remit of the Applicant that fall within proximity of the Proposed Development have been considered in the cumulative assessment.

### Limitations to Assessment

#### Desk Study

- 6.11.39 NBN data was used as a substitute for Local Environmental Recording Centre (LERC) data due to no active LERC within the study area. Creative Commons with attribution non-commercial (CC-BY-NC) licenced species records have been excluded from this assessment. Review of the NBN dataset deemed that the exclusion of CC-BY-NC data would not significantly impact the outcomes of this assessment.
- 6.11.40 Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that important habitats or protected species not identified during the data search do in fact occur within the vicinity of the Site. Interpretation of maps and aerial photography has been conducted in good faith, using recent imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field study area.

#### Field Surveys

- 6.11.41 Access to the Cultmalundie Woods bordering the Site to the west, and a small unnamed woodland bordering the Site to the south, was not available during the initial extended habitat survey on 31 March 2025. These areas were revisited to complete the protected mammals and DBW survey coverage when access was made available on 27 June 2025.
- 6.11.42 Following these surveys, an amendment was made to the proposed application boundary to include an additional area for biodiversity enhancement opportunities,



- comprising four arable fields to the east. This additional area was visited to complete baseline survey coverage on 31 July 2025.
- 6.11.43 The UKHab survey of the original development area being outside the main botanical season (April-September) means that some botanical species may not have been recorded. This is not considered to be a significant limitation in this case as the Site is unlikely to support protected botanical species or protected habitats due to its arable setting. The UKHab survey of a section of the Site that was later incorporated into the Site boundary was conducted during the peak of the botanical season and so no seasonal limitations affected the survey of this area.
- 6.11.44 Following a revision to the Site boundary, two fields located in the north-west corner of the original survey area were excluded from further breeding bird survey effort after the second visit, due to the presence of a private water supply and the removal of this area from the Proposed Development. However, adjacent fields situated north of the revised boundary remained within the scope of the survey. As documented previously, the subsequent boundary amendment incorporated four arable fields adjoining the south eastern edge of the survey area. Due to the timing of this change, these fields were not surveyed (for breeding birds); however, they exhibit similar habitat characteristics to the arable fields bordering woodland in the central portion of the survey area. Breeding records from comparable habitats included skylark territories within arable fields, and willow warbler and woodpigeon territories within woodland edge buffer zones. Based on habitat similarity and proximity, it is anticipated that the additional arable land parcels would support a comparable assemblage and density of breeding species, estimated at approximately 2–3 skylark territories, 1–2 willow warbler territories, and up to one woodpigeon territory.
- 6.11.45 Goose feeding distribution surveys were conducted in September and October 2025 only, in agreement with NatureScot, subject to survey results. This period coincides with pink-footed goose migration when peak numbers of the species are recorded across Scotland<sup>41</sup>. Following four survey visits, the field surveys ceased and NatureScot was re-consulted and agreed on undertaking a desk-based assessment of existing data and habitat availability for goose qualifying features of the relevant European and international designated sites (see more information on consultation in **Section 6.10**). Consequently, this assessment has been undertaken and presented in the shadow HRA (**Technical Appendix 6.3**).

## 6.12 Ecological Baseline Conditions

- 6.12.0 This section details the results of the desk study and field surveys conducted across the study area and wider ecological context (see **Section 6.11** for

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<sup>41</sup> BTO Bird Facts. Pink-footed Goose. Seasonality. Available online: <https://www.bto.org/learn/about-birds/birdfacts/pink-footed-goose#seasonality> [Accessed: November 2025]



descriptions) which provides the baseline conditions from which the EclA is based.

### Desk Study

#### Statutory Designated Sites

6.12.1 The Site does not overlap or intersect any statutory sites designated for nature conservation, however there is one site of national importance (SSSI) that lies immediately adjacent to the southwest corner of the Site boundary. There are four sites of international importance (SAC, SPA, Ramsar), one site of European importance and six sites of national importance (SSSI) within 10 km of the Site. Details of each are provided in **Table 6-7** and illustrated on **Figure 6.2 – 6.3**.

**Table 6-7: Statutory Designated Sites with Nature Conservation Interest within study area**

Site Name	Designation	Relevant Qualifying / Notified Ecological Features	Approximate Distance and Direction from Site Boundary <sup>42</sup>
Dupplin Lakes	SSSI	<ul style="list-style-type: none"> <li>Breeding bird assemblage; and</li> <li>Pink-footed goose (<i>Anser brachyrhynchus</i>), non-breeding</li> </ul>	Immediately adjacent to the Site at the south-west corner, located on the opposite side of Roman Road.
South Tayside Goose Roosts	Ramsar	<ul style="list-style-type: none"> <li>Greylag goose (<i>Anser anser</i>), non-breeding;</li> <li>Pink-footed goose, non-breeding;</li> <li>Waterfowl assemblage, non-breeding; and</li> <li>Wigeon (<i>Anas penelope</i>), breeding</li> </ul>	0.8 km south west
	SPA		
River Tay	SAC	<ul style="list-style-type: none"> <li>Atlantic salmon (<i>Salmo salar</i>);</li> <li>Brook lamprey (<i>Lampetra planeri</i>);</li> <li>Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels;</li> <li>Otter;</li> <li>River lamprey (<i>Lampetra fluviatilis</i>); and</li> <li>Sea lamprey (<i>Petromyzon marinus</i>)</li> </ul>	1.9 km north, with the East Pow Burn representing the closest hydrological connection.
Methven Moss	SSSI	<ul style="list-style-type: none"> <li>Raised bog</li> </ul>	2.4 km north west
	SAC	<ul style="list-style-type: none"> <li>Active raised bog; and</li> <li>Degraded raised bog</li> </ul>	

<sup>42</sup> Measured from the nearest point “as the crow flies”.



Site Name	Designation	Relevant Qualifying / Notified Ecological Features	Approximate Distance and Direction from Site Boundary <sup>42</sup>
Methven Woods	SSSI	<ul style="list-style-type: none"> <li>Invertebrate assemblage; and</li> <li>Lowland mixed broadleaved woodland</li> </ul>	3.5 km north
Kinnoull Hill	SSSI	<ul style="list-style-type: none"> <li>Upland oak woodland</li> </ul>	6.3 km east
Pitkeathly Mires	SSSI	<ul style="list-style-type: none"> <li>Basin fen</li> </ul>	8.0 km south east
	SAC	<ul style="list-style-type: none"> <li>Slender green feather-moss (<i>Hamatocaulis vernicosus</i>); and</li> <li>Very wet mires often identified by an unstable 'quaking' surface</li> </ul>	
Thistle Brig	SSSI	<ul style="list-style-type: none"> <li>Lowland neutral grassland</li> </ul>	9.7 km north east
Firth of Tay and Eden Sanctuary	Ramsar	<ul style="list-style-type: none"> <li>bar-tailed godwit (<i>Limosa lapponica</i>), non-breeding;</li> <li>common scoter (<i>Melanitta nigra</i>), non-breeding;</li> <li>cormorant (<i>Phalacrocorax carbo</i>), non-breeding;</li> <li>dunlin (<i>Calidris alpina alpina</i>), non-breeding;</li> <li>eider (<i>Somateria mollissima</i>), non-breeding;</li> <li>goldeneye (<i>Bucephala clangula</i>), non-breeding</li> <li>goosander (<i>Mergus merganser</i>), non-breeding;</li> <li>grey plover (<i>Pluvialis squatarola</i>), non-breeding;</li> <li>greylag goose, non-breeding;</li> <li>Icelandic black-tailed godwit (<i>Limosa limosa islandica</i>), non-breeding;</li> <li>little tern (<i>Sternula albifrons</i>), breeding;</li> <li>long-tailed duck (<i>Clangula hyemalis</i>), non-breeding;</li> <li>marsh harrier (<i>Circus aeruginosus</i>), breeding;</li> <li>oystercatcher (<i>Haematopus ostralegus</i>), non-breeding;</li> <li>pink-footed goose, non-breeding;</li> <li>red-breasted merganser (<i>Mergus serrator</i>), non-breeding;</li> <li>redshank (<i>Tringa tetanus</i>), non-breeding;</li> <li>sanderling (<i>Calidris alba</i>), non-breeding;</li> </ul>	13.7 km east
	SPA		



Site Name	Designation	Relevant Qualifying / Notified Ecological Features	Approximate Distance and Direction from Site Boundary <sup>42</sup>
		<ul style="list-style-type: none"> <li>shelduck (<i>Tadorna tadorna</i>), non-breeding;</li> <li>velvet scoter (<i>Melanitta fusca</i>), non-breeding; and</li> <li>waterfowl assemblage, non-breeding</li> </ul>	
Loch Leven	SPA	<ul style="list-style-type: none"> <li>cormorant, non-breeding;</li> <li>gadwall (<i>Anas strepera</i>), non-breeding;</li> <li>goldeneye, non-breeding;</li> <li>pink-footed goose, non-breeding;</li> <li>pochard (<i>Aythya farina</i>), non-breeding;</li> <li>shoveler (<i>Anas clypeata</i>), non-breeding;</li> <li>teal (<i>Anas crecca</i>), non-breeding;</li> <li>tufted duck (<i>Aythya fuligula</i>), non-breeding;</li> <li>waterfowl assemblage, non-breeding; and</li> <li>whooper swan, non-breeding</li> </ul>	19 km south east
	Ramsar		

### Non-statutory Designated Sites

6.12.2 There are no non-statutory designated sites of ecological interest within 2 km of the Site. As such, non-statutory designated sites are not considered further in this assessment.

### Other Sites of Nature Conservation Interest

6.12.3 Eleven areas of ancient woodland listed on the AWI were identified within 2 km of the Site during the desk study (see **Table 6-8** below and **Figure 6.2**).

**Table 6-8: Ancient Woodland within 2 km**

Woodland Name / ID	Area (ha)	Antiquity	Distance from Site
Unnamed (Site ID: 18026)	750.27	Long-Established (of plantation origin)	0 km, west
West Lamberkine Wood (Site ID: 18524)	84.46	Long-Established (of plantation origin)	0 km, east
Unnamed (Site ID: 18414)	113.6	Long-Established (of plantation origin)	0.1 km, south
Coldwells Wood (Site ID: 18526)	175.26	Long-Established (of plantation origin)	0.9 km, east



Woodland Name / ID	Area (ha)	Antiquity	Distance from Site
Unnamed (Site ID: 18415)	8	Other (on Roy map)	1.2 km, south
Unnamed (Site ID: 18027)	3.22	Long-Established (of plantation origin)	1.2 km, west
Patterton Wood (Site ID: 18417)	6.71	Long-Established (of plantation origin)	1.2 km south
Patterton Wood (Site ID: 18419)	13.04	Long-Established (of plantation origin)	1.3 km south
Unnamed (Site ID: 18418)	2.77	Long-Established (of plantation origin)	1.6 km south
Unnamed (Site ID: 18416)	24.13	Long-Established (of plantation origin)	1.6 km, south
Hill Wood (Site ID: 18532)	4.9	Long-Established (of plantation origin)	2.0 km, west

### Protected or Otherwise Notable Species

6.12.4 The desk study returned numerous records (from the last 15 years) of protected and/or notable species within 2 km of the Site. These records have been included in full within **Technical Appendix 6.1: PEA** and are summarised below:

#### **Flora**

6.12.5 The data search returned records of two non-native invasive flowering plants:

- Japanese knotweed *Fallopia japonia*; and
- Himalayan balsam *Impatiens glanduifera*.

#### **Mammals**

6.12.6 The data search returned records of five protected species of mammal within 2 km of the Site within the last 15 years:

- Beaver *Castor fiber*;
- Red squirrel *Sciurus vulgaris*;
- Brown hare *Lepus europaeus*;
- Hedgehog *Erinaceus europaeus*; and
- Roe deer *Capreolus capreolus*.

#### **Birds**

6.12.7 The data search identified two Annex I bird species:

- Kingfisher *Alcedo atthis*. and
- Smew *Mergellus albellus*.



- 6.12.8 Furthermore, one species which is included on Schedule 1 of the WCA (as amended in Scotland) was recorded:
- Barn owl *Tyto alba*.
- 6.12.9 The desk study identified a total of seven records for pink-footed goose and nine records of greylag goose within 2 km of the Site. All of these were recorded within Dupplin Loch between 2009-2021, which is part of the South Tayside Goose Roosts SPA/ Ramsar. Apart from Dupplin Loch (0.8 km from the Site), the SPA/ Ramsar consists of two other roosts, i.e., Drummond Pond (17.1 km from the Site) and Carsebreck and Rhynd Lochs (19.7 km from the Site).
- 6.12.10 The Wetland Bird Survey (WeBS) average five-year peak count for 2019/20-2023/24 for Dupplin and Pitcairnie Lochs WeBS Site was 56 greylag geese and 1 pink-footed goose<sup>43</sup>. The average five-year peak for the same period at Drummond Pond was 7,187 pink-footed geese with a peak count of 13,400 in 2023/24, and 63 greylag geese with a peak count of 121 in 2023/24. Carsebreck and Rhynd Lochs supported most of the SPA population of pink-footed geese with an average 5-year peak count of 15,510 birds and the highest peak of 24,000 birds recorded in 2019/20. Greylag goose average five-year peak count was 61 with the highest peak count of 139 birds recorded in 2021/22.
- 6.12.11 The Goose and Swan Monitoring Programme (GSMP) monitors the abundance and breeding success of the UK's native geese and migratory swans during the non-breeding season throughout the United Kingdom and Ireland, to provide data for the conservation of their populations. Selected sites are visited in the autumn and winter months to count numbers of migratory geese and swans and, where possible, assess a proportion of young birds present to monitor breeding success. GSMP dawn/ dusk roost data was obtained for three roosts of the South Tayside Goose Roosts SPA/ Ramsar for the period of 2014-2023. Most years data were collected in October and November and in some years in September, December, January, February and March (**Table 6-9**).

**Table 6-9: Peak counts of greylag and pink-footed geese at the South Tayside Goose Roosts SPA/ Ramsar roosts Dupplin Loch, Drummon Pond and Carsebreck and Rhynd Lochs between 2014 and 2023**

Species/ site	Peak count/ year									
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
<b>Greylag Goose</b>										
Carsebreck and Rhynd Lochs	77	0	83	104	140	0	16	139	33	71
Drummond Pond	7	4	2	390	575	28	6	33	29	121
Dupplin Lochs	NC*	NC	NC	NC	NC	NC	NC	NC	NC	NC
<b>Pink-footed Goose</b>										
Carsebreck and Rhynd Lochs	20600	16900	13700	27000	22000	24000	17500	22500	6470	2850

<sup>43</sup> Calbrade, N.A., Birtles, G.A., Woodward, I.D., Feather, A., Hiza, B.M., Caulfield, E.B., Balmer, D.E., Peck, K., Wotton, S.R., Shaw, J.M. & Frost, T.M. 2025. Waterbirds in the UK 2023/24. BTO/RSPB/JNCC/NatureScot



Species/ site	Peak count/ year									
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Drummond Pond	NC	NC	1650	6520	3400	7450	2750	1933	10400	13400
Dupplin Lochs	NC	NC	NC	2700	NC	NC	NC	NC	NC	NC

\* **NC – no counts**

6.12.12 Mitchell (2012)<sup>44</sup> provides an overview of wintering pink-footed geese and greylag geese distribution around SPAs designated for these species, based on data from 2007-08 to 2011-12 (new records in relation to older data presented in the same publication from 1986/87 to 2006/07). There are no sensitive feeding areas for the pink-footed and greylag geese of the South Tayside Goose Roosts SPA within the 10 km national grid square where the Site is located (NO02). The nearest areas of high and medium sensitivity index from modern data for foraging geese are located:

- 5.7 km SW near Gask for pink-footed goose; and
- 8.5 km W near Madderty for pink-footed goose.

6.12.13 A desk-based assessment of habitat availability within 20 km from SPA/ Ramsar roosts and 5 km from the application boundary was undertaken based on the Scotland Habitat and Land Cover Map – 2022<sup>45</sup> available under the Open Government Licence v3.0<sup>46</sup> to assess habitat availability within 20 km radius from SPA roosts and 5 km around the development Site<sup>47</sup>.

## Field Surveys

### Habitats

6.12.14 The results of the UKHab classification surveys are presented below. The habitats are also shown in **Figure 6.4** which illustrates the location and extent of habitat

<sup>44</sup> Mitchell, C. 2012. Mapping the distribution of feeding Pink-footed and Iceland Greylag Geese in Scotland. Wildfowl & Wetlands Trust / Scottish Natural Heritage Report, Slimbridge. 108pp.

<sup>45</sup> <https://spatialdata.gov.scot/geonetwork/srv/eng/catalog.search#/metadata/8462f345-6e9c-45de-b1d2-665a55b9d74a> [Accessed: October 2025]

<sup>46</sup> <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/> [Accessed: October 2025]

<sup>47</sup> Habitat and land cover map was created by Space Intelligence<sup>47</sup> in partnership with NatureScot using Artificial Intelligence to classify satellite data to EUNIS Level 2<sup>47</sup> habitat classification which uses 28 different classes<sup>47</sup>. The map was converted from GeoTIFF raster layer to vector shapefile to enable analyses of area coverage of habitat classes, which are key for foraging pink-footed goose, i.e., arable land and three types of grassland: mesic, dry and seasonally wet.



types recorded within the Site. For a full description of the survey results, please refer to **Technical Appendix 6.1: Preliminary Ecological Appraisal**.

- 6.12.15 A total of seven broad habitat types were recorded within the study area, which are further broken down into their respective UKHab classifications, where possible, as detailed below.

***Other Neutral Grassland (g3c)***

- 6.12.16 Thin strips of neutral grassland occur along the borders to the fields within the western half of the Site. This habitat is dominated by tufted hair grass *Deschampsia cespitosa* and cock's foot *Dactylis glomerata*, with scattered soft rush *Juncus effusus*. The species density was poor with fewer than five species regularly occurring per m<sup>2</sup>.
- 6.12.17 This habitat is considered to be of **Less than Local Ecological Importance** due to its poor species diversity and disturbed nature.

***Modified grassland (g4)***

- 6.12.18 The Site's field margins were mostly comprised of thin strips of modified grassland dominated by meadow grasses *Poa sp.* and cock's foot with occasional dock *Rumex sp.*, thistles *Cirsium sp.*, nettles *Urtica dioica* and white clover *Trifolium*



*repens*. The species diversity was poor at the time of survey with fewer than 5 species regularly occurring per m<sup>2</sup>.

- 6.12.19 This habitat is considered to be of **Less than Local Ecological Importance** due to its poor species diversity and disturbed nature.

***Arable and Horticulture (c1)***

- 6.12.20 Cereal crops are the dominant habitat type within the Site. During the Spring 2025 survey, these fields were noted to be ploughed. In the Summer 2025 survey, the arable crop had grown, with barley and wheat forming the primary cropping.

- 6.12.21 This habitat is considered to be of **Less than Local Ecological Importance** due to its poor species diversity and managed nature.

***Artificial Unvegetated Sealed Surface (u1c)***

- 6.12.22 This habitat comprised a dirt track that runs north to south across the Site.

- 6.12.23 This habitat is considered to be of **Less than Local Ecological Importance**.

***Built Linear Features (u1e)***

- 6.12.24 Dry-stone walls were present along the majority of field boundaries.

- 6.12.25 This habitat is considered to be of **Less than Local Ecological Importance**.

***Other Rivers and Streams (r2b)***

- 6.12.26 Two drainage ditches were present on Site. The ditch present along the eastern edge of the Site comprised of a narrow, shallow channel with slow flow and a substrate of organic material with some gravel and pebbles. The banks were steep with excessively cut hawthorn *Crataegus monogyna*, providing occasional shading.

- 6.12.27 The second ditch, emerging from Cultmalundie Woods and running along the western edge of the Site, was partially wet at its origin but dry within the Site extent, supporting dominant rush species.

- 6.12.28 This habitat is considered to be of **Less than Local Ecological Importance** due to its modified and managed nature, limited hydrological function, and low botanical and structural diversity.

***Other Native Hedgerow (h2a6)***

- 6.12.29 Hedgerows present along the eastern Site boundary and field margins were generally species-poor, containing fewer than three native woody species per 30 m and dominated by hawthorn, with occasional dog rose *Rosa canina*, gorse *Ulex europaeu*, rowan *Sorbus aucuparia*, and bramble *Rubus fruticosus*. The field



hedgerow was non-continuous, with a height of 1 m–1.5 m, and directly adjacent to a wet ditch between fields.

- 6.12.30 This habitat is considered to be of **Local Ecological Importance** in accordance with SBL priorities.

### **Invasive Non-Native Species**

- 6.12.31 Japanese knotweed *Fallopia japonica*, was recorded within an area of vegetation in one of the arable fields to the north west of the Site.
- 6.12.32 While INNS are not IEFs, their presence represents a management constraint. Without control, construction activities could facilitate its spread, with potential negative effects on surrounding native habitats. There is a legal obligation to avoid the spread of any INNS.

### **Protected Species**

#### **Bats**

- 6.12.33 Full details of the survey results are contained within **Technical Appendix 6.1: Preliminary Ecological Appraisal**.
- 6.12.34 Habitats within the Site are considered to be of low suitability for bat usage. The open arable habitat dominating the Site is generally sub-optimal to foraging and commuting bats due to the lack of suitable linear features. For this reason, the open arable habitat is unlikely to support significant numbers of foraging and/or commuting bats, though small numbers of common species may pass through. In addition, the majority of this area of open ground is highly exposed, and almost completely void of trees and structures that may offer potential roosting opportunities. Two trees with PRFs were identified within the Site. A mature oak tree in the east of the Site had many veteran features creating potential suitability for multiple bats and/or maternity roosting (PRF-M). A mature ash tree in the south of the Site had potential roosting features that could not be fully inspected at the time of survey due to height and leaf cover.
- 6.12.35 The woodland areas surrounding the Site are likely to be suitable for bats and it is therefore likely that bats are present, to some extent, commuting and foraging along the woodland that runs closest to the Site boundaries - specifically in the west at Cultmalundie, to the south at Roman Road and to the east (West Lamberkine Wood).
- 6.12.36 Bat populations within the Site itself are unlikely to be present in high numbers, with boundary features offering more suitability. Bats are protected as EPS and



are priority species on the SBL. Therefore, bat populations within the context of the study area are considered as **Local Importance**.

#### ***Badger***

- 6.12.37 Full details of field survey results and legislation protecting badger can be found in **Technical Appendix 6.1: Preliminary Ecological Appraisal (PEA)**
- 6.12.38 Evidence of badger activity was limited to the woodland to the west of the Site. Foraging and commuting evidence was identified within the woodland and woodland edges and a badger print was recorded in the centre of the Site, which indicates that badger use the wider Site for commuting. No badger setts were identified within the Site or study area. As such, badger are considered to be present throughout the study area, favouring woodland and agricultural boundaries for foraging and commuting.
- 6.12.39 Badgers are not listed as an EPS or SBL species and are therefore considered as **Less than Local Ecological Importance**; however, are offered protection under the Protection of Badgers Act 1992. As such, badger are carried forward in this assessment.

#### ***Otter***

- 6.12.40 No evidence of otter was recorded during the field surveys, and no records were returned from the desk study. Two watercourses were identified within the study area; however, these comprised of dry or partially dry field ditches with bare or sparsely vegetated banks, offering negligible suitability for foraging or resting otter. Neither feature provided hydrological connectivity to the wider area, and therefore the potential for commuting otter is considered low.
- 6.12.41 Given the lack of suitable habitat and absence of field or desk-based evidence, otter are considered likely to be absent from the Site.

#### ***Water Vole***

- 6.12.42 The two watercourses (i.e. the field ditches) identified within the study area had poorly vegetated banks, with little to no water flow. This, coupled with the modified nature of the ditches results in negligible suitability for water vole.
- 6.12.43 Owing to the absence of suitable habitat and lack of supporting evidence from both field surveys and desk study, water vole are considered likely to be absent from the Site.

#### ***Red Squirrel***

- 6.12.44 Full details of field survey results and legislation protecting red squirrel can be found in **Technical Appendix 6.1: Preliminary Ecological Appraisal (PEA)**. The habitats within the west, east and south of the study area offer suitable habitat for red squirrel in the form of coniferous plantation woodland and semi-natural mixed



- woodland. Agricultural habitats within the Site are not considered suitable for red squirrel.
- 6.12.45 Three potential dreys were recorded within the woodland to the west of the study area beyond the application boundary, along with frequent signs of squirrel feeding activity such as stripped cones and gnawed shells. The combination of dreys and feeding evidence indicates that the woodland is actively used by squirrels for both foraging and nesting. The habitat within this area provides suitable structure and food resources to support resident individuals.
- 6.12.46 While the field signs recorded cannot be definitively attributed to red squirrel, in the absence of conclusive species confirmation, a precautionary approach has been applied. Given the nature of the signs observed, desk study records and the presence of nearby warning signage indicating known red squirrel populations in the local area, the features have been assessed on the basis that they may be attributable to red squirrel for the purposes of this assessment.
- 6.12.47 Red squirrel are listed as SBL species, and as such, are considered as **Local Importance**.

#### ***Pine Marten***

- 6.12.48 For full details of field survey results and the legislation protecting pine marten can be found in **Technical Appendix 6.1: Preliminary Ecological Appraisal (PEA)**. The habitats within the western and eastern areas of the study area offered suitable habitat for pine marten in the form of coniferous plantation woodland. Agricultural habitats within the Site are not considered suitable for pine marten.
- 6.12.49 Evidence of pine marten was restricted to the coniferous woodland within the western extent of the study area beyond the application boundary. No dens were confirmed; however commercial forestry is considered to offer suitable habitat for den creation. Pine marten scats were identified within the same woodland area, signifying presence of this species in the study area, and the importance of woodland areas for pine marten for foraging and commuting. In addition, more open areas of woodland with areas of grassland and scrub habitats provide ample prey and food resource i.e. mice, voles and berries.
- 6.12.50 Pine marten are listed as SBL species, and as such, are considered as **Local Importance**.

#### ***Other Mammals***

- 6.12.51 Multiple mammal records were collected incidentally throughout the study area during the field survey work. These included live sightings of brown hare *Lepus europaeus*, as well as evidence of deer species and red fox *Vulpes vulpes*, identified through presence of hair and scat/dung. No evidence of hedgehog was



observed during field surveys however they may be present in woodland in the wider surroundings

- 6.12.52 All aforementioned species are considered **Less than Local Importance**.

***Herptiles***

- 6.12.53 Full details of field survey results and the legislation protecting herptiles can be found in **Technical Appendix 6.1: Preliminary Ecological Appraisal (PEA)**.

- 6.12.54 The habitats across the study area offer some suitable habitat for herptiles, with woodland edges and field margins offering shelter and foraging opportunities, whilst the arable fields are considered suboptimal. Scattered rock piles occurring infrequently across the Site offer suitable refugia and basking habitat for reptiles. Drainage ditches were observed throughout the study area offering suitable habitat for amphibians. A common frog was incidentally recorded during endoscope inspection of a tree to the south of the study area.

- 6.12.55 Populations of herptiles are considered to be of **Local Importance**.

***Invertebrates***

- 6.12.56 No protected species of invertebrates were recorded during the field survey. Agricultural lands within the Site do not offer significant habitat suitability for invertebrates due to current management regimes and low species and structural diversity. Neutral grassland around field boundaries may offer greater diversity of plant species which may support invertebrate populations however agricultural practices likely involve chemical pesticide use which may also limit populations. As such, the Site is not considered to support a significant assemblage of invertebrates.

- 6.12.57 Invertebrate populations are not considered further in this assessment.

***Breeding Birds***

- 6.12.58 A total of 38 bird species were recorded across six breeding bird survey visits conducted on the Site. Of these, 21 were classified as primary target species (listed as BoCC Red, Amber or SBL). The remaining 17 species were considered as non-target species (BoCC Green or not assessed).

- 6.12.59 A total of 34 breeding territories were identified for nine primary target species (**Table 6-10**). For more information on survey methods and results, including



distribution of territories and nests, please refer to **Technical Appendix 6.2: Baseline Ornithology Report.**

**Table 6-10: Number of territories recorded for target species, their conservation status and summary of observations on Site**

Species	Conservation status (BoCC, SBL)	Number of territories	Summary of observations and distribution
Woodpigeon	Amber	3	Territories were found along the forest edge on the western sides of the site.
Skylark	Red, SBL	9	Territories were distributed evenly across arable fields within the Site
Willow warbler	Amber	8	Territories were found along the forest edge on the southern and western sides of the site.
Starling	Red, SBL	4	At least four territories were confirmed, three nests were found within the vicinity of the farmhouse on the northern side of the Site, and one was found at the farmhouse in the northwest side of the site. However, more breeding pairs could have been present as the number of birds for each sighting ranged from four to 14 birds at these locations.
House sparrow	Red, SBL	3	At least three territories were confirmed, two nests were found at the farmhouse on the north side of the Site and one was found at the farmhouse on the north west side of the site. However, more territories could have been present as the number of birds for each sighting ranged from four to 12 birds at these locations.
Dunnock	Amber, SBL	2	One territory was in the north east side of the Site, and one in the north west.
Greenfinch	Red	1	Recorded singing on multiple visits in the forestry on the western side of the Site.
Linnet	Red, SBL	3	Birds recorded singing on multiple visits across the north side of the Site
Yellowhammer	Red, SBL	1	Yellowhammer was recorded on two visits on the north east corner of the site including singing on one visit.
<p>Key: SBL = on the Scottish Biodiversity List<sup>48</sup> ; BoCC5 Red/Amber = BoCC5 status category - Red or Amber.</p> <p>In addition, all wild birds and their nests are afforded general protected under the Wildlife &amp; Countryside Act 1981 (as amended).</p>			

<sup>48</sup> [Scottish Biodiversity List \(webarchive.org.uk\)](http://webarchive.org.uk)



- 6.12.60 Skylark was the most prominent species, with nine territories identified throughout the Survey Area. Willow warbler followed closely, with eight territories concentrated along the southern and western forestry edges.
- 6.12.61 Linnet and woodpigeon each accounted for three territories. Linnet territories were located along the northern edge (outside of the current application boundary), while woodpigeon territories were confined to the western woodland.
- 6.12.62 The northern farm buildings supported at least seven territories, comprising four starling and three house sparrow territories. However, due to high numbers and lack of sex-specific data, the actual number of territories may be higher. These territories were also outside of the current application boundary.
- 6.12.63 Additional target species with confirmed territories included:
- Dunnock: two territories (north east and north west corners)
  - Yellowhammer: one territory (north east corner)
  - Greenfinch: one territory (western woodland area)
- 6.12.64 The Site’s fields were frequently used as foraging grounds by a variety of species, including starling, carrion crow, jackdaw, herring gull, and lesser black-backed gull. Notably, kestrel and buzzard were also observed utilising these areas.

***Wintering Birds***

- 6.12.65 Four goose feeding distribution and roost surveys were undertaken in September and October 2025. Two records of 88 and 237 foraging pink-footed geese were made within the 500 m buffer north west of the Site boundary. Furthermore, up to an estimated 2,200 pink-footed geese were roosting at Dupplin Loch on 28 October 2025. No greylag geese were recorded (**Table 6-11**).

**Table 6-11: Result of the feeding and roosting goose distribution surveys in September and October 2025**

Date	Species	Feeding/ Roosting (location)	Total number (Number of records)
28/09/2025	Pink-footed goose	Roost	66 (3)
9/10/2025	Pink-footed goose	Feeding (buffer)	88 (1)
9/10/2025	Pink-footed goose	Roost	330 (6)
25/10/2025	Pink-footed goose	Feeding (buffer)	237 (1)
25/10/2025	Pink-footed goose	Roost	1,426-2,200 (4-7) (maximum range is an estimate due to poor visibility toward the end of the survey)



## Evaluation of Baseline Features

6.12.66 An evaluation of the baseline ecological features is presented in **Table 6-10** below.

**Table 6-12: Baseline Ecological Features**

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
<b><i>Nature Conservation Designations</i></b>		
River Tay SAC	International	Habitats Directive
Methven Moss SAC and SSSI	International	
Pitkeathly Mires SAC and SSSI	International	
Methven Woods SSSI	National	Nature Conservation (Scotland) Act 2004.
Kinnoull Hill SSSI	National	
Thistle Brig SSSI	National	
AWI Woodland	Council Area	Scottish Planning Policy (2014)
<b><i>Habitats and Flora</i></b>		
g3c Other neutral grassland	Less than Local	LBAP
g4 Modified grassland	Less than Local	N/A
c1 Arable and horticulture	Less than Local	N/A
u1c Artificial unvegetated unsealed surface	Less than Local	N/A
u1e Built linear features	Less than Local	N/A
r2b Other rivers and streams	Local	LBAP, WFD
h2a6 Other native hedgerow	Local	LBAP, SBL
INNS	N/A (Legal Obligation)	WCA 1981 (as amended)
<b><i>Fauna</i></b>		
Bats	Local	Full protection – EPS; WCA 1981 (as amended); Nature Conservation (Scotland) Act 2004 (as amended); SBL species
Badger	NA – Legal obligation	Protection of Badgers Act 1992



Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
Otter	Local	Full protection – EPS; WCA 1981 (as amended); Nature Conservation (Scotland) Act 2004 (as amended); SBL species
Water Vole	Local	Partial protection - WCA 1981 (as amended)
Red Squirrel	Local	Full protection - WCA 1981 (as amended); SBL species.
Pine Marten	Local	Partial protection - WCA 1981 (as amended)
Other Mammals	Less than Local	Partial protection - WCA 1981 (as amended)
Herptiles	Local	Partial protection - WCA 1981 (as amended).
Breeding Birds	Local	All nesting birds are fully protected under WCA 1981, however the species recorded breeding on Site are common in lowland farms of Scotland and NHZ 16 and therefore of Local importance.
Wintering Birds	International	Pink-footed goose is a BoCC amber-listed species and is protected under Article 4.2 of the Birds Directive as regularly occurring migratory species. The species is a qualifying interest of Westwater and the Firth of Forth SPA/ Ramsar. NHZ 16 holds the largest proportion of this species in Scotland, estimated at 162,039 birds (Wilson <i>et al.</i> 2015) <sup>37</sup> . The birds potentially present within the Site can be functionally linked with the European/ international sites and therefore are of international importance.

## Future Baseline

6.12.67 The Site is currently managed as arable farmland, and in the absence of the Proposed Development, this land use and management regime would be expected to continue into the foreseeable future. Continued agricultural



management may also result in ongoing soil disturbance, erosion, and nutrient enrichment from fertiliser use, maintaining low botanical diversity and limiting the potential for natural habitat development. As such, the future baseline is anticipated to remain broadly consistent with current conditions.

- 6.12.68 Wider environmental changes may occur over time as a result of climate change. These are difficult to predict in detail but may include increased rainfall intensity, a higher frequency of severe weather events, and gradual rises in average temperatures. Such factors could lead to subtle shifts in vegetation composition and soil conditions across the Site. Refer to **Technical Appendix: Land Capability for Agriculture** for descriptions of soils, functionality and capability.
- 6.12.69 Given these conditions, the Site's suitability for protected and notable species is unlikely to change significantly, and species presence and abundance are expected to remain similar to current baseline conditions.

## 6.13 Design Considerations and Embedded Mitigation

### Embedded Design Considerations

- 6.13.0 The ecological baseline has been considered throughout the thorough design process for the Proposed Development, including design consultations with specialists' input to subsequent design iterations. Several design iterations were undertaken with the aim of either eliminating or reducing the potential for any significant effects on receptors, in accordance with the mitigation hierarchy<sup>49</sup>.
- 6.13.1 In line with current CIEEM guidelines, the assessment of likely significant effects is carried out on the basis of embedded design and standard good practice measures being in place during construction. The following embedded design measures have been applied to the design or will be applied during Proposed Development construction, to ensure that any effects on IEFs and IOFs are avoided or reduced:
- utilising existing access tracks as far as practicable to reduce the need for new tracks;
  - application of a minimum 10 m buffer for any infrastructure or construction activity around all watercourses;
  - application of a minimum 30 m buffer between woodland habitats and infrastructure, and a 15 m buffer between woodland habitats and fencing;
  - avoidance of areas of priority habitats including AWI woodland, as far as practicable; and
  - protection of retained habitats including woodland, to minimise impacts as far as practicable.

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<sup>49</sup> CIEEM: Good Practise principles for development (2016) (online) available at: <https://cieem.net/resource/biodiversity-net-gain-good-practice-principles-for-development/> [last accessed 14/10/2025]



## Good Practice Measures

- 6.13.2 In terms of good practice measures assumed to be in place during construction of the Proposed Development, these include the following:
- The Applicant will appoint a suitably qualified ECoW prior to the commencement of any construction activities. The ECoW will be present and oversee all construction activities where ecological consideration is required, provide toolbox talks to all site personnel with regards to priority species and habitats, as well as undertake monitoring works, and brief relevant staff and contractors as appropriate;
  - The ECoW or other suitably qualified and experienced ecologist will carry out pre-construction surveys for relevant protected species. In line with NatureScot guidance<sup>50</sup>, these pre-construction surveys would take place no more than three months before commencing works (including facilitating works such as vegetation clearance). Surveys shall take place no less than six weeks prior to construction to allow time for potential licence applications and thus avoid possible project delays. Follow up pre-construction surveys and checks will then be conducted immediately before works as required;
  - A Species Protection Plan (SPP) will be produced for key target species and agreed prior to commencement of construction and implemented as required. SPPs will be prepared for bats, badger, red squirrel, pine marten, brown hare and herptiles. Mitigation measures outlined in the SPPs shall include the following:
    - the SPP will detail measures to safeguard protected species known to be in the area and will include pre-construction surveys (complimenting the seasonality of the construction start date), as well as ensuring the use of best practice measures to minimise ecological impact during all construction activities (such as sensitive lighting, sensitively timed vegetation clearance or phased clearance, ramps exiting open excavations, consideration of key foraging areas, etc.);
    - the SPP will describe the process to be followed in the case that new protected or notable species are recorded on site that will therefore also need to be protected during construction works, as well ensuring the implementation of effective toolbox talks to raise awareness of site personnel to sensitive ecological receptors on site; and,
    - the SPP will ensure that working methods shall be adopted to minimise the chance of protected species being killed or injured during construction works. An ECoW shall be present during Site clearance works.
  - In order to prevent accidental pollution of watercourses and impacts on fish within the site or areas downstream (with particulate matter or other pollutants such as fuel), best practice techniques will be employed. These are outlined in **Chapter 8: Hydrology, Geology and Hydrogeology** and **Technical Appendix: Flood Risk Assessment (FRA) and Drainage Impact Assessment (DIA)**. In addition, a robust sedimentation strategy will be employed and set out in the Pollution Prevention Plan (PPP) which will form an integral part of the CEMP. The CEMP will be finalised post-consent and

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<sup>50</sup> NatureScot (2024) pre-application guidance for onshore wind farms (online) available at: <https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms> [last accessed 14/10/2025]



prior to commencement of construction, and shall be agreed with Perth and Kinross Council, in consultation with NatureScot and SEPA as appropriate,

- Where there is a requirement for any lighting, a sensitive lighting scheme during the construction and operational phases that aims to avoid disruption to bat, badger, red squirrel and pine marten foraging and commuting behaviour will be adopted. The following measures are to be incorporated into the design and installation of temporary lighting during works, and the permanent lighting scheme:
  - any lighting will be directional (using fittings such as hoods, cowls or shields to direct light downwards wherever possible and avoid unnecessary light spill);
  - LED Luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
  - a warm white spectrum (ideally <2700 Kelvin, max 4000 Kelvin) should be adopted to reduce the blue light component;
  - lighting will be positioned to avoid illuminating suitable foraging, commuting and nesting habitat within hedgerows and edge habitat adjacent to the Site and any newly created woodland and hedgerow habitats that form part of the planting design for the Site; and
  - the times during which lighting is active should be limited to provide dark periods.
- Works near or at any retained native trees or semi-natural woodland would follow guidance in British Standard 5837 (2012) “Trees in Relation to Design, Demolition and Construction – Recommendations” (British Standards Institution, 2012)<sup>51</sup>. An **Outline Biodiversity Enhancement Management Plan (OBEMP)** has been provided within **Technical Appendix 6.4**. This would be finalised in agreement with PKC and NatureScot prior to commencement of site enabling and construction works. The OBEMP will detail habitat types to protect, and where relevant, detail methods to restore habitats that are being retained.
- In order to avoid the introduction or spread of non-native invasive species, biosecurity measures will be included within the CEMP and a non-native invasive species management plan will be developed. This will include and be informed by:
  - pre-construction surveys for non-native invasive species be undertaken by a suitability qualified ecologist (SQE) prior to the commencement of site clearance activities. In the event that further infestations of non-native invasive species have become established on Site since the baseline surveys were undertaken, exclusion fencing shall be installed around the infestation. The SQE will confirm the appropriate stand-off distances.
  - the SQE will provide an environmental briefing to individuals working on Site. The briefing will communicate key legislation and obligations concerning invasive species, how to identify the species that may be

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<sup>51</sup> British Standards Institution (2012). Trees in relation to design, demolition and construction – Recommendations. BSI. Available at: <https://www.bathnes.gov.uk/sites/default/files/2020-01/BS5837%202012%20Trees.pdf> [Last accessed 22/10/2025.]



present on the property, and how to report any invasive species observations or possible sightings.

- tool-box talks shall highlight appropriate biosecurity practices to be undertaken on Site. These include cleaning and disinfecting footwear, tools and vehicles before entering and after leaving the construction site. Appropriate measures will be in accordance with guidance provided by Scottish Government<sup>52</sup> and SEPA<sup>53</sup>; and
- additional measures such as wash down areas shall be detailed within the CEMP as required following pre-construction surveys.

## 6.14 Scope of the Assessment

### Receptors Scoped Out

- 6.14.0 Due to a range of factors, some of the IEFS can be scoped out of further consideration if they are not vulnerable to effects from the Proposed Development, with the standard and embedded mitigation in place.
- 6.14.1 Ecological features of local and higher value are considered IEFs. Furthermore, only those with potential to experience significant effects following the implementation of the embedded and standard mitigation have been taken forward for detailed assessment.
- 6.14.2 IEFs scoped out of further assessment are described in **Table 6-11** below. This is based on professional judgement and experience from other relevant projects in the region.

**Table 6-11: IEFs and IOFs Scoped out of Further Assessment**

IEF/ IOF	Rationale for Scoping Out
<b><i>Nature Conservation Designations</i></b>	
Methven Moss SAC and SSSI	These sites are designated for their presence of valuable habitats, flora, and bryophyte/lichen assemblages. These sites are not functionally connected to the Proposed Development, via direct habitat connectivity or hydrological connectivity. As such, significant effects from the Proposed Development are very unlikely, and these sites have been scoped out of further assessment.
Pitkeathly Mires SAC and SSSI	
Methven Woods SSSI	
Kinnoull Hill SSSI	
Thistle Brig SSSI	

<sup>52</sup> Scottish Government, 2012. Non-native species: code of practice [Online] Available at <https://www.gov.scot/publications/non-native-species-code-practice/>

<sup>53</sup> Scottish Environmental Protection Agency, no date. Biosecurity and management of invasive non-native species for construction sites and Controlled Activities [Online] Available at <https://www.sepa.org.uk/media/163480/biosecurity-and-management-of-invasive-non-native-species-construction-sites.pdf>



IEF/ IOF	Rationale for Scoping Out
AWI Woodland	<p>There are 11 areas listed on the AWI within 2 km of the Site, two areas of woodland border the Site. Design mitigation has ensured that this woodland habitat is appropriately buffered from the Proposed Development by a minimum of 30m. At this distance, it is considered that there will be no direct or indirect impacts to the AWI-listed woodland, including both above ground habitat and the root systems. A habitat and tree protection plan will be incorporated into a CEMP to ensure best practice measures are followed throughout construction and operational maintenance. As such, AWI-listed woodland is scoped out of further assessment.</p>
<b>Habitats and Flora</b>	
g3c Other neutral grassland	<p>A narrow strip of other neutral grassland is present along the edge of an arable field within the Site. This area is species-poor, comprising a mix of common, disturbance-tolerant grasses and herbs typical of field margins subject to agricultural influence and regular management. The habitat does not correspond to any Priority Habitat type under the UK Habitat Classification, SBL, or LBAP.</p> <p>Given its limited extent, low botanical diversity, and frequent disturbance from adjacent land use, this habitat is considered to be of Less than Local Ecological Importance and has been scoped out of further assessment, as impacts are not anticipated to be significant.</p>
g4 Modified grassland	<p>The grassland habitats within the Site comprise thin strips along field margins. These areas are species-poor and dominated by common, widespread grass species with few, if any, indicator species of higher conservation value. The habitat is not representative of any priority habitat type under the UK Habitat Classification, SBL or LBAP.</p> <p>Given its limited botanical diversity, frequent agricultural management, and widespread distribution both locally and nationally, modified grassland is considered to be of less than local ecological value. As such, this habitat is scoped out of further assessment as impacts on this habitat type are not expected to be significant.</p>
c1 Arable and horticulture	<p>Arable land within the Site is subject to intensive agricultural management and supports low botanical and structural diversity. This habitat is not listed as a UKHab Priority Habitat, SBL, or LBAP habitat. Given its limited ecological value, widespread occurrence, and low potential to support notable species, arable cropland is considered to be of less than local ecological importance and has been scoped out of further assessment.</p>
u1c Artificial unvegetated unsealed surface	<p>Areas of artificial unsurfaced ground within the Site, such as farm tracks, are of artificial origin and support minimal vegetation or ecological function. This habitat is not listed as UKHab Priority Habitats, SBL, or LBAP habitats. Given their low biodiversity value and limited potential to support notable species, artificial unsurfaced surfaces are considered to be of less than local ecological importance and have been scoped out of further assessment.</p>



IEF/ IOF	Rationale for Scoping Out
u1e Built linear features	<p>Built linear features within the Site, such as fences and drystone walls, are of artificial origin and support minimal vegetation or ecological function. These habitats are not listed as UKHab Priority Habitats, SBL, or LBAP habitats. Given their low biodiversity value and limited potential to support notable species, built linear features are considered to be of less than local ecological importance and have been scoped out of further assessment.</p>
r2b Other rivers and streams	<p>This habitat has been appropriately buffered through design mitigation. Water courses have been buffered by a minimum of 10 m for construction works associated with PV panels. In addition, embedded and standard mitigation measures that are to be applied during construction include the implementation of Site-wide pollution and contamination prevention measures to be detailed within a CEMP. These measures will ensure significant effects from the Proposed Development are avoided.</p> <p>As such, other rivers and streams (r2b) have been scoped out of further assessment.</p>
h2a6 Other native hedgerow	<p>This habitat has been appropriately buffered through design mitigation, and all hedgerows will be retained. Hedgerows have been buffered by a minimum of 5 m from proposed fences, extending to 10 m for minimal construction works associated with PV panels (footings). At these distances, it is considered that there will be no direct or indirect impacts to the hedgerows including both above ground habitat and the root system. A tree protection plan will be incorporated into a CEMP to ensure best practice measures are followed throughout construction and operational maintenance.</p> <p>As such, other native hedgerow (H2a6) is scoped out of further assessment.</p>
<b>Fauna</b>	
Bats	<p>Bats are considered to be likely present within the Site and study area. There will be no direct loss of trees or woodland habitat for bats. Embedded design mitigation measures have ensured that trees and woodland are appropriately buffered by a minimum of 30 m from construction and infrastructure, reduced to 15 m for fencing, associated with the Proposed Development. Additional measures ensured by the SPP, complimented by a sensitive lighting scheme, pre-construction surveys and an on-site ECoW, will ensure the avoidance of any significant impacts on bats. As such, bats are scoped out of further assessment.</p>



IEF/ IOF	Rationale for Scoping Out
Badger	<p>Badger are confirmed as present within the Site and study area. Embedded design mitigation measures ensured by the SPP, complimented by pre-construction surveys and an on-site ECoW, will ensure the avoidance of any significant impacts on badgers. Passages/gaps under fencing will also be incorporated to ensure continued use of the Site for badgers for commuting and foraging purposes to ensure no long-term loss of foraging areas or access to foraging areas.</p> <p>Furthermore, Site boundaries will remain open and freely accessible and when considering the proposed enhancement measures, as outlined in <b>Technical Appendix 6.4</b>, it is considered that any potential impact would be short-term and ultimately the foraging conditions enhanced so that there would be a residual beneficial impact for badger. As such, badgers are scoped out of further assessment.</p>
Otter	<p>Otter are considered to be likely absent on Site. However, as a precaution, embedded mitigation measures ensured by the SPP, complimented by pre-construction surveys and an on-site ECoW, will ensure the avoidance of any significant impacts on otter.</p> <p>There will be no direct loss of aquatic or riparian habitat for otter however, standard mitigation measures that are to be applied during construction include the implementation of Site-wide pollution and contamination prevention measures to be detailed within a CEMP. These measures will ensure that any longer-term habitat degradation impacts from the Proposed Development are avoided. As such, otters are scoped out of further assessment.</p> <p>Potential effects on otter, as a qualifying interest of the River Tay SAC, are considered separately within <b>Technical Appendix 6.3: sHRA</b>.</p>
Water vole	<p>Habitat suitability for water vole is negligible across the Site, with watercourses dry or sub-optimal. As a precaution, measures ensured by the SPP, complimented by pre-construction surveys and an on-site ECoW, will ensure the avoidance of any significant impacts on water vole should they be present in the future. Embedded design measures are included at all water courses to establish a minimum buffer of 10 m from proposed fences, extending to 15 m for construction works associated with PV panels. In the event of water vole being identified during pre-construction surveys, micro-siting commitments will be made to adjust fencing distances to allow a 10 m buffer from any confirmed water vole burrows.</p> <p>In addition, embedded and standard mitigation measures that are to be applied during construction include the implementation of Site-wide pollution and contamination prevention measures to be detailed within a Construction Environment Management Plan (CEMP). These measures will ensure that any longer-term habitat degradation impacts from the Proposed Development are avoided. As such, water vole is scoped out of further assessment.</p>



IEF/ IOF	Rationale for Scoping Out
Red squirrel	Red squirrel are confirmed present within the wider study area. There will be no direct loss of woodland habitat for red squirrel. Embedded design mitigation measures have ensured that the woodland habitats are appropriately buffered by a minimum of 30 m from construction works associated with the Proposed Development, there are no breeding dreys identified on Site or within a 50 m buffer. Additional measures ensured by the SPP, complimented by pre-construction surveys and an on-site ECoW, will ensure the avoidance of any significant impacts on red squirrel. As such, red squirrel is scoped out of further assessment.
Pine marten	Pine martens are confirmed present within the wider study area. There will be no direct loss of woodland habitat for pine marten. Embedded design mitigation measures have ensured that woodland habitat is appropriately buffered a minimum of 30 m from construction works associated with the Proposed Development, there are no breeding dens identified on Site or within a 100 m buffer. Additional measures ensured by the SPP, complimented by pre-construction surveys and an on-site ECoW, will ensure the avoidance of any significant impacts on red squirrel. As such, pine marten is scoped out of further assessment.
Other mammals	Incidental records of brown hare, red fox and deer species were recorded during field surveys. No evidence of hedgehog observed during field surveys however may be present in woodland in the wider surroundings. The measures ensured by the SPP, complimented by pre-construction surveys and the presence of an ECoW during vegetation clearance works, will ensure the avoidance of any significant impacts on other mammals.
Herptiles	<p>One incidental observation of common frog was recorded during field surveys. No other incidental sightings of herptiles were noted. The measures ensured by the SPP and checks completed by the designated ECoW will ensure the avoidance of any potential impacts presented to herptiles and to protect any hibernaculum and / or breeding sites during the construction phase.</p> <p>In addition, embedded and standard mitigation measures that are to be applied during construction include the implementation of Site-wide pollution and contamination prevention measures to be detailed within a CEMP. As such, herptiles are scoped out of further assessment.</p>



IEF/ IOF	Rationale for Scoping Out
Breeding Birds	<p>The potential impacts from the development have been identified in <b>Section 6.15</b>. The measures ensured by the SPP and checks completed by the designated ECoW during ground clearance and construction works will ensure the avoidance of injury and/or mortality to birds nesting from construction activities within field boundaries and therefore scoped out (see <b>Section 6.13</b>).</p> <p>In addition, embedded and standard mitigation measures that are to be applied during construction include the implementation of Site-wide pollution and contamination prevention measures to be detailed within the CEMP. These measures will ensure that any longer-term habitat degradation impacts from pollution are avoided and therefore scoped out (see <b>Section 6.13</b>).</p> <p>Maintenance is expected to consist mostly of routine Site inspections by technicians, as well as some unscheduled visits when required. There would likely be no more than a handful of such vehicle movements during any typical week, and they would typically be Light Goods Vehicles (LGVs) or pick-up trucks. There may be the occasional need for an Heavy Goods Vehicle (HGV) to visit once operational to, for example, replace a defective item. Maintenance activities will be similar to or lower to a baseline level of agricultural and other types of activities taking place in the vicinity of the Site. Therefore, disturbance during the operational phase development is not considered significant and therefore scoped out.</p> <p>Impacts taken forward in the assessments are habitat loss and disturbance/ displacement during construction and during operation.</p>
Wintering Birds	<p>Disturbance of wintering birds during operation is scoped out with the same rationale as for breeding birds above.</p> <p>Impacts taken forward in the assessment are habitat loss and displacement during construction and operation in relation to pink-footed goose and greylag due to proximity of the Development Site to European/ international designated sites for these species and desk study records of birds utilising fields within 2 km from the Site.</p>

## 6.15 Assessment of Potential Effects

6.15.1 The main elements of the Proposed Development which have the potential to impact on IEFs or IOFs during construction and/or operation are:

- track construction, including culverting of watercourses/drainage ditches, mobile plant traffic movements and potential for dust generation;
- temporary potential for dust generation;
- installation of solar panels, BESS and associated infrastructure;
- temporary compound areas;
- temporary materials storage (soils and turves);



- site water management; and
  - site restoration (track batters, compounds, etc.).
- 6.15.2 The above activities have the potential to cause the following construction impacts to the IOFs identified for the Site:
- Direct loss of foraging habitat and/or breeding habitat.
  - Indirect loss of foraging habitats and/or breeding habitat through displacement.
  - Disturbance (including noise, vibration, pollution) and displacement due to heavy machinery, noise and human activity associated with the construction works on the site. Disturbance of ground vegetation may affect a zone of approximately 5 m around all infrastructure.
- 6.15.3 The potential operational impacts have been identified as:
- Direct habitat loss and indirect loss of foraging or breeding habitat due to displacement or avoidance.
  - Reflection / glare impacts due to solar panels.
  - Cumulative impacts of the Proposed Development in the context of other nearby developments (operational, consented and in planning).

#### Nature Conservation Sites

- 6.15.4 All of the European and international designated sites (and their underpinning SSSIs) located within 10 km (20 km for sites with goose qualifying interests) from the application boundary have been screened in for Appropriate Assessment as part of the **shadow Habitats Regulations Appraisal (sHRA) (Technical Appendix 6.3)**.
- 6.15.5 The sHRA Appropriate Assessment was carried out for greylag and pink-footed geese of the South Tayside Goose Roosts SPA/ Ramsar (and overlapping Dupplin Lakes SSSI); otter of the River Tay SAC, greylag and pink-footed geese of the Firth of Tay and Eden Estuary SPA/ Ramsar (and partially overlapping Inner Tay Estuary SSSI); and pink-footed goose of the Loch Leven SPA/ Ramsar (and underpinning Loch Leven SSSI).
- 6.15.6 Other nationally designated sites have been screened out from further assessment (see **Table 6-11**).
- 6.15.7 The Appropriate Assessment ascertained no adverse impacts on conservation objectives and integrity of these sites. Given the conclusions of the **shadow Habitats Regulations Appraisal (sHRA)** and otherwise screened out designated sites, there will be **no significant effects** on any of the European, international or nationally designated sites.

#### Breeding Birds

- 6.15.8 All wild birds in Scotland and their nests are protected under the WCA 1981 (as amended). Certain species listed on Schedule 1 of the Act receive additional



- protection, particularly against disturbance while nesting. Further protection is afforded to species listed on the Scottish Biodiversity List (SBL) as national conservation priorities, and to those listed under the Birds Directive (2009/147/EC), which are safeguarded through site designations (e.g. SPAs) under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).
- 6.15.9 The Site supports a diverse assemblage of breeding and foraging bird species. Target species are considered of **Local importance** due to their conservation status and evidence of breeding territories on Site. Of the total of nine skylark breeding territories found within the survey area, five were located within the current application boundary with a maximum of three predicted to be nesting within the area not covered by the survey due to subsequent changes of the application boundary. All of the other target species such as willow warbler (seven territories), woodpigeon (three territories) and one territory of greenfinch were distributed along the woodland edge within the current application boundary plus the 100 m buffer. Full results and discussion relating to surveys are provided within **Technical Appendix 6.2 Baseline Ornithology Survey Report**.
- 6.15.10 *Construction and decommissioning* activities could result in degradation of foraging and nesting habitats through construction activities and/ or pollution incidents. However, all the breeding target species apart from skylark (discussed below) were recorded along woodland edges within the 100 m buffer of the application boundary. These edge habitats will be retained as the design of the Proposed Development avoids woodland edge through application of buffers minimising the scale of impacts to these habitats. Given the local importance of the feature as well as availability of alternative nesting habitats in the vicinity of the development and the short-term, localised character of disturbance, these effects are considered to be **Not Significant**.
- 6.15.11 *Construction and decommissioning* activities do have the potential to result in displacement or disturbance to nesting birds, if undertaken during the breeding bird season. The embedded mitigation ensures retaining and buffering of linear woody habitats and woodland edges, minimising the risk of fringe habitat loss. The construction phase is expected to be 8-12 months, therefore in a worst-case scenario breeding birds could be displaced/ disturbed during one breeding seasons. However, in reality construction activities will be phased across the Site. The impact of displacement for most of the breeding species will therefore be temporal and localised, which is considered **Not Significant**.
- 6.15.12 The *operation* of the Proposed Development has the potential to impact nesting directly or indirectly through permanent loss of habitat beneath the footprint of the Proposed Development. There will be a permanent loss of approximately 126 ha of breeding habitat (arable land) to solar array within the approximately 160 ha application boundary, which was occupied by up to eight pairs of skylarks at a density of 0.044 pairs/ ha. Skylarks avoid nesting close to tall vegetation and structures such as buildings or solar panels to avoid predation (Donald, *et al.*,



2001)<sup>54</sup>. However, a large area of approximately 11 ha of wildflower rich grassland will be created in the north east extent of the Site, which will be able to support 2-3 displaced pairs. Therefore, it can be assumed that five out of the eight territories will be lost to the Development. While skylarks avoid nesting close to high structures, they can (to some extent) utilise solar farms for foraging including by chicks (Copping *et al.*, 2025<sup>55</sup>, Fox *et al.*, 2022<sup>56</sup>). The wildflower rich grassland created along the northern and southern edges of the Site will offer improved foraging opportunities and productivity for displaced skylarks nesting adjacent to the Site, as the habitat should support a larger biomass of insect prey items and offer a better cover against predators for chicks compared to the currently existing improved grassland and arable fields. Therefore, it is considered that the impact of the permanent loss of breeding habitats for skylark will be **Not Significant**.

### Wintering Birds

6.16 Wintering goose species which are of qualifying interest of the SPA/ Ramsar sites within 20 km from the Site have been assessed against construction and operation effects in the **shadow Habitats Regulations Appraisal (Technical Appendix 6.3)**. Please refer to the **Nature Conservation Sites** assessment above and to **Technical Appendix 6.3** for more detail.

## 6.17 Additional Mitigation & Monitoring

6.17.0 No additional mitigation or monitoring is proposed.

## 6.18 Cumulative Effects

6.18.0 Consideration has also been given to the potential for likely significant effects to arise as a result of the Proposed Development alongside other identified cumulative schemes during both construction and operational phases.

6.18.1 The cumulative schemes that are considered relevant to this technical assessment are shown in **Table 6-12**.

**Table 6-12: Relevant Cumulative Schemes**

Name	Proximity	Description	Status
Kinnon Park Farm Solar Array	2.25 km north	49.9 MW solar farm comprising ground mounted solar arrays and ancillary infrastructure, and battery energy storage system.	Awaiting Decision

<sup>54</sup> Donald, P.F., Evans, A.D., Buckingham, D.L., Muirhead L.B. and Wilson J.D. (2001). Factors affecting the territory distribution of Skylarks *Alauda arvensis* breeding on lowland farmland. *Bird Study* 48: 271-278.

<sup>55</sup> Copping, J. P. et al. (2025) 'Solar farm management influences breeding bird responses in an arable-dominated landscape', *Bird Study*, 72(3), pp. 217–222. doi: 10.1080/00063657.2025.2450392.

<sup>56</sup> Fox, H. (2022). Blithe spirit: Are skylarks being overlooked in impact assessment? *CIEEM - In Practice*, 117: pp47-51.



- 6.18.2 Cumulative effects with Kinnon Park Farm Solar project have been considered for receptors scoped into this assessment, other receptors have not been assessed cumulatively as they were scoped out of this assessment and are not expected to experience significant interaction with other developments.
- 6.18.3 Kinnon Park is located to the west of Perth and is approximately 134 ha in size, comprising a working farm dominated by arable land, broad-leaved woodland, hedgerows, scattered trees and ruderal vegetation. The Site located 3.8 km from the South Tayside Goose Roosts SPA/ Ramsar. Other international sites located within 20 km from the Site were not considered in the Kinnon Park EIA.

**Direct or indirect habitat loss habitat**

- 6.18.4 No breeding bird survey was conducted as part of the Kinnon Park planning application, however, winter bird survey<sup>57</sup> were carried out in January and February 2024 identified 2,500 pink-footed geese just outside of the development footprint. This was subsequently not included within the EIA report with a conclusion following two winter bird survey visits that: *“Although it is acknowledged that the absence of evidence does not in itself exclude the use of the site by these species, it is considered highly unlikely that the site represents an important, regular or even occasional resource for resting birds.”*<sup>58</sup>.
- 6.18.5 It needs to be assumed however that pink-footed and greylag geese of the South Tayside Goose Roosts SPA/ Ramsar and other European/ international sites designated for these qualifying interests could also utilise Kinnon Park and that a further 134 ha would be lost for foraging in the local area (within 5 km of the proposed Dupplin Solar) with a total of 260 ha lost in combination with Kinnon Park, should this be consented.
- 6.18.6 The area of approximately 260 ha that could be cumulatively lost to the Proposed Development and Kinnon Park represents approximately 0.34% of the total of 77,324 ha of suitable foraging habitats within a 20 km radius from the South Tayside Goose Roosts SPA / Dupplin Lake roost. This represents a relatively

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<sup>57</sup> Ellendale Environmental Limited (2024). EEL606 Kinnon Park Farm – Wintering Bird Surveys 2024. Technical Report for Gray Planning & Development Ltd. Available online: [https://planningapps.pkc.gov.uk/online-applications/files/848D7EC28552730B7B9FCB6DB47BE7EB/pdf/24\\_01188\\_FLM-WINTERING\\_BIRD\\_SURVEYS-2243534.pdf](https://planningapps.pkc.gov.uk/online-applications/files/848D7EC28552730B7B9FCB6DB47BE7EB/pdf/24_01188_FLM-WINTERING_BIRD_SURVEYS-2243534.pdf) [Accessed: 10/12/2025]

<sup>58</sup> Ellendale Environmental Limited (2024). Kinnon Park Farm. Ecological Impact Assessment (EIA). Technical Report for Namene Solar. Available online: [https://planningapps.pkc.gov.uk/online-applications/files/971D6708608A740023D924E4BC7544D4/pdf/24\\_01188\\_FLM-EIA\\_REPORT-2243524.pdf](https://planningapps.pkc.gov.uk/online-applications/files/971D6708608A740023D924E4BC7544D4/pdf/24_01188_FLM-EIA_REPORT-2243524.pdf) [Accessed: December 2025]



- small area compared to the existing alternative habitats locally within 5 km from the Site (i.e. 3.81% of the total 6,816.38 ha of available suitable habitat).
- 6.18.7 The area of approximately 260 ha that could be cumulatively lost represents approximately 0.35% of a total of 75,164 ha of suitable foraging habitats within a 20 km radius from the Firth of Tay and Eden Estuary SPA/ Ramsar.
- 6.18.8 The area of approximately 260 ha that could be cumulatively lost represents approximately 0.35% of a total of 73,556 ha of suitable habitat within a 20 km radius from Loch Leven SPA/ Ramsar.
- 6.18.9 Therefore, pink-footed and greylag geese have a significant resource available in the wider region during winter within the 20 km foraging range and locally within 5 km from the development. Permanent loss of habitat from the Project in-combination due to construction and operation is therefore considered **Not Significant**.

**Disturbance of bird species due to construction (noise, light, vibration, construction worker presence)**

- 6.18.10 Pink-footed and greylag geese forage within 5 km from the Site. The construction of the Proposed Development has the potential to disturb or displace geese due to noise and movement of construction machinery and plant.
- 6.18.11 Goodship & Furness (2022)<sup>59</sup> carried out a review of disturbance distances and reported 350-500 m flight initiation distance during hunting in Denmark in the migration and non-breeding season for pink-footed goose. NatureScot recommends 200-600 m disturbance buffer for both pink-footed and greylag geese during construction activities in the non-breeding season<sup>20</sup>.
- 6.18.12 Disturbance should be judged as significant if an action causes impacts on populations of a species through either (i) changed local distribution on a continuing basis; and/or (ii) changed local abundance on a sustained basis; and/or (iii) the reduction of ability of any significant group of birds to survive, breed, or rear their young<sup>40</sup>.
- 6.18.13 The Kinnon Park planning application was submitted to Perth and Kinross Council in April 2024 and it is still under consideration, however it is likely that it would potentially be constructed earlier than Dupplin Solar which is scheduled for 2030/31. However, even with overlapping construction periods, any construction-related disturbance effects will be short in duration (within maximum one non-breeding season during the development) and also limited to a relatively small area compared to alternative habitats available locally (as detailed in Sections 6.18.5-6.18.10).. The Dupplin Lake roost is beyond a disturbance distance range

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<sup>59</sup> Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022). Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.



of 200-600 m, and in addition, it is sheltered from the Site by a block of established woodland.

- 6.18.14 It is therefore considered that construction related disturbance effects do not constitute significant disturbance as they do not cause sustained changes in local distribution, abundance and ability of these birds to survive and breed. Thus, the project in-combination with other projects is considered **Not Significant**.

### **Designated Sites (including Ancient Woodland) and Wintering Birds**

- 6.18.15 Cumulative assessment of impacts for designated sites and qualifying goose species interests has been carried out in the **shadow Habitats Regulations Appraisal (sHRA) (Technical Appendix 6.3)**.
- 6.18.16 It has been concluded that the project in-combination with other projects will not undermine conservation objectives in relation to avoiding significant disturbance and maintaining population of pink-footed and greylag geese of the assessed European/ international sites, and therefore cumulative impact is considered **Not Significant**.

## **6.19 Likely Residual Effects**

- 6.19.0 The likely residual effects of the Proposed Development are those that will arise after any secondary mitigation has been taken into account.
- 6.19.1 The likely residual effects of the Proposed Development during the construction and operational phases are set out in **Table 6-13**.
- 6.19.2 Given that no likely significant effects are anticipated as a result of the construction or operational phases of the Proposed Development, the residual effect is expected to be negligible adverse and **Not Significant** under the EIA Regulations.
- 6.19.3 Through the delivery of the OBEMP, the Proposed Development is expected to deliver areas of biodiversity enhancement within the Site, from baseline conditions (as detailed in **Technical Appendix 6.4**).



**Table 6-13: Summary of Residual Effects**

IEF/OEF	Potential Effect	Significance of Effect (with embedded mitigation)	Additional Mitigation Measures Required	Residual Effect
<b>Construction Phase</b>				
Designated Sites (HRA Input)	Species displacement / disturbance Habitat loss	Not Significant	N/A	Negligible
Breeding Birds	Species displacement / disturbance	Not Significant	N/A	Negligible
Wintering Birds	Species displacement / disturbance Habitat loss	Not Significant	N/A	Negligible
<b>Operation Phase</b>				
Designated Sites	Species displacement / disturbance Habitat loss	Not Significant	N/A	Negligible
Breeding Birds	Species displacement / disturbance Habitat loss	Not Significant	N/A	Negligible
Wintering Birds	Species displacement / disturbance Habitat loss	Not Significant	N/A	Negligible
<b>Cumulative Impacts</b>				
Designated Sites	Species displacement / disturbance Habitat loss	Not Significant	N/A	Negligible
Wintering Birds	Species displacement / disturbance Habitat loss	Not Significant	N/A	Negligible

## 6.20 Summary

- 6.20.0 This Chapter has been undertaken using baseline data collected through a combination of desk study, targeted surveys, and consultation with relevant nature conservation and statutory organisations. Best practice guidelines, such as the CIEEM Guidelines, serve as the foundation for the impact assessment.
- 6.20.1 This process established ecological features that could potentially be affected by the Proposed Development. No potential adverse effects on statutory designated sites were identified.
- 6.20.2 The Proposed Development has been designed through careful constraints analysis and feedback to minimise the potential for impacts on important habitats, and protected species as far as practicable. This has been achieved through



embedded mitigation and the iterative design process. This process, combined with further commitments to certain mitigation measures, during both pre-construction and construction phases, allowed potential effects on the majority of habitats and species present to be scoped-out of the assessment. The following IEFs were taken forward to the assessment stage:

- Dupplin Lakes SSSI, Tayside Goose Roosts SPA/Ramsar, River Tay SAC and Loch Leven SPA/Ramsar, breeding birds, and wintering birds.

6.20.3 The EIA assessment concluded that following the successful implementation of mitigation measures, guided by the development of SPPs, OBEMP, and any subsequent Construction Environmental Management Plan (CEMP), the potential residual impacts upon IEFs and IOFs were, therefore, considered **Negligible** or **No Effect** and therefore **Not Significant** under the EIA Regulations. In addition, the incorporation of biodiversity enhancement measures within the Proposed Development is anticipated to deliver localised ecological benefits, resulting in a minor beneficial effect in the long term.

6.20.4 The sHRA Appropriate Assessment was carried out for greylag and pink-footed geese of the South Tayside Goose Roosts SPA/ Ramsar (and overlapping Dupplin Lakes SSSI); otter of the River Tay SAC, greylag and pink-footed geese of the Firth of Tay and Eden Estuary SPA/ Ramsar (and partially overlapping Inner Tay Estuary SSSI); and pink-footed goose of the Loch Leven SPA/ Ramsar (and underpinning Loch Leven SSSI) (**Technical Appendix 6.3**) The Appropriate Assessment ascertained no adverse impacts on conservation objectives and integrity of these sites. Given the conclusions of the shadow Habitats Regulations Appraisal (sHRA) and otherwise screened out designated sites, there will be **no significant effects** on any of the European, international or nationally designated sites.

