7 Ecology

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7 Ecology

7.1 Executive Summary

7.1.1 An assessment of terrestrial ecology effects arising from the construction and operation of the Proposed Development was undertaken and is presented in this Chapter.

7.1.2 Following consultation with Orkney Islands Council (OIC), NatureScot and SEPA, a range of ecological studies were undertaken to identify the terrestrial ecological interests of the Proposed Development and to establish the ecological baseline for the Ecological Impact Assessment (EcIA). This included identification of existing wildlife records and nature conservation designations in the local area, as well as surveys of the habitats and faunal interests of the site. The following field surveys were undertaken:

- Phase 1 Habitat Survey, extended to include assessment of the potential presence of protected or otherwise notable faunal species; and
- National Vegetation Classification (NVC) Habitat Survey.

7.1.3 The habitats (listed in order of size) identified on site are currently:

- improved grassland;
- marshy grassland;
- blanket bog;
- wet modified bog;
- valley mire (fen);
- wet heath/acid grassland mosaic;
- wet dwarf shrub heath;
- semi-improved acid grassland;
- flush and spring – acid and neutral;
- inundation vegetation; and
- acid dry dwarf shrub heath.

7.1.4 A few small water drainage ditches were recorded within the site also.

7.1.5 The Desk Study, which included a 5 km survey buffer, identified the presence of otter.

7.1.6 Through a standardised evaluation method, Important Ecological Features (IEFs) were identified and brought forward for assessment. IEFs taken forward to assessment include:

- Loch of Isbister Special Areas of Conservation (SAC);
- West Mainland Moorlands Sites of Special Scientific Interest (SSSI);
- Loch of Swannay Local Nature Conservation Site (LNCS);
- wet heath/acid grassland mosaic; and
- blanket bog.

7.1.7 Potential impacts of the construction and operation phases are presented, prior to the assessment of effects. In line with guidelines, the impact assessment process assumes the application of standard mitigation measures. With these in place, predicted effects were considered to be barely

perceptible, and therefore not significant, with the exception of some loss of Loch of Swannay LNCS wet heath habitat and Loch of Swannay LNCS lowland fen habitats as well as wider area habitat types of wet heath/acid grassland mosaic and blanket bog.

7.1.8 Given these effects, biodiversity enhancement is proposed to be set out in a Habitat Management Plan (HMP) and a Grazing Management Plan (GMP). A pre-construction survey and Species Protection Plan dependant on the survey results is also proposed to further minimise any adverse effects on otter.

7.1.9 With the biodiversity enhancement and further mitigation detailed, residual impacts for the operation phase are considered to be negligible and therefore not significant for all IEFs except the LNCS burns and canalised burns feature where a low significant effect remains.

7.1.10 Likely cumulative effects of nearby developments (Costa Head, Burgar Hill, Hammars Hill and Holodykes wind farms), consented or at application stage, were also considered; no significant cumulative effects are anticipated.

7.2 Introduction

7.2.1 This Chapter sets out the methods used to describe and evaluate the non-avian ecological interests within the Study Area (see Section 7.4.2) of the Proposed Development. It documents the baseline conditions and includes an assessment of the likely effects of the Proposed Development on ecological features above a certain value and defines mitigation and compensation measures where significant effects are predicted. Ornithological features are described and assessed in **Chapter 8**. The effects on hydrology are addressed in **Chapter 12**.

7.2.2 This Chapter has been authored by ITPEnergised and is supported by baseline data provided within the following technical appendices:

- **Appendix 7.1** – Extended Phase 1 Habitat Survey Report (Nevis Environmental, 2021);
- **Appendix 7.2** – National Vegetation Classification Report (Whytock Ecology Ltd, 2022); and
- **Appendix 8.3** – Nisthill Wind Farm HRA (ITPEnergised, 2022).

7.2.3 The Extended Phase 1 Habitat Survey area included the potentially developable area of turbines only, whereas the National Vegetation Classification (NVC) survey in this assessment included a 250 m radius buffer beyond the potentially developable area of turbines (see Section 7.4.2 for a definition of Study Area).

7.2.4 The specific objectives of the Chapter are as follows:

- Describe the Ecological Impact Assessment (EcIA) methodology and criteria used to make the assessment.
- Describe the ecological baseline conditions.
- Describe the proposed standard mitigation measures which will be embedded in the Proposed Development and which the impact assessment takes cognisance of.
- Describe the likely effects of the Proposed Development, including direct, indirect and cumulative effects.
- Describe any additional mitigation or compensation measures proposed to address any significant effects.
- Describe and assess potential cumulative effects.
- Assess any residual effects.

7.2.5 The Assessment has been carried out in accordance with the Code of Professional Conduct of the Chartered Institute of Ecology and Environmental Management (CIEEM) by Donna Black (BA (Hons), MSc, ACIEEM) who has over 15 years' relevant experience.

7.3 Legislation, Policy and Guidelines

Legislation

7.3.1 Relevant legislation and guidance documents have been reviewed and taken into account as part of this ecological assessment. Of particular relevance are:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the "Habitats Directive");
- The Wildlife and Countryside Act 1981 (as amended) (WCA);
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended in Scotland) (the "Habitats Regulations");
- The Conservation of Habitats and Species Regulations 2010 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011 (as amended) (the "WANE Act"); and
- The Nature Conservation (Scotland) Act 2004 (as amended) (the "NCA").

Planning Policy

7.3.2 **Chapter 5** provides an overview of all the relevant planning policy. Of particular relevance to this Chapter are:

- National Planning Framework (NPF) 3 (Scottish Government, 2014) as the emerging NPF 4 does not yet have the full weight of adopted policy;
- Scottish Planning Policy (SPP; Scottish Government, 2014); and
- Orkney Local Development Plan (Orkney Islands Council, 2017).

7.3.3 Planning Advice Notes (PANs) 60: Planning for Natural Heritage provides guidance relevant to this assessment and the Proposed Development.

Guidance

7.3.4 Further key guidance documents relating to the assessment of effects of wind farms on terrestrial (non-avian) ecological receptors that have been referenced in this assessment include the following:

- The Scottish Biodiversity List (SBL) (Scottish Government, 2013);
- The Orkney Local Biodiversity Action Plan (LBAP) (Orkney Islands Council, 2018);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018, version 1.2 – updated April 2022);
- Good Practice during Wind Farm Construction 4th Edition (SNH, 2019);
- Monitoring the Otter *Lutra Lutra* (Chanin, 2003a);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). Bat Conservation Trust, London (Collins, 2016); and
- Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (SEPA, 2017).

7.3.5 Where appropriate, more detail relating to specific legislation, guidance or policy is provided in the corresponding Appendices supporting this Chapter (**Appendices 7.1 to 7.2**).

7.4 Assessment Methodology and Significance Criteria

Consultation

7.4.1 Table 7.1 provides details of consultations undertaken with relevant stakeholders, together with action undertaken by the Applicant in response to consultation comments.

Table 7.1 – Consultation Relevant to Non-Avian Ecology

Consultee	Key Consultee Comments	Applicant Action
Orkney Islands Council Scoping Opinion received 30th May 2022.	Designated Sites: Peerie Water and North Mainland Evie to Finstown Coast LNCS should be added to the list of sites within 5 km.	Designated sites, including Peerie Water and North Mainland Evie to Finstown Coast LNCS were considered during the desk study, the search area for local designated sites was 2 km therefore these two LNC sites are scoped out of the assessment. See Section 7.6 and Section 7.8 – 7.12.
	The proposed development borders the West Mainland Moorland SSSI. The qualifying features of the SSSI should be taken into consideration in the assessment.	This is acknowledged. Designated sites are identified in Section 7.6; assessment is in Section 7.8 – 7.12 and includes the SSSI.
	Locally designated sites: Part of the Proposed Development site lies within the Loch of Swannay Local Nature Conservation Site. An assessment should be undertaken of the likely direct and indirect effects of the Proposed Development on the qualifying interests of these sites and any other designated site with qualifying species whose foraging range includes the proposed development site.	This is acknowledged. Designated sites are identified in Section 7.6; assessment is in Section 7.8 – 7.12 and includes local designations
	The findings of the NVC survey should inform assessment of the likely effects of the proposed development on the habitats and ecosystems in this and the wider area and should take account of the effects of the proposal on Groundwater Dependant Terrestrial Ecosystems (GWDTEs).	NVC habitats and GWDTEs are identified in Section 7.6; assessment is in Section 7.8 – 7.12.

Consultee	Key Consultee Comments	Applicant Action
	Appropriate mitigation measures should be identified that will avoid or minimise the potential for adverse impacts.	
	The EIA Report should quantify the area of natural and semi-natural habitat that would be damaged or lost as a result of the development. Where possible, opportunities to incorporate benefits for biodiversity should be identified – these should not be restricted to the development site and may include options for compensatory biodiversity enhancement in other areas managed by the applicant.	Habitat loss is identified in Section 7.8; assessment, mitigation and compensation are described in Section 7.8 – 7.12.
	European Protected Species – Otter: A full otter survey is requested, and the findings should be presented in the EIA report.	Nevis Environmental completed an extended Phase 1 Habitat Survey on 23rd September 2021 which included surveying the site for its suitability for otter, based on guidance outlined in Monitoring the Otter (Chanin, 2003). The survey concluded there was no requirement for a further detailed otter survey, see **Appendix 7.1**. Otter presence is considered in Section 7.6 – 7.12.
NatureScot Scoping Opinion received 12th April 2022	The proposal lies adjacent to the West Mainland Moorlands Site of Special Scientific Interest (SSSI), protected for its upland habitats and breeding birds.	This is acknowledged. Designated sites are identified in Section 7.6; assessment is in Section 7.8 - 7.12 and includes West Mainland Moorlands SSSI.
	Requirement for an assessment of the direct and indirect impacts on the SSSI and its notified features in context of the management statement. The assessment should also consider the impact of the proposal as both a single development and cumulatively	An assessment of direct and indirect impacts on the SSSI and its notified features are included in Section 7.6 – 7.12. The SSSI is considered in the cumulative assessment

Consultee	Key Consultee Comments	Applicant Action
	with other proposals affecting the protected area.	
	The EIA will also need to take account of other potential significant impacts on nature including, but not limited to protected species.	An extended Phase 1 survey was conducted and is reported in **Appendix 7.1**. An assessment of impacts on protected and notable species is also included in Section 7.6 – 7.12.
RSPB Scotland, Senior Marine Conservation Planner, received 12th April 2022	Request for a detailed Habitat Management Plan (HMP) be prepared as part of the EIA and submitted with the application, including any proposals for mitigation/enhancement in relation to important habitats and species.	Proposed mitigation / enhancement measures are described in Section 7.7 and Section 7.9-7.11. It is proposed that a detailed HMP based on these measures is produced post consent, in consultation with RSPB, OIC and NatureScot.
SEPA Scoping Opinion received 31st March 2022	Advised to map and assess impacts upon Ground Water Dependent Terrestrial Ecosystems (GWDTE) and buffers.	GWDTE presence has been mapped (see **Figure 7.6**) and considered within Section 7.6 and in **Chapter 12**.

Study Area

7.4.2 The Proposed Development is located at the north end of Orkney Mainland and is centred on Ordnance Survey (OS) grid reference HY 30437, 27082. Appropriate study areas (the 'Study Area') for each specific survey were derived from best practice guidance in areas with available access as follows:

- extended Phase 1 Habitat Survey: the red line boundary as September 2021 (slightly larger than the scoping boundary);
- NVC survey: the red line boundary plus accessible areas up to 250 m;

7.4.3 The Study Areas as described are shown in **Figure 7.1** and comprise a mixture of agricultural grassland, swamp, blanket bog and wet heath, which is used to rear livestock; mainly cattle.

Ecological Desk Study

7.4.4 An Ecological Desk Study was undertaken by Nevis Environmental in 2021 and is documented within the extended Phase 1 Habitat Survey report (**Appendix 7.1**). This data was used to confirm the presence of any statutory and non-statutory nature conservation sites and legally protected or otherwise notable species within 2 km of the site. The desk study did not include Local Biological Records Centre data, as Orkney Wildlife Information and Records Centre was not operational at the time due to the Covid-19 pandemic. In spring 2022 ITPEnergised also approached the Local Biological Records Centre for records; however, it was confirmed that Orkney Wildlife Information and Records Centre remains inoperative. However, the 2021 desk study was extended to include publicly available data, on the NBN database, within 5 km of the site.

Field Surveys

7.4.5 Ecological field studies were undertaken to establish the site baseline for habitats and a range of protected or otherwise notable species and included the following technical studies:

- An extended Phase 1 Habitat Survey conducted in September 2021 and which included an assessment of the suitability of the site for otters, roosting bats as well as other protected or otherwise notable species (**Appendix 7.1**).
- An NVC survey conducted in April 2022 of the 'Study Area' defined as potentially developable area with a 250 m survey buffer around potential locations with deep (>1 m) excavations, such as turbine foundations, to identify potential groundwater-dependent terrestrial ecosystems, which could be vulnerable to the Proposed Development (**Appendix 7.2**).

7.4.6 Full details of the methodologies applied are presented in **Appendices 7.1 to 7.2**.

Evaluation Methods for Ecological Features

7.4.7 Table 7.2 lists the criteria used to determine the value of ecological features in a geographical context.

Table 7.2 – Geographical Evaluation Criteria

Scale of Ecological Value	Criteria	Examples
International	Nature conservation resource, i.e. designated nature conservation area, habitat or populations of species, of international importance. N.B. For designations, such as a Special Area of Conservation (SAC), 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.	International nature conservation areas: ▪ Any SAC; ▪ Any candidate SAC (cSAC); and ▪ Any Ramsar wetland. Significant numbers of a designated population outside the designated area. A site supporting more than 1 % of the EU population of a species.

Scale of Ecological Value	Criteria	Examples
National (Scotland)	Nature conservation resource, i.e. designated nature conservation area, habitat or populations of species, of national importance. 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.	National nature conservation areas: ▪ Any SSSI or NNR designated for biological feature(s). A site supporting more than 1 % of the UK population of a species. Nationally important population/assemblage of a European Protected Species (EPS) or species listed on Schedule 5 of the WCA.
Council area (Orkney)	Nature conservation resource, i.e. nature conservation designation, habitat or species, of importance on a council area scale.	Statutory and non-statutory nature conservation designations: ▪ Any Local Nature Reserve (LNR); ▪ Any Local Nature Conservation Site (LNC); ▪ Any Scottish Wildlife Trust (SWT) reserve; and ▪ Any Local Biodiversity Site (LBS). A council area-scale important population / area of a species or habitat listed on the Scottish Biodiversity List (SBL) (Scottish Government, 2013) as requiring conservation action. A council area-scale important population/area of a species or habitat listed on the local Biodiversity Action Plan (local BAP). A council area-scale important population/assemblage of an EPS or species listed on Schedule 5 of the WCA.
Local (i.e., within 2 km of the site)	Nature conservation resource, e.g., a habitat or species of importance in the context of the local district.	A breeding population of a species or a viable area of a habitat that is listed in a Local BAP because of its rarity in the locality. An area supporting 0.05-0.5 % of the UK population of a species.

Scale of Ecological Value	Criteria	Examples
		A breeding population of a species on the SBL. All breeding populations of EPS or Schedule 5 species.
Less than local	Unremarkable, common and widespread habitats and species of little/no intrinsic nature conservation value.	Common, widespread, modified and/or impoverished habitats. Common, widespread, agricultural and/or exotic species.

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

7.4.9 In the EcIA reported in this Chapter, any ecological feature of local or higher value is considered an Important Ecological Feature (IEF).

Impact Assessment Methods

7.4.10 The approach to the EcIA follows the CIEEM guidelines (CIEEM, 2018), which prescribe an industry-standard method to define, predict and assess likely ecological effects to a given proposed development. Starting with establishing the baseline through a mix of desk study and field survey, key ecological features (the IEFs) are identified and those requiring assessment established through a reasoned process of valuation and consideration of factors, such as statutory requirements, policy objectives for biodiversity, conservation status of the IEF (habitat or species), habitat connectivity and spatial separation from the proposed development. From this stage, these features are assessed for impacts with the assumption of this being in the presence of construction industry-standard mitigations to ameliorate impacts as far as practicably possible. Additional mitigation strategies can then be determined to minimise any residual impacts that would otherwise be experienced by the IEF and any opportunities for enhancement identified.

7.4.11 In summary, the impact assessment process (CIEEM, 2018) involves:

- identifying and characterising impacts and their effects;
- incorporating measures to avoid and mitigate adverse impacts and effects;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects; and
- identifying opportunities for ecological enhancement.

Ecological Zone of Influence

7.4.12 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 bats, or indirect, e.g. noise or visual disturbance causing a species to move out of the EZoI. The EZoI was 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
- through liaison with other technical specialists involved in the assessment, e.g. hydrologists and noise specialists.

Temporal Scope

7.4.13 Likely impacts on ecological features have been assessed in the context of how the predicted baseline conditions within the EZoI might change between the surveys and the start of construction.

Characterising Ecological Impacts and Effects

7.4.14 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, ground clearance prior to construction that results in the removal of a hedgerow; and
- Effect – Outcome to an ecological feature from an impact. For example, the effects on a species population from loss of a hedgerow.

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

7.4.16 Both direct and indirect impacts are considered. Direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action but 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.

7.4.17 For the purposes of this assessment, the predicted impacts on ecological features are categorised as 'no impact', 'negligible', 'minor', 'moderate' or 'major', based on the definitions in Table 7.3, below.

Table 7.3 – Levels 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.
Minor	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.

Level of impact	Definition
Moderate	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.
Major	Irreversible impact on the status of the nature conservation designation, habitat or species and likely to threaten the long-term integrity of the feature. Not reversible or replaceable. Will remain detectable in the medium and long term.
The following definitions have been applied in respect to timescales: Immediate: Within approximately 12 months; Short term: Within approximately 1-5 years; Medium term: Within approximately 6-15 years; and Long term: More than 15 years.	

7.4.18 The magnitude of any impact on IEFs has been categorised according to the criteria outlined in Table 7.3, which is based on a table presented in the CIEEM (2018) guidelines. It should be noted that the concept of 'integrity' refers to coherence of ecological structure and function and includes both temporal and spatial considerations.

Determining Ecologically Significant Effects

7.4.19 An EcIA 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 development. Both adverse and beneficial impacts/effects are possible.

7.4.20 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.

7.4.21 In accordance with the CIEEM guidelines, the approach adopted in this 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. the ecological significance of an effect is not dependent on the value of the feature in question. Rather, the value of a feature that will be significantly affected is used to determine the geographical scale at which the effect is significant.

7.4.22 In accordance with the current CIEEM guidelines, effects of impacts are assessed in the presence of standard mitigation measures. Additional mitigation may be identified where it is required to reduce a significant effect.

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

7.4.24 In addition to determining the significance of effects on valued ecological features, this Chapter also identifies any legal requirements in relation to wildlife.

Limitations to Assessment

Habitats

7.4.25 The extended Phase 1 Habitat Survey was undertaken in September, during the optimal survey period for Phase 1 surveys (April – September, inclusive) and there were no limitations to access within the site. See **Appendix 7.1** for further details.

7.4.26 The NVC surveys were carried out in April, which is slightly earlier than is considered optimal for NVC surveys. As a result, some flowering plants may have been missed due to the timing of the survey; however, this is unlikely to have affected the conclusions drawn from the results. See **Appendix 7.2** for further details.

7.4.27 After the extended Phase 1 Habitat Survey was completed the site boundary changed slightly. However, any limitations that resulted from this were effectively overcome by the more detailed NVC work.

7.5 Baseline Conditions

7.5.1 This section details the results of the desk study and field surveys conducted across the site and respective Study Areas and describes the baseline conditions against which predicted impacts are assessed. This includes:

- designated sites and desk study/external data;
- habitats and vegetative communities; and
- protected species.

Desk Study

Nature conservation designations

7.5.2 **Figure 7.2** shows the statutory nature conservation designations within 5 km of the site, and non-statutory designations within 2 km of the site. These designations are detailed in Table 7.4. For the purposes of brevity, all features presented here are relevant to non-avian ecology only. Records pertinent to ornithological or geological interests are included within **Chapter 8** and **Chapter 12**, respectively.

Table 7.4 – Nature Conservation Designations

Site	Designation	Distance and Direction from Site	Reasons for Designation
Statutory Designated Sites within 5 km			
West Mainland Moorlands	SSSI	0 km – adjacent to southern boundary of the site	The site is designated for the following non-ornithological features: ▪ blanket bog
Glims Moss and Durka Dale	SSSI	1.5 km south of the site boundary	The site is designated for the following ecological features: ▪ mire habitats; ▪ valley fen habitats; and ▪ raised bog.
Loch of Banks	SSSI	3.9 km southwest of the site boundary	The site is designated for the following non-ornithological features: ▪ basin fen habitats

Site	Designation	Distance and Direction from Site	Reasons for Designation
Loch of Isbister	SAC	4.6 km south west of the site boundary	The qualifying features of the site are: ▪ otter *Lutra lutra*; ▪ eutrophic lakes; and ▪ transition mires and quaking bogs
Loch of Isbister and Loons SSSI	SSSI	4.6 km south west of the site boundary	The site is designated for the following non-ornithological features: ▪ basin fen
Eynhallow SSSI	SSSI	4.7 km north east of the site boundary	The site is designated for the following ecological features: ▪ common seal *Phoca vitulina* – important haul out site
Non-Statutory Sites within 2 km			
Site	**Designation**	**Distance to site**	**Non-ornithological Reasons for Designation**
Loch of Swannay	LNCS	Inside the southeast of the site and adjacent to the eastern boundary	The LNCS comprises the loch itself, fringing marshy grassland along parts of the shore (round much of the loch, improved grassland reaches to or very nearly to the shore), and some nearby rough grassland. Features of note include the following: ▪ lowland fens* ▪ mesotrophic lakes* ▪ upland heath* ▪ burns and canalised burns ▪ brown trout (*Salmo trutta*) ▪ large red damselfly (*Pyrrhosoma nymphula*) ▪ flat-stalked pondweed* (*Potamogeton friesii*) ▪ blunt-leaved pondweed (*Hydroptila apalachicola*) *Nationally important habitats and species
Loch of Hundland	LNCS	0.04 km – west of the site boundary	This site comprises the Loch of Hundland and areas of marsh at its northern and southern ends. Features of note include the following: ▪ mesotrophic lakes* ▪ lowland fens* ▪ upland heath* ▪ blanket bog* ▪ burns and canalised burns ▪ large red damselfly ▪ brown trout ▪ common toad (*Bufo bufo*)

Site	Designation	Distance and Direction from Site	Reasons for Designation
			▪ lesser bearded stonewort* (*Chara curta*) ▪ flat-stalked pondweed* ▪ slender leaved pondweed* (*Potamogeton pusillus*) ▪ pink water speedwell (*Veronica catenata*) *Nationally important habitats and species
Costa Hill, Evie/Birsa	LNCS	1.5 km northeast of the site boundary	An area of heather moorland with patches of grassland. Coastal grassland occurs near the cliff tops. There are also wetter areas including bog pools and lime rich springs. Features of note include the following: ▪ upland heath* ▪ crowberry heath ▪ maritime heath ▪ maritime cliff and slope* ▪ maritime grassland ▪ upland fens, flushes and swamps* *Nationally important habitats
Loch of Boardhouse	LNCS	1.9 km to the west of the site boundary	The LNCS comprises loch, areas of marsh and marshy grassland at its south-eastern end, and the lower course of the Burn of Kirbister where it enters the loch. Features of note include the following: ▪ lowland fens* ▪ mesotrophic lakes* ▪ upland heath* ▪ burns and canalised burns ▪ flat-stalked pondweed* ▪ brown trout *Nationally important habitats and species

7.5.3 As detailed in Table 7.4, a single statutory designated area, West Mainland Moorland SSSI, is located immediately to the south of the southern boundary of the site. Four other statutory area designations for ecological features are present within 5 km of the site.

7.5.4 The site partly overlaps with the Loch of Swannay LNCS. Another two LNCSs, Loch of Hundland and Loch of Boardhouse, are located practically adjacent (40 m) and within 1.9 km west of the site boundary, respectively. A fourth LNCS, Costa Hill, Evie/Birsa is located 1.5 km northeast of the site boundary.

Protected or Otherwise Notable Species

7.5.5 The Orkney Wildlife Information and Records Centre (OWIRC) was contacted for a data search. However, it was confirmed that the Centre is not currently operational. The desk study results therefore only include records of publicly available data of protected or otherwise notable species from locations within 5 km of the site centre and dating from within the last 10 years, as summarised in Table 7.5.

Table 7.5 – Records of Protected or Otherwise Notable Species

Common Name	Scientific Name	Legal / Conservation Status	Records
Brown hare	*Lepus europaeus*	SBL Priority Species Orkney LBAP	12 records of brown hare were identified within 5 km of the site with the nearest being 2.8 km away.
Mountain hare	*Lepus timidus*	Wildlife and Countryside Act 1981 (as amended) SBL Avoid negative impacts Orkney LBAP	A single record of Mountain hare was identified in 2019 approximately 3 km south-east of the site.
Otter	*Lutra lutra*	Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). SBL Avoid negative impacts Orkney LBAP	Two records of otter were identified within 5 km of the Site with the nearest being 1.5 km away in 2019. An otter survey done in 2016 for Costa Head wind farm also recorded an otter holt within 1.7 km of the Nisthill Site boundary.
West European hedgehog	*Erinaceus europaeus*	Wildlife and Countryside Act 1981 (as amended) Orkney LBAP	14 records of hedgehog were identified within 5 km of the site with the nearest being 2.8 km away.
Great yellow bumblebee	*Bombus distinguendus*	SBL Priority Species Orkney LBAP	Four records of this species were identified, with the nearest being 0.97 km to the east of the site.
Black darter	*Sympetrum danae*	Orkney LBAP	Three records of this species were identified, two from Cuppar, Evie and once at Birsay Moors, West Mainland.
Large red damselfly	*Pyrrhosoma nymphula*	Orkney LBAP	53 records of this species were identified within 5 km of the site.

Species

Bats

7.5.6 No records of bats were returned during the desk study.

Fish

7.5.7 No notable records of fish were returned during the desk study

Fungi

7.5.8 No notable records of fungi were returned during the desk study.

Plants

7.5.9 No notable plant species records were returned during the desk study.

Other Notable Species

Orkney vole

7.5.10 No records of Orkney vole were returned during the desk study.

Field Surveys

Habitats

7.5.11 The results of the Habitat Surveys are outlined in this section and are shown in **Figures 7.3** and **7.4** (NVC communities and corresponding Phase 1 habitats). These figures illustrate the location and extent of vegetation types recorded within the Study Area. For a full description of the survey results and detailed figures, please refer to **Appendices 7.1** and **7.2**. A total of 15 habitats were recorded within the Study Area. Table 7.6 presents the cover of NVC community, sorted under the broader Phase 1 habitat categories.

Table 7.6 - Cover of Vegetation Types

Phase 1 Habitat Code	NVC Type (where Relevant)	Extent in Study Area (ha)
B4 Improved grassland	MG6 *Lolium perenne-Cynosurus cristatus* grassland	87.69
J5 Other habitat	n/a	51.94
B5 Marsh/marshy grassland	MG10 *Holcus lanatus – Juncus effusus* rush-pasture	34.18
	M23 *Juncus effusus/acutiflorus–Galium palustre* rush-pasture	25.03
E1.6.1 Blanket bog	M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire (inclusive of the M17a *Drosera rotundifolia-Sphagnum* species sub-community and the M17c *Juncus squarrosus-Rhytidiadelphus loreus* sub-community)	13.21
	M19a *Calluna vulgaris-Eriophorum vaginatum* blanket mire, the *Erica tetralix* sub-community	5.59
E1.7 Wet modified bog	M25 *Molinia caerulea-Potentilla erecta* mire (including the M25a *Erica tetralix* sub-community and the M25c *Angelica sylvestris* sub-community	13.21
E3.1 Valley mire	M27c *Filipendula ulmaria-Angelica sylvestris* mire, the *Juncus effusus-Holcus lanatus* sub-community	11.61
	M28a *Iris pseudacorus-Filipendula ulmaria* mire, the *Juncus* species sub-community	0.69
D6 Wet heath/acid grassland mosaic	U6c *Juncus squarrosus-Festuca ovina* grassland, the *Vaccinium myrtillus* sub-community	8.62

Phase 1 Habitat Code	NVC Type (where Relevant)	Extent in Study Area (ha)
D2 Wet dwarf shrub heath	M15b *Trichophorum cespitosum–Erica tetralix* wet heath, the Typical sub-community (but some stands could not be identified to sub-community level)	6.24
B1.2 Semi-improved acid grassland	U5 *Nardus stricta-Galium saxatile* grassland (including the U5a Species-poor sub-community and the U5c *Carex panicea-Viola riviniana* subcommunity)	2.78
E2.1 Flush and spring – acid and neutral	M6 *Carex echinata–Sphagnum fallax /denticulatum* mire (Sub-community M6d)	2.60
F2.2 Inundation vegetation	S23 Other water-marginal vegetation	2.42
F1 Swamp	S27b *Carex rostrata-Potentilla palustris* tall-herb fen, the *Lysimachia* sub-community	1.90
	S9b *Carex rostrata* swamp, the *Menyanthes trifoliata-Equisetum fluviatile* sub-community	0.08
D1.1 Acid Dry Dwarf shrub heath	H9d *Calluna vulgaris-Deschampsia flexuosa* heath, the *Galium saxatile* sub-community	1.41
G1 Standing water	n/a	36.72
Running water	n/a	0
TOTAL		**269.18**

7.5.12 An overview of the vegetation types and condition recorded within the Study Area is presented below; for full descriptions, scientific names and target notes please refer to **Appendix 7.2**.

Improved grassland

7.5.13 Most of the Study Area is dominated by improved grassland used for grazing cattle or left to be harvested for sileage. The fields are dominated by Yorkshire fog and perennial rye grass. Forb species were frequent, but limited to a few species such as common daisy, creeping buttercup, meadow buttercup and white clover, with the swards being very short due to the high grazing pressure.

7.5.14 This habitat conforms to MG6 *Lolium perenne-Cynosurus cristatus* grassland in the NVC and was considered to be in favourable condition.

Marsh/marshy grassland

7.5.15 Marshy grassland is widespread throughout the Study Area but found mainly in valley bottoms and gently sloping ground with slow, constant water movement. Soft-rush dominates the vegetation, with sharp-flowered rush also present but rare. Between these tussocks of rushes is a species poor sward of Yorkshire fog, creeping bent-grass and rough meadow-grass. Forb species includes creeping buttercup, meadow buttercup and cuckooflower.

7.5.16 The marshy grassland conforms to M23 *Juncus effusus/acutiflorus–Galium palus*tre rush-pasture and was considered to be in favourable condition.

Blanket bog

7.5.17 Blanket bog is present in the southeast and northwest corners of the Study Area where the habitat aligned to NVC communities M17 *Trichophorum germanicum - Eriophorum vaginatum* blanket mire and M19a Calluna vulgaris-Eriophorum vaginatum blanket mire, the Erica tetralix sub-community.

7.5.18 M17 It was recorded on waterlogged peat which allowed a significant bog-moss (*Sphagnum* spp.) layer to dominate underneath tussocks of deergrass, cross-leaved heath and heather.

7.5.19 Two sub-communities were recorded in the M17 community, the M17a *Drosera rotundifolia-Sphagnum* species and the M17c *Juncus squarrosus – Rhytidiadelphus loreus* sub-community. The two sub-communities represent two differing ground conditions with the M17c occurring on sloping soils that are drier in nature than the M17a. Species such as round-leaved sundew, hare's-tail cottongrass, red bog-moss and cranberry were more common in M17a sub-communities where the ground layer is often saturated with water. Species such as mat-grass, heath rush and wavy hair-grass are more common in the M17c sub-community where the peat layer is thinner.

7.5.20 M19a was sparsely found within the Study Area with small pockets found in the south and northwest corners. This habitat is dominated by large swathes of heather, hare's-tail cottongrass and regular shoots of common cottongrass. It was rather uniform in composition, but deergrass, purple moor-grass and crowberry were all occasional, with species such as bog asphodel and round-leaved sundew occurring in wetter areas.

7.5.21 M19a is often located where the topography is flat or only slightly inclined so that a continuous peat layer can form.

7.5.22 Three areas of blanket bog were considered to be in favourable condition and therefore of Annex 1 quality (Figure 5 in **Appendix 7.2**). While other areas were considered degraded due to grazing pressure and therefore in unfavourable condition.

Wet modified bog

7.5.23 Wet modified bog was found in the northwest and southeast corners of the Study Area. None was found within the Site itself. It mostly conforms to NVC habitat M25 *Molinia caerulea-Potentilla erecta* mire which occurs on moderately wet, shallow peat. Purple moor grass dominates this community and can form large conspicuous tussocks. Bryophyte diversity is often poor and restricted to robust common pleurocarpous mosses such as glittering wood-moss and heath plait-moss.

7.5.24 Two sub-communities have been recorded within the Study area and represent two quite distinct vegetation types. The M25a *Erica tetralix* sub-community and the M25c *Angelica sylvestris* sub-community. The M25a sub-community is derived from blanket bog communities and contain species typical of those communities such as crowberry, heather and cross-leaved heath. The M25c sub-community is found in mosaics with M6d communities near the Loch Swannay shore in the east and forms a diverse community with wild angelica, soft rush, sharp-flowered rush, Devil's-bit scabious, cuckooflower and common primrose and bugle.

7.5.25 The M25 habitat (an Annex 1 habitat where peat depth is >50cm) within the Study Area was considered unfavourable and as such did not qualify for Annex 1 status.

Valley mire

7.5.26 Valley mires occur throughout the Study Area in the east and west. The habitat conforms to two NVC communities namely M27 and M28.

7.5.27 Several stands of the M27 *Filipendula ulmaria - Angelica sylvestris* mire type were recorded within the Study Area where they occupied moderately large areas where water flows sluggishly and are located predominantly in valley bottoms. Species recorded included soft rush, sharp-flowered rush, common primrose, meadowsweet, Devil's-bit scabious and marsh bedstraw. The vegetation keys out as the M27c *Juncus effusus* sub-community which is similar in composition to M23b mires but has a more diverse range of species including wild angelica which is prominent within the community.

7.5.28 M28 *Iris pseudacorus - Filipendula ulmaria* mire was recorded in small stands in the northwest of the survey area. This community occupies very wet areas where it is closely linked to swamp communities. Yellow flag iris is the overwhelmingly dominant species, though other recorded species included floating sweet-grass, soft rush, marsh bedstraw and wild angelica. The vegetation keys out as the M28a *Juncus* species sub-community owing to the dominance of rush species throughout all stands within the survey area and was considered to be in favourable condition.

Wet heath/acid grassland mosaic

7.5.29 This habitat was found at the centre of the Study Area around Hundland Hill. Found on mineral deficient, shallow peaty substrates. This habitat is likely formed through a combination of intensive grazing or burning practices on peatland habitats. Heath rush was the dominant species in this habitat mixed with sweet vernal grass, velvet bent grass, wavy hair-grass, heath bedstraw and tormentil. Bryophytes recorded within this community included glittering wood-moss, red-stemmed feathermoss, springy turf-moss and pointed spear-moss.

7.5.30 This community aligned to NVC habitat type U6c *Juncus squarrosus – Festuca ovina* acid grassland, the *Vaccinium myrtillus* sub-community due to the high frequency of bilberry recorded within the vegetation and was considered to be in favourable condition.

Wet dwarf shrub heath

7.5.31 This habitat has a restricted distribution within the Study Area where it was found in the east and the northwest corner. Dominant species included deergrass, cross-leaved heath and heather. The vegetation keys out as M15 *Trichophorum cespitosum–Erica tetralix* wet heath in the NVC classification.

7.5.32 The largest area of wet heath keys out as the M15b typical sub-community and contains frequent cross-leaved heath with lesser amounts of heather. One stand of M15 located in the west of the survey area could not be assigned to sub-community level, as it was quite degraded in nature due to a combination of drainage and grazing activities. However, it did contain small amounts of black bog-rush which indicates that the vegetation would be quite diverse if grazing occurred at less intensity.

7.5.33 The M15 habitat within the Study Area (an Annex 1 habitat) was not considered to qualify for Annex 1 status, due it's degraded unfavourable condition.

Semi-improved acid grassland

7.5.34 Semi-improved acid grassland has a patchy and scarce distribution within the Study Area. This habitat is found on moist, acidic soils often with a mix of peat substrates, often near the loch shores. Mat-grass is the most frequent grass and often grows in thick wiry clumps. Other species recorded within the community include common bent, sheep's fescue and lesser amounts of wavy hair-grass and sweet vernal grass. Heath bedstraw can form intricate patches in places and is generally widespread throughout.

7.5.35 The vegetation conforms to U5 *Nardus stricta-Galium saxatile* acid grassland in the NVC. Two sub-communities were identified in the survey, including the U5a species poor and the U5c *Carex panicea-Viola riviniana* sub-communities and was considered to be in favourable condition.

Flush and spring – acid/neutral flush

7.5.36 This habitat was found in one location within the Study Area which was at the eastern side along the shore of Loch of Swannay. The vegetation is dominated by bog-mosses such as flat-topped bog-moss, feathery bog-moss and blunt-leaved bog-moss. The community is aligned to NVC habitat M6 *Carex echinata–Sphagnum fallax /denticulatum* mire.

7.5.37 As the water within the community flows to the loch shore, it increases in base richness as the peat layer becomes thinner and more rock becomes exposed. Small channels are found near the loch shore that contain a slightly more diverse range of species including bog pimpernel, cow-horn bog-moss, water-starwort agg. and hooked scorpion-moss. Rushes and grasses are the other dominant

species commonly found within this community. Creeping buttercup, creeping forget-me-not, devil's-bit scabious, star sedge and common sedge were frequently recorded throughout.

7.5.38 The vegetation all conforms to the M6d *Juncus acutiflorus* sub-community and was considered to be in favourable condition.

Inundation vegetation

7.5.39 This habitat was recorded along the Loch Swannay shore where frequent inundation creates a narrow niche along the loch shore. The species diversity is relatively low, with single species such as shoreweed or creeping buttercup often being dominant to the exclusion of most other species.

7.5.40 The community aligns with NVC habitat S23 Other water-marginal vegetation.

Swamp

7.5.41 S27 *Carex rostrata – Comarum palustre* tall herb fen formed a large swamp community situated around loch margins in the west of the Study Area. The vegetation is rich in herbaceous species, including marsh cinquefoil, marsh lousewort, marsh marigold, marsh grass of Parnassus, meadowsweet, sneezewort and creeping buttercup. Ragged robin was also recorded in the shallower areas. Access to this area was limited to the margins where the water was shallow but the community appeared to be a good example of its type. The vegetation shows a best fit with the S27b *Lysimachia vulgaris* sub-community, although *Lysimachia vulgaris* itself was not recorded.

7.5.42 Swamp dominated by bottle sedge is infrequent within the Study Area. Other common species include marsh marigold, bogbean, marsh cinquefoil, common sedge and water horsetail, as well as cuckoo flower and marsh lousewort. The vegetation keys out as S9b *Carex rostrata* swamp, the *Menyanthes trifoliata – Equisetum fluviatile* sub-community which has a diverse vascular plant assemblage.

7.5.43 The S27 swamp (Annex 1 habitat) community located in the northwest of the Study Area is considered to be in favourable condition and therefore qualifies for Annex 1 status.

Dry dwarf shrub heath - Acid

7.5.44 Dry heath occurs in small patches along the eastern boundary of the Site which has Calluna vulgaris as the dominant dwarf shrub species and conforms to NVC community H9 Calluna vulgaris – Avenella flexuosa heath.

7.5.45 The heath is found on shallow peat with a mix of mineral soils which creates conditions suitable for a variety of grass species. Avenella flexuosa is the dominant grass species within the community, though Anthoxanthum odoratum and Festuca rubra occur rather sporadically, according to soil conditions. The heath is heavily grazed which reduces the dwarf shrub cover and increases nutrient input. Forb species such as Galium saxatile, Potentilla erecta and Rumex acetosa were recorded throughout the heath community.

7.5.46 The H9 dry heath (Annex 1 habitat) community within the Study Area is considered to be in unfavourable degraded condition and therefore does not qualify for Annex 1 status.

Standing water

7.5.47 Loch of Swannay was within the eastern boundary of the Study Area and lies adjacent to the Site itself. It is a designated feature of Loch of Swannay LNCS and is a mesotrophic lake. It supports a variety of species including brown trout and a nationally uncommon species of pondweed.

Running water

7.5.48 Drainage ditches are present to the northeast and northwest of the Site, with those in the east running into Loch of Swannay. These drainage ditches are relatively steep sided and vegetated with grasses and were running clear at the time of the extended phase 1 Habitat Survey.

Quarry

7.5.49 A small stone quarry is present in the northeast of the site. The quarry has been used to install and maintain the tracks throughout the site, including for the existing wind turbine. The quarry was active at the time of the extended phase 1 Habitat Survey and consisted of mostly bare ground with some grasses, mosses and rock piles.

Bare ground and hardstanding

7.5.50 Several tracks run throughout the Study Area as well as the base of an existing wind turbine.

Groundwater-Dependent Terrestrial Ecosystems

7.5.51 Guidance issued by SEPA (2017) classifies NVC communities in terms of their potential groundwater dependency. The actual groundwater dependency is often dependant on setting, and not all communities listed may therefore be truly groundwater dependent. See **Chapter 12** for further details of the assessment of groundwater dependency.

7.5.52 Table 7.7 lists the NVC communities that have a potential for moderate or high groundwater dependency (see **Appendix 7.2** and its Tables 1 and 2) as defined by SEPA (2017). In total, six communities have moderate potential, and two communities have high potential groundwater dependency. These are shown on **Figure 7.6**.

Table 7.7 - Potential GWDTE Recorded in Study Area

NVC community name	GWDTE potential
M15 *Trichophorum cespitosum–Erica tetralix* wet heath	Moderate
M25 *Molinia caerulea - Potentilla erecta* mire	Moderate
M27 *Filipendula ulmaria - Angelica sylvestris* mire	Moderate
M28 *Iris pseudacorus - Filipendula ulmaria* mire	Moderate
MG10 *Holcus lanatus – Juncus effusus* rush-pasture	Moderate
U6 *Juncus squarrosus-Festuca ovina* grassland	Moderate
M6 *Carex echinata–Sphagnum fallax /denticulatum* mire	High
M23 *Juncus effusus/acutiflorus–Galium palustre* rush-pasture	High

7.5.53 **Chapter 12** includes a hydrological assessment of these wetlands. It concludes the following:

- With respect to groundwater sensitivity, despite the identification of areas of potential GWDTE on site, further analysis of the hydrogeological regime has identified no major aquifer, with only potential for localised perched groundwater within superficial materials or upper weathered bedrock.
- Further detail, including schematic cross-sections of each proposed turbine that is located within 250 m of an identified potential GWDTE area.
- Based on the analysis described above, the sensitivity of the groundwater resource is assessed as Low.
- It has been assessed that due to the low likelihood of any significant aquifer being present, there would not be a significant effect on GWDTE or on groundwater quality or quantity as a result of the Proposed Development (please see **Chapter 12** for more details).

Species

Otter

7.5.54 As described in **Appendix 7.1**, no evidence of otter was identified during the extended phase 1 Habitat Survey assessment and no holts or hovers were identified within 200 m of the site.

Bats

7.5.55 No evidence of bats or habitat suitable for roosting bats was identified within the Proposed Development site during the extended Phase 1 Habitat Survey (see **Appendix 7.1** for further details).

7.5.56 The habitats on site offer very little in the way of linear features, and therefore much of the habitat, although suitable for supporting prey species, is relatively open and exposed, offering low suitability for foraging or commuting bats.

Fish

7.5.57 No significant watercourses are recorded within the site boundary. However, Loch of Swannay is present along the eastern boundary, which according to SEPA has high suitability for fish migration and good water quality.

Invertebrates

7.5.58 Four records of great yellow bumblebee were returned during the desk study, approximately 970 m east of the site boundary, on the opposite side of Loch of Swannay. No suitable habitat, such as flower-rich meadows or machair, capable of supporting this Scottish Biodiversity List species was found within the site.

7.5.59 Three records of black darter were returned during the desk study, the nearest being approximately 3.3 km east of the site boundary. Suitable habitat capable of supporting this Orkney LBAP species was found within the site including the drainage ditches and the shores of Loch of Swannay.

7.5.60 Fifty-three records of large red damselfly were returned during the desk study. Suitable habitat capable of supporting this Orkney LBAP species was found within the site including the drainage ditches and the shores of Loch of Swannay.

Fungi

7.5.61 No notable records of fungi were returned during the desk study or recorded on Site.

Plants

7.5.62 No notable plant species, or invasive plant species were recorded during the field survey and no records were returned during the desk study.

Other Notable Species

Orkney vole

7.5.63 Four mammal burrows were recorded on an ad-hoc basis during the Extended phase 1 Habitat Survey along the banks of the drainage channel in the northeast of the site. They were approximately 6 cm in diameter, large enough to potentially be Orkney vole (*Microtus arvalis arcadensis*) burrows. No other field signs were found around the burrows.

Evaluation of Baseline Features

7.5.64 Table 7.8 below provides a summary of the level of importance of each of the recorded features.

Table 7.8 – Summary of Evaluation of Ecological Features

Feature	Rationale for Evaluation	Level of Importance
Loch of Isbister SAC	For designated sites, the value corresponds to the level of the designation.	International
West Mainland Moorlands SSSI		National
Glims Moss and Durka Dale SSSI		National
Loch of Banks SSSI		National
Loch of Isbister and Loons SSSI		National
Eynhallow SSSI		National
Loch of Swannay LNCS		Council
Loch of Hundland LNCS		Council
Costa Hill, Evie/Birsa LNCS		Council
Loch of Boardhouse LNCS		Council
Improved grassland	Improved grassland is widespread throughout the Study Area. This habitat is identified as a locally important habitat on the Orkney LBAP that provides a breeding resource for wading birds such as curlew, snipe, lapwing, oystercatcher and redshank. The impacts on the loss of breeding habitat are considered within **Chapter 8**. This habitat is considered of low non-ornithological ecological value.	Less than local
Marshy grassland – MG10 *Holcus lanatus – Juncus effusus rush-pasture*	This habitat is not clearly aligned with the SBL or LBAP priorities. It is considered of low non-ornithological ecological value.	Less than local
Marshy grassland – M23 *Juncus effusus/acutiflorus–Galium palustre* rush-pasture	This habitat is listed as a watching brief only habitat within the SBL. Small sections are found in the centre and eastern part of the Study Area. See **Chapter 12** for further details on GWDTEs.	Less than local
Blanket bog – M17 *Trichophorum germanicum –Eriophorum vaginatum* blanket mire and M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire	M17 and M19 are listed as Annex 1 blanket bog habitats, SBL priority habitat within blanket mire and is listed within the peatland priority habitat of the Orkney LBAP.	M17 without pools: Council M19: Council
Wet modified bog – M25 *Molinia caerulea–Potentilla erecta* mire (on shallow peat)	M25 is included in the priority habitat description for blanket mire and is an Annex 1 habitat if found on peat deeper than 0.5 m which is not the case here. This habitat is a potential GWDTE habitat (SEPA, 2017) but the assessment in **Chapter 12** concluded it not to be a GWDTE.	Less than local

Feature	Rationale for Evaluation	Level of Importance
Valley mire – M27 *Filipendula ulmaria-Angelica sylvestris* mire	This habitat is listed as a watching brief only habitat within the SBL.	Local
Valley mire – M28 *Iris pseudacorus-Filipendula ulmaria* mire	This habitat is listed as a watching brief only habitat within the SBL.	Local
Wet heath/acid grassland mosaic U6 *Juncus squarrosus-Festuca ovina* grassland	U6 habitat is listed as a watching brief only habitat within the SBL and is mentioned within the Farmland habitat of the Orkney LBAP.	Local
Wet dwarf shrub heath M15 *Trichophorum cespitosum–Erica tetralix* wet heath	M15 is a priority habitat on both the SBL and the Orkney LBAP. Wet heath is present throughout the Study Area both within the LNCS and the wider area. Wet heath is a potential GWDTE habitat (SEPA, 2017), but the assessment in **Chapter 12** concludes that this is not the case for the sections of this habitat with the Study Area.	Local
Semi-improved acid grassland U5 *Nardus stricta-Galium saxatile* grassland	U5 is listed as a watching brief in the SBL and is listed within the Orkney LBAP.	Local
Flush and spring – acid and neutral M6 *Carex echinata–Sphagnum fallax /denticulatum* mire	Upland flushes are listed with a watching brief on the SBL. Flushes are also listed within the peatland priority habitat of the Orkney LBAP.	Local
Inundation vegetation S23 Other water-marginal vegetation	This habitat was recorded along the Loch Swannay shore where frequent inundation creates a narrow niche along the loch shore.	Less than local
Swamp S27 *Carex rostrata-Potentilla palustris* tall-herb fen	Upland swamps are listed with a watching brief on the SBL. Swamps are also listed within the farmland priority habitat of the Orkney LBAP.	Local
Swamp S9 *Carex rostrata* swamp	Upland swamps are listed with a watching brief on the SBL. Swamps are also listed within the farmland priority habitat of the Orkney LBAP.	Local
Standing water	Loch of Swannay is a mesotrophic lake which is an SBL priority habitat	Council
Running water	Several drainage ditches are present to the northeast and northwest of the site, with two running east into Loch of Swannay. These drainage ditches are relatively steep sided and vegetated and were running clear at the time of the survey.	Less than local
Bare ground	Areas of hard standing (including base of existing wind turbine) do not align with stated nature conservation priorities.	Less than local

Feature	Rationale for Evaluation	Level of Importance
Buildings	The stone buildings have negligible value to roosting bats and are not conservation priorities in any other way.	Less than local
Fence	Post and wire fences are considered to have no ecological value.	Less than local
Mountain hare	This is a priority species on the SBL and the Orkney LBAP. The nearest mountain hare record returned during the desk study was over 3 km away and no sightings or signs were recorded during the extended phase 1 Habitat Survey therefore the Site is considered unsuitable habitat for this species.	Less than local
Brown hare	Twelve records of this species were returned in the desk study with the nearest being 2.8 km away. This is a priority species on the SBL and the Orkney LBAP. Brown hare was not seen during the field survey but could on occasion commute across the Study area.	Local
Otter	Otter is an EPS and is a priority species on the SBL and Orkney LBAP. Although no holts or hovers or other evidence of otter were recorded within the Study Area, the species is known to be present in the local area, and otters could on occasion move between watersheds either side of the Study Area.	Local
Bats	Bat species are also EPS and priority species on the SBL and Orkney LBAP. Bats are concluded not to be roosting within the Study Area, with the local potential for commuting and/or foraging activity likely restricted to limited linear features.	Less than local
Orkney vole	Orkney vole are an Orkney LBAP priority species. They are present throughout mainland Orkney and the ditches which offer potential for supporting voles are common and widespread in the immediate landscape of the site.	Local
Fish	Loch of Swannay LNCS is designated for its brown trout population. Therefore fish interests are evaluated as part of the LNCS.	Council
Great yellow bumble bee	Four records of great yellow bumble bee were returned during the desk study within approximately 970 m of the proposed development site boundary. No flower rich meadows or Machair were recorded in the Study Area so it is unlikely this species will be found there.	Less than local
Odonata (dragonflies)	Records of two Orkney LBAP species were returned during the desk study within 5 km of the Site.	Less than local

7.5.65 As noted in Section 7.4, above, ecological features of local and higher value are considered IEFs. Due to a range of factors, including some embedded mitigation measures, certain IEFs of local or higher value can also be scoped-out of further consideration.

Future Baseline Scenario

7.5.66 The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, require that a "*a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without development as far as natural changes from the baseline scenario can be assessed with reasonable effort, on the basis of the availability of environmental information and scientific knowledge*" is included within the EIA Report.

7.5.67 In order to ensure that the Proposed Development is assessed against a realistic baseline scenario, i.e. what the baseline conditions are likely to be once the Proposed Development is operational, a description of the likely future baseline conditions is provided within this section.

7.5.68 In the event that the site remained undeveloped, aside from slight variations in populations and distribution of the more mobile species, and variations associated with changes to livestock management, it is considered unlikely that there would be any significant change to the baseline conditions within the ecology survey area.

7.5.69 The site is likely to currently support species at or near to its carrying capacity. This means that a net increase in species population numbers would not be expected, should the Proposed Development not proceed.

7.5.70 Other changes over time may occur as a result of climatic change; although these are difficult to predict they may involve increased weather events, including higher precipitation, and gradual increases in average temperatures. Some change in the vegetation assemblage is likely to occur as a result of these changes.

7.6 Embedded Mitigation

Design Mitigation

7.6.1 A range of measures have already been applied as part of the iterative design process (see **Chapter 2**. During the design process, the following decisions have been implemented to reduce the potential for impacts on IEFs:

- Higher value areas of blanket bog (i.e. Annex 1 habitat) and waterbodies have been avoided as far as practicable.
- Existing tracks have been used, where possible, in order to reduce the footprint of the Proposed Development and to limit the number of watercourse crossings as far as practicable. Some localised upgrading may be required to ensure a minimum 4.5 m running width, with local widening on corners and the addition of passing places.
- The presence of potential GWDTEs has informed the site layout, which has maximised distances to such features as far as possible (see above).
- Electrical infrastructure cabling will be installed alongside tracks, wherever possible, to further minimise habitat loss.

Good Practise Mitigation

7.6.2 In line with the current CIEEM guidelines, the assessment of likely effects is carried out in the presence of standard mitigation measures. In the event of consent this mitigation will be implemented as part of the Proposed Development. The following good practice and mitigation measures will be applied to the Proposed Development during construction to ensure that likely effects on the IEFs and legally protected species are reduced:

- A suitably qualified Ecological Clerk of Works (EcoW) will be appointed prior to the commencement of any construction activities take place. The EcoW will be present and oversee construction activities as well as providing toolbox talks to all site personnel with regards to priority species and habitats, as well as undertaking monitoring works and briefings to relevant staff and contractors as appropriate.
- Development of an otter-specific protection plan inclusive of:
  - Cap any exposed pipe systems when not being worked and provide exit ramps for any exposed trenches or excavations (to prevent otters entering and becoming trapped).
  - Driver awareness and 10 mph speed controls within the Proposed Development site to limit the risk of road traffic accident mortality.
  - Implementation of an exclusion zone of at least 30 m to be implemented around any new holt or resting place.
- In order to prevent impacts on fish and pollution of watercourses within the site (with particulate matter or other pollutants such as fuel), best practice pollution prevention techniques will be employed.
- Regular monitoring of turbidity and suspended solids within watercourses will be required during construction. The monitoring will include a responsive element, with an on-site EcoW checking areas where active works are taking place and areas where sediment run-off may be a concern during periods of high rainfall.
- Full details of construction mitigation measures will be provided in a Construction Environmental Management Plan (CEMP) to be agreed with Infinergy, in consultation with NatureScot and SEPA, post-consent but prior to development commencing.

7.7 Potential Effects

Scoped Out IEFs

Designated Sites

7.7.1 Loch of Hundland LNCS is within 40 m of the Proposed Development site boundary. However, none of the features for which it is designated will be directly affected by the development infrastructure. One drainage ditch, which possibly runs into Loch of Hundland LNCS, will be affected by an access track and a turbine base. However, the implementation of good practice and a CEMP should mitigate any negative effects.

7.7.2 Glims Moss and Durka Dale SSSI lies over 1.5 km south from the nearest infrastructure and the physical separation of the site by a road means there is a lack of connectivity between the designated habitat features and the Proposed Development.

7.7.3 Loch of Banks SSSI lies over 3.9 km southwest from the nearest infrastructure and the physical separation of the site by distance and several roads means there is a lack of connectivity between the designated habitat features and the Proposed Development.

7.7.4 Loch of Isbister and Loons SSSI lies over 4.6 km southwest from the nearest infrastructure. The physical separation of the site by distance and several roads as well as waterbodies means there is a lack of connectivity between the designated habitat features and the Proposed Development.

7.7.5 Enyhallow SSSI lies 4.7 km northeast of the Site boundary. The physical separation of the site by distance, lochs, land and sea means there is unlikely to be a significant disturbance effect on the designated species feature (common seal) of the site.

7.7.6 Costa Hill, Evie/Birsa LNCS lies over 1.5 km northeast from the nearest infrastructure and the physical separation of the site by a waterbody and a road means there is a lack of connectivity between the designated habitat features and the Proposed Development.

7.7.7 Loch of Boardhouse LNCS lies over 1.9 km west from the nearest infrastructure. Whilst physically connected to Loch of Hundland LNCS, which is within 400 m of the Site, mitigation measures relating to pollution control in Section 7.7 are predicted to mitigate any likely significant effects on the designated habitat or species features of the site.

Habitats

7.7.8 Adverse impacts on habitats within the site will include direct losses, e.g. permanent land-take for turbine foundations and other infrastructure, temporary land-take for the construction site compounds as well as temporary disturbance of habitats within and adjacent to works areas and at the temporary construction compound, as well as indirect adverse impacts of mire, e.g. through changed hydrological conditions.

7.7.9 Despite the restoration of temporary loss areas, and taking a precautionary approach, it is assumed for the assessment that the areas of land-take for infrastructure also represent permanent losses of habitat due to the complexities in recreating habitat types.

7.7.10 Direct loss refers to the footprint of the infrastructure, while indirect effects refer to the disturbance zone around this infrastructure in damp or wet habitats, where a transitional habitat is likely to be formed between the infrastructure and the surrounding habitats. This zone has been defined as a worst-case 10 m buffer around the infrastructure elements of the Proposed Development (in practice, transition strips are likely to be reduced for drier vegetation types).

7.7.11 For clarity, Table 7.9 presents the areas of habitat loss by habitat type.

Table 7.9 – Summary of Effects on Habitats

Phase 1 habitat	NVC community or habitat types	Permanent loss (ha)	Temporary loss (ha)	Indirect Construction effects (ha)	Of which – Hydrological effects during operation
Loch of Swannay LNCS – designating features (* wording in designation)					
E3.1 Valley mire (lowland fens *from designation) (IEF)	M27 *Filipendula ulmaria-Angelica sylvestris* mire	0.561	0	0.264	0.112
Mesotrophic lakes*	n/a	-	-	-	-
D2 Wet dwarf shrub heath (upland heath*) (IEF)	M15 *Trichophorum cespitosum–Erica tetralix* wet heath	0.685	0	0.601	0.26
G2 Running water (burns and canalised burns*) (IEF)	Running water	3.48 m	0	21.52m	n/a
Total		**1.246**	**0**	**0.865**	**0.372**
All other habitats (including non-designated habitats within the LNCS)					

Phase 1 habitat	NVC community or habitat types	Permanent loss (ha)	Temporary loss (ha)	Indirect Construction effects (ha)	Of which – Hydrological effects during operation
B4 Improved grassland	MG6 *Lolium perenne-Cynosurus cristatus* grassland	1.32	0.25	0	
J5 Other habitat	n/a	0.67	0.33	0.74	0.46
B5 Marsh/marshy grassland	MG10 *Holcus lanatus – Juncus effusus* rush-pasture	0.62	-	0.70	0.42
	M23 *Juncus effusus/acutiflorus–Galium palustre* rush-pasture	1.42	1.04	0.81	0.49
E1.6.1 Blanket bog (IEF)	M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire	0.03	0	0.18	0.04
	M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire	0	0	0	0
E1.7 Wet modified bog	M25 *Molinia caerulea-Potentilla erecta* mire	0	0	0	0
E3.1 Valley mire (IEF) – (non-LNCS) wider area habitats only	M27 *Filipendula ulmaria-Angelica sylvestris* mire	0	0	0	0
	M28 *Iris pseudacorus-Filipendula ulmaria* mire	0	0	0	0
D6 Wet heath/acid grassland mosaic (IEF)	U6 *Juncus squarrosus-Festuca ovina* grassland	0.34	0	0.79	0.2
D2 Wet dwarf shrub heath (IEF) – (non-LNCS) wider area habitats only	M15 *Trichophorum cespitosum–Erica tetralix* wet heath	0	0	0	0
B1.2 Semi-improved acid	U5 *Nardus stricta-Galium saxatile* grassland	0	0	0	0

Phase 1 habitat	NVC community or habitat types	Permanent loss (ha)	Temporary loss (ha)	Indirect Construction effects (ha)	Of which – Hydrological effects during operation
grassland (IEF)					
E2.1 Flush and spring – acid and neutral (IEF)	M6 *Carex echinata–Sphagnum fallax /denticulatum* mire	0	0	0	0
F2.2 Inundation vegetation	S23 Other water-marginal vegetation	0	0	0	0
F1 Swamp (IEF)	S27 *Carex rostrata-Potentilla palustris* tall-herb fen	0	0	0	0
	S9 *Carex rostrata* swamp	0	0	0	0
D1.1 Acid Dry Dwarf shrub heath (IEF)	H9 *Calluna vulgaris-Deschampsia flexuosa* heath	0	0	0	0
G1 Standing water (IEF)	n/a	0	0	0	0
G2 Running water (IEF)* linear feature	n/a	3.48 m*	0	21.52 m*	n/a
J2.4 Fence	n/a	n/a	n/a	n/a	n/a
J3.6 Buildings	n/a	n/a	n/a	n/a	n/a
J4 Bare ground (including hardstanding)	n/a	n/a	n/a	n/a	n/a
Total		**4.4**	**1.62**	**3.22**	**1.61**

7.7.12 Based on the above calculations the following habitat IEFs have been scoped out of further assessment:

- Loch of Swannay LNCS – mesotrophic lake. There will be no works in close proximity to the loch.
- Wet dwarf shrub heath out with Loch of Swannay LNCS – M15 *Trichophorum cespitosum–Erica tetralix* wet heath. There will be no direct or indirect impacts on this feature.
- Valley mire – M28 *Iris pseudacorus-Filipendula ulmaria* mire lies just over 100 m from the nearest access track and over 320 m from a turbine base. There will be no direct or indirect impacts on this feature.

- Blanket bog – M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire lies over 415 m from the nearest access track and 300 m from the nearest turbine base. There will be no direct or indirect impacts on this feature.
- Semi-improved acid grassland – u5 *Nardus stricta-Galium saxatile* grassland, while it is located directly adjacent to an access track and c. 165 m of a turbine base, there will be no direct take of this habitat of dry substrates. There will be no direct or indirect impacts on this feature.
- Flush and Spring – M6 *Carex echinata–Sphagnum fallax /denticulatum* mire lies within 4 m of infrastructure; however, there will be no direct or indirect impacts on this feature.
- Swamp – S9 *Carex rostrata* swamp and S27 *Carex rostrata-Potentilla palustris* tall-herb fen is located out with the Site and 40 m away from the nearest infrastructure. There will be no direct or indirect impacts on these features.

7.7.13 The following species IEFs have been scoped out of the assessment:

- Loch of Swannay LNCS – all species other than brown trout. There will be no works in close proximity to the loch itself and no likely impacts on the plant and dragonfly species.
- Bats – Bats are concluded not to be roosting within the site, and their local presence is likely to be limited to commuting and/or foraging activity along the bank of Loch of Swannay which lies approximately 190 m east of the nearest turbine. Activity in this area is likely to be limited and unaffected by the turbines.
- Brown hare – The nearest brown hare record returned during the desk study was 2.8 km away and no incidental sightings or signs were recorded during the extended Phase 1 Habitat Survey. While there is suitable habitat on the site including improved grassland it is considered that any impacts will be temporary in nature and therefore not significant.
- Otter – As otter using the site may form part of the Loch of Isbister SAC population, it has been scoped out and instead will be assessed as part of the SAC.
- Orkney vole – Mammal holes were found along the banks of the northern of the two drainage ditches within Loch of Swannay LNCS which were considered suitable for Orkney vole. However, this drainage ditch will not be affected by any development infrastructure therefore maintaining any population of Orkney vole that may be present. As a precautionary approach, any diversion of the southern drainage ditch will be surveyed by an ECOW prior to construction.

Scoped in IEFs

7.7.14 Based on the above, the following IEFs are brought forward for detailed assessment in relation to the Proposed Development:

- Loch of Isbister SAC inclusive of its qualifying features;
- West Mainland Moorlands SSSI inclusive of its non-ornithological notified features;
- Loch of Swannay LNCS inclusive of the following habitat/species IEFs:
  - lowland fens (valley mire);
  - upland heath (wet dwarf shrub heath);
  - burns and canalised burns; and
  - brown trout.
- Wet heath/acid grassland mosaic – U6 *Juncus squarrosus-Festuca ovina* grassland; and

- Blanket bog – M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire.

7.8 Potential Effects

Construction

Loch of Isbister SAC

7.8.1 Loch of Isbister SAC lies over 4.6 km southwest from the nearest infrastructure and the physical separation of the site by distance and several roads as well as waterbodies means there is a lack of connectivity between the qualifying habitat features and the Proposed Development.

7.8.2 In contrast, the qualifying otter interest may be connected with the Proposed Development. Otters have been recorded within 1.5 km of the site, and surveys done for Costa Head wind farm in 2016 recorded otter holts on the shores of Loch of Swannay, 1.7 km from the boundary of the Proposed Development site. As otters can have large home ranges (>20 km), it is considered possible that otters using Loch of Swannay and surrounding landscapes could form part of the SAC population.

7.8.3 As per Table 7.8: Summary of IEFs Brought Forward in the Assessment, Natura sites have international value. The status of the qualifying species feature is currently assessed as 'favourable' (NatureScot 2020).

7.8.4 The majority of otter activity on or near the site is likely to be from animals foraging or commuting along the shore of Loch of Swannay or Loch of Hundland. It is likely otters do on occasions commute across the site between these two waterbodies, although this activity is likely to be at night only due to the nocturnal nature of otters.

7.8.5 Any otters crossing the site are potentially vulnerable to mortality or injury due to collision with construction traffic or construction methods, such as falling into excavations and becoming trapped or injured from the fall.

7.8.6 Otter holts, including any natal holts, are likely absent from the site and within the 200 m disturbance buffer zone. It is therefore considered unlikely that the Proposed Development will result in significant effects to the breeding otter population of the SAC.

7.8.7 Although the site itself borders Loch of Swannay to the east, the nearest proposed construction activity area is over 70 m from the loch bank. As the recommended buffer for disturbance to foraging/commuting otter is 50 m, in addition to the temporary nature of the construction phase, it is unlikely that the Proposed Development would result in significant disturbance of foraging/commuting otter of the SAC population.

7.8.8 No significant barriers will be presented to otters commuting across the site from Loch of Swannay to Loch of Hundland as no additional fencing is to be installed on-site. Access roads will be created, but these will be subject to occasional use in the long-term for access only for maintenance, and therefore will not present any significant barriers to otter movement across the site. It is therefore considered unlikely that the development will result in significant loss of supporting habitat of the SAC population of otter.

7.8.9 It has been demonstrated that the SAC population of otter may use the site and surrounding habitats for foraging and commuting; however, any disturbance to foraging/commuting otter is not considered to result in a likely significant effect. Disturbance to breeding otter has also been screened out, along with significant loss or deterioration of supporting habitat. As there is potential for otter to use the site for dispersal between two adjacent lochs, there is potential for likely significant effects to occur as a result of increased mortality during the construction phase of development only.

7.8.10 The embedded mitigation measures outlined in Section 7.6, including speed limits and the provision of exit ramps from excavation works, will reduce the risk of harm to individuals. There would therefore be an immediate **Negligible** and reversible adverse impact on otter which is a **non-significant effect** at the international scale.

West Mainland Moorland SSSI

7.8.11 The footprint of the Proposed Development does not overlap with the West Mainland Moorland SSSI and there will therefore not be any direct impacts on the notified features. However, there is potential for indirect negative changes to the hydrological regime of the notified feature, blanket bog, which requires constant moisture. Drying of the underlying peat body, e.g. as a result of dewatering turbine excavations or from trackside drainage, can lead to an associated change in the blanket bog vegetation, both in terms of structure and species composition. West Mainland Moorland SSSI is located approximately 67 m south-east of an access track at the closest point and 92 m south-east of the nearest turbine. With the closest section area downslope, impacts of drying due to excavations are unlikely. Impacts caused by accidental spillage are also considered unlikely due to the lie of the land which slopes downhill into the Loch of Swannay and away from the SSSI.

7.8.12 As per Table 7.8: Summary of IEFs Brought Forward in the Assessment, SSSIs have national value. The status of the notified feature is currently assessed as 'unfavourable recovering' for blanket bog (NatureScot, 2013).

7.8.13 The SSSI covers an area of approximately 3,310 ha. The development footprint is set back from the SSSI boundary by at least 92 m and downslope of the SSSI. Therefore, neither drainage impacts nor any accidental spillages are likely to affect habitats within the SSSI. The Proposed Development will therefore maintain the water table of the SSSI blanket bog at the current level, not compromising management objective 1 (to restore the blanket bog to favourable condition).

7.8.14 Given the above consideration of sensitivity and magnitude, the effect significance is considered to be **negligible** and **not significant**.

Loch of Swannay LNCS

Upland Heath (wet heath)

7.8.15 Both direct and indirect negative effects are likely on wet heath during the construction phase. There will be a direct loss of habitat during construction of the Proposed Development and indirect losses (through temporary disturbance of peatland habitats and disruption of water flows in neighbouring wetland habitats occurring from the construction period into the operational period).

7.8.16 An area of 5.38 ha of wet heath was found within the LNCS. A total of 0.69 ha will be directly lost to the Proposed Development infrastructure (Table 7.9). Direct habitat loss due to permanent infrastructure is therefore predicted to be at most 12.82 % of the wet heath within the LNCS. The direct loss of this habitat is of a small extent in the council context. There may also be indirect effects from drainage around infrastructure. If, as a worst-case scenario, indirect drainage impacts were fully realised out to 10 m in all wet modified bog areas, this would result in an additional 0.84 ha, thus increasing the overall predicted lost or changed habitat to 1.53 ha or 28.4 % of the habitat within the LNCS. However, effects are likely to operate on a much smaller scale because, drainage impacts are very unlikely to result in the entire wet heath resource suffering drying impacts leading to habitat change, as drying impacts may not be significant enough to facilitate such change in some areas, and because other areas may have water diverted to them.

7.8.17 The direct losses to the Proposed Development, as well as the potential drying impacts of part of the resource on Loch of Swannay LNCS Upland Heath (wet dwarf shrub heath) is considered to result in a **moderate** adverse effect, significant at the council area scale.

Lowland Fens (valley mire)

7.8.18 Both direct and indirect negative effects are likely on lowland fen during the construction phase. There will be a direct loss of habitat during construction of the Proposed Development and indirect losses (through temporary disturbance of peatland habitats and drying of wet peat and disruption of water flows in wetland habitats occurring from the construction period into the operational period).

7.8.19 Several stands of the M27 *Filipendula ulmaria – Angelica sylvestris* mire type were recorded within the LNCS where they occupied moderately large areas where water flows sluggishly and are located predominantly in valley bottoms.

7.8.20 Lowland fen accounts for 9.53 ha of the LNCS. A total of 0.56 ha will be directly lost to the Proposed Development infrastructure (Table 7.9). Direct habitat loss due to permanent infrastructure is therefore predicted to be at most 5.87 % of the lowland fen within the LNCS.

7.8.21 The direct loss of this habitat is of a small extent in the council context. There may also be indirect effects from drainage around infrastructure. If, as a worst-case scenario, indirect drainage impacts were fully realised out to 10 m in all lowland fen areas, this would result in an additional 0.4 ha, thus increasing the overall predicted lost or changed habitat to 0.96 ha or 10.07 % of the habitat within the LNCS. However, effects are likely to operate on a much smaller scale because drainage impacts are very unlikely to result in the entire lowland fen resource suffering drying impacts leading to habitat change, as drying impacts may not be significant enough to facilitate such change in some areas, and because other areas may have water diverted to them.

7.8.22 The adoption of standard good practice and environmental management techniques, as well as an appropriate and considered drainage design, will further reduce the risk of impacts.

7.8.23 The direct losses to the Proposed Development, as well as the potential drying impacts of part of the resource on Loch of Swannay LNCS Lowland Fen (valley mire) is considered to result in a **minor** adverse effect, significant at the council area scale.

Burns and Canalised Burns (running water)

7.8.24 Both direct and indirect negative effects are likely on the burns and canalised burns habitat during construction. There is already a crossing in place with an already existing track which will need to be upgraded and widened. For the purpose of this assessment, it is assumed that the impacts will be the full width of the new track.

7.8.25 The area of direct loss due to construction is considered to be 3.48 m with the temporary impacts extending to a length of 21.52 m (See Table 7.9). The full length of the two burns within the LNCS 663.92 m meaning the direct loss during construction will be the equivalent of 0.52 % of the LNCS habitat and temporary losses would result in a predicted loss of 3.24 %.

7.8.26 Given that there is already a crossing in place and these calculations represent a worst case scenario it is considered that the direct losses to the Proposed Development, as well as the temporary impacts on Loch of Swannay LNCS Burns and Canalised Burns (running water) is considered to result in a **negligible** adverse effect, not significant at the council area scale.

Brown trout

7.8.27 There are no watercourses within the site except two drainage ditches, which lie in the north-east corner. These drain into Loch of Swannay LNCS which has brown trout as a designated feature.

7.8.28 A single watercourse crossing which is an upgrade to an existing water crossing is needed over the southern drainage channel within the LNCS which is already crossed by the existing access track. As such potential impacts on fish species are limited to possible accidental spillages and the siltation of the downstream environment, although all watercourse crossings, localised diversions of the drainage ditches near T4 (if required) and any site discharges will be regulated under the CAR licensing regime and all necessary licences will be obtained from SEPA prior to the commencement of construction. The implementation of a CEMP is also likely to reduce these risks to a minimum.

7.8.29 Therefore, overall, there will be an immediate small-magnitude impact, which has a negligible short-term adverse effect, and the effect would therefore be **not significant**.

Wet heath/acid grassland mosaic – U6 *Juncus squarrosus-Festuca ovina* grassland

7.8.30 Both direct and indirect negative effects are likely on wet heath/acid grassland mosaic during the construction phase. There will be a direct loss of habitat during construction of the Proposed Development and indirect losses (through temporary disturbance of peatland habitats and

disruption of water flows in wetland habitats occurring from the construction period into the operational period).

7.8.31 U6 Wet heath/acid grassland mosaic is a moderate potential GWDTE habitat (SEPA, 2017) although the hydrological assessment in **Chapter 12** concludes that due to the low likelihood of any significant aquifer being present, none of the GWDTE habitats are truly groundwater dependent.

7.8.32 As per Table 7.8, there is one area of wet heath/acid grassland mosaic located at Hundland Hill within the site. Found on mineral deficient, shallow peaty substrates. This habitat is likely formed through a combination of intensive grazing or burning practices on peatland habitats. As such it is considered to have no more than local value.

7.8.33 Wet heath/acid grassland mosaic accounts for 6.45 ha of the Study Area. A total of 0.34 ha will be directly lost to the Proposed Development infrastructure (Table 7.9). Direct habitat loss due to permanent infrastructure is therefore predicted to be at most 5.27 % of the wet heath/acid grassland within the Study Area.

7.8.34 The direct loss of this degraded habitat is of a small extent in the local context. There may also be indirect effects from drainage around infrastructure amounting to 0.33 ha, thus increasing the overall predicted lost or changed habitat to 0.67 ha or 10.4 % of the habitat within the Study Area.

7.8.35 The direct losses to the Proposed Development, as well as the potential drying impacts of part of the resource is considered to result in a **moderate** adverse effect, significant at the local area scale.

Blanket bog (M17)

7.8.36 Both direct and indirect negative effects are likely on blanket bog during the construction phase., There will be a direct loss of habitat during construction of the Proposed Development and indirect losses (through potential drying effect upon neighbouring bog habitats occurring from the construction period into the operational period).

7.8.37 As per Table 7.8, blanket mire within the Study Area is relatively uniform and has a modest range of species, likely as a result of the same degrading factors, notably draining and grazing. As such it is considered to have no more than council value. In the 3rd UK Habitats Directive Report (JNCC, 2019) the conservation status of blanket bog status is listed as 'Bad' and 'Declining' at the UK level. The corresponding Scottish report (SNH 2013) does not include an assessment specifically for Scotland.

7.8.38 Scotland has an estimated 1,759,000 ha of blanket bog (SNH 2013). Blanket mire accounts for 18.8 ha of the Study Area, of which 13.21 ha is M17 mire.

7.8.39 A total of 0.03 ha will be directly lost to the Proposed Development infrastructure (Table 7.9), representing 0.16 % of the blanket mire within the Study Area and 0.23 % of the M17 resource. This direct loss is of a small extent in the local and regional context. In addition to direct loss, there may also be indirect losses associated with the zone of drainage around infrastructure. However, effects are likely to operate on a much smaller scale. In addition, drainage impacts are very unlikely to result in the entire blanket bog resource suffering drying impacts leading to habitat change, as drying impacts may not be significant enough to facilitate such change in some areas, and because other areas may have water diverted to them.

7.8.40 The adoption of standard good practice and environmental management techniques, as well as an appropriate and considered drainage design, will further reduce the risk of impacts.

7.8.41 The direct and temporary losses to the Proposed Development, as well as the potential drying impacts of part of the resource is considered to result in a **moderate** adverse effect, significant at a local area scale.

Operation

7.8.42 Due to the fact that the only potential issue for otters during operation is the possible collision with maintenance vehicles and, as stated above, given otters' nocturnal behaviour around humans it is unlikely to be a significant issue, Loch of Ibister SAC is scoped out of the operation section.

7.8.43 Owing to the Proposed Development being set back by at least 68 m and also downslope of the SSSI, no significant effects, e.g. from drying impacts, are likely during the operational phase of the wind farm and therefore West Mainland Moorland SSSI is scoped out of the operation section.

Loch of Swannay LNCS

7.8.44 All likely direct and indirect effects on wet heath, lowland fen and brown trout (and therefore Loch of Swannay LNCS) have also been considered in the construction effects section above. Indirect habitat losses from drying of peat will commence when drains are first installed during the construction phase and then continue during the operation phase; the moment when vegetation change and drying impacts may become measurable is difficult to predict but may be delayed and therefore not occur until the operational phase. However, for completeness and ease of assessing impacts, they have been considered together in the construction effects section. No further significant negative impacts on wet heath and lowland fen are predicted during the operational phase.

Wet heath/acid grassland mosaic and blanket bog

7.8.45 All likely direct and indirect effects on wet heath/acid grassland mosaic and blanket bog have been considered in the construction effects section above. Indirect habitat losses from drying of peat will commence when drains are first installed during the construction phase and then continue during the operation phase; the moment when vegetation change and drying impacts may become measurable is difficult to predict but may be delayed and therefore not occur until the operational phase. However, for completeness and ease of assessing impacts, they have been considered together in the construction effects section. No further significant negative impacts on wet heath/acid grassland mosaic or blanket bog are predicted during the operational phase.

Decommissioning

7.8.46 In the event of decommissioning, or replacement of turbines, it is anticipated that the levels of effect would be similar but of a lesser level than those during construction. Decommissioning would be undertaken in line with best practice processes and methods at that time and will be managed through an agreed Decommissioning Environmental Management Plan.

7.9 Additional Mitigation and Enhancement

7.9.1 A Habitat Protection Plan will be developed that will include demarcation of no-go areas in sensitive habitats, e.g., the blanket bog within the West Mainland Moorlands SSSI boundary and Loch of Swannay LNCS boundary.

7.9.2 Specific habitat and species mitigation measures for the construction and operational phases of this Proposed Development will be defined within the CEMP documentation. Additional mitigation, compensation and enhancement measures include:

Construction Phase

- Habitats:
  - Identification of appropriate exclusion zones around sensitive features (e.g. waterbodies, wet heath, blanket bog etc) to prevent construction vehicles tracking through these areas.
- Otter:
  - Pre-construction otter survey to establish if there has been any significant change in the status of otter on site and within 250 m since the original survey. If the presence of otter is considered a possibility, then an Otter-Specific Protection Plan will be prepared ahead of the start of works.

- Fish:
    - Site run-off will be intercepted and treated according to SEPA PPG guidelines. The CEMP will include measures to prevent sedimentation of water courses and reduce potential for pollution incidents and provision of spill kits.

Operation Phase

- Habitats:
    - Exclusion of livestock from any restored areas to permit habitat recovery free from grazing pressure (which otherwise has the potential to degrade the surface).
    - The permanent loss of some wet heath, lowland fen and wet heath/acid grassland mosaic to the footprint of the Proposed Development is unavoidable and due to a large majority of the site comprising intensively managed land, it is unlikely that the creation of replacement habitats would be possible. Therefore, in consultation and agreement with OIC, NatureScot and the landowner, a detailed Habitat Management Plan/Grazing Management Plan will be prepared and implemented throughout the site to increase the quality of the remaining habitat and as a result improve the biodiversity of the site. The HMP/GMP will be developed in conjunction with the ornithology chapter (**Chapter 8**) and specifically focus on introducing suitable grazing numbers on sensitive habitats and ground nesting birds. This will include such measures as ensure stocking numbers of cattle are kept low during critical times of the year and grazing of the same areas by sheep is not permitted during the bird breeding season on sensitive sections of the site. Specific stocking rates are recommended for different habitat types during different months and the GMP will incorporate where possible rates which will allow regeneration of habitats and species. These measures will be kept in place for the lifetime of the scheme.

7.10 Residual Effects

7.10.1 An assessment of the residual ecological impacts and effects after the implementation of mitigation outlined above in Section 7.9 is presented in Table 7.11 and summarised below. This Assessment of Effects is considered for construction, operation and decommissioning of the Proposed Development as a whole.

Loch of Swannay LNCS

7.10.2 Only 5.38 ha of wet dwarf shrub heath and 9.53 ha of lowland fen was recorded within the LNCS, it is calculated that the Proposed Development will result in the permanent loss of only 0.69 ha (12.82 %) of the wet dwarf shrub heath and 0.56 ha (5.87 %) of lowland fen (present within the LNCS respectively). Due to both habitats being a priority habitat on the SBL and Orkney LBAP as well as a designated feature of the LNCS, the permanent loss of wet heath and lowland fen is assessed as a **moderate** adverse effect for wet heath but **minor** adverse for lowland fen, significant at the **council area** scale. However, providing a grazing management plan is adhered to, the potential effect would in both cases be reduced to a **minor** adverse, but not significant effect. This would be achieved by increasing the quality and biodiversity of 83.69 ha of remaining habitat located within the LNCS, compensating for the loss of a small area of wet heath and lowland fen.

Habitats

7.10.3 In terms of the temporary loss of habitats, **no significant residual effects** are anticipated following the completion of mitigation.

7.10.4 As only 0.34 ha (5.27 %) of wet/heath acid grassland mosaic and 0.03 ha (0.16 %) of blanket bog will be permanently lost, **no significant residual effects** are anticipated from direct impacts. Indirect impacts associated with changes to the hydrological/hydrogeological regime are anticipated to be minimal, as no major aquifer has been identified, with only potential for localised perched groundwater within superficial materials or upper weathered bedrock (discussed in **Chapter 12**).

7.11 Cumulative Assessment

7.11.1 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. The main projects likely to cause similar impacts to those associated with the Proposed Development are other operational wind farms, those under construction or those consented. Several other wind farms are present within the wider area, in planning, under construction and operational.

7.11.2 Wind farm projects at the scoping stage have been scoped out of the Cumulative Assessment, because they generally do not have sufficient information on likely impacts to be included, as the baseline survey period is ongoing, or results have not been published. Projects that have been refused or withdrawn have also been scoped out.

7.11.3 It should be noted that there is no published NatureScot guidance for cumulative impact assessment on terrestrial ecological receptors. NatureScot guidance is confined to landscape and visual impacts and to those affecting birds. The key principle of NatureScot's cumulative impact assessment guidance (SNH, 2012) for birds is to focus on any significant effects and, in particular, those that are likely to influence the outcome of the consenting process. Application of the outlined principles to terrestrial ecological features leads to a focus on the likely cumulative impacts to the Proposed Development's IEFs.

7.11.4 At time of writing, there are a number of wind farms projects in Orkney to take into consideration. However, due to the limits of connectivity between terrestrial ecological features, this assessment has considered a 10 km radius to be appropriate, but excluding developments located on islands other than the Orkney Mainland. In addition, single turbines close to the Proposed Development have been included in the assessment. The installations considered for this cumulative assessment were therefore limited to those listed in Table 7.10.

Table 7.10 – Schemes included in the Cumulative Assessment

Name	Status	Distance (km)	Direction	Turbines
Costa Head	Consented	1.27	N	4
Burgar Hill	Operational	2.7	SE	6
Hammars Hill	Operational	7	SE	7
Holodykes	Operational	5	SE	1

Loch of Swannay LNCS

7.11.5 On the basis of the minor adverse residual effects predicted above, the cumulative impact assessment has been carried out for the Loch of Swannay LNCS wet dwarf shrub heath and lowland fen features even though the effects are concluded not to be significant.

7.11.6 Hammars Hill wind farm assessed loss of blanket bog as the only residual impact of the development which was assessed as being locally significant within the West Mainland area with a positive effect on grassland habitats due to the reduction of grazing pressures proposed throughout the operational phase. These habitats are not features of the Loch of Swannay LNCS. Although blanket bog was identified within the Nisthill site, no significant residual effects are anticipated after mitigation and compensation measures are applied.

7.11.7 Costa Head windfarm assessed loss of dry heath as the only residual impact of the development which was assessed as being locally significant after compensatory measures. This habitat is not a feature of the Loch of Swannay LNCS. Although dry heath is present within the site, no significant impact on this habitat is anticipated at any stage of the Proposed Development.

7.11.8 Holodyke wind farm was assessed as having no significant effects upon the ecology of the area, avoiding moorland habitat with infrastructure located on intensively managed farmland.

7.11.9 No information regarding the ecological impacts of Burgar Hill wind farm were found; however, based on aerial imagery the site appears to be located on arable land.

7.11.10 Based on the information summarised above, no cumulative effect on the Loch of Swannay LNCS habitat features has been identified.

West Mainland Moorland SSSI

7.11.11 Although the Proposed Development is not predicted to result in any significant effects on the West Mainland Moorland SSSI, it is considered in this cumulative impact assessment because scoping responses requested that the qualifying features are taken into consideration in the assessment.

7.11.12 Burgar Hill abuts the West Mainland Moorland SSSI and Holodykes Wind Farm lies just inside the SSSI boundary. Burgar Hill appears to be on arable land and Holodykes was not considered to have a significant effect on the notified blanket bog feature. Nisthill identified blanket bog within the site; however, the effect after mitigation/enhancement was considered negligible and not significant. Hammers Hill wind farm lies 1.9 km southeast of the SSSI and Costa Head lies 3.08 km northwest; therefore, owing to the separation distances, any in-combination impacts are not considered likely.

7.12 Summary

7.12.1 Refer to Table 7.11 and Table 7.12 for a summary of the assessment.

Table 7.11 – Summary of Effects

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Construction					
Loch of Isbister SAC. Loss of habitat and disturbance to Qualifying species: otter	Negligible and not significant at an international scale	N/A	Implementation of Species protection plan.	Negligible and not significant at an international scale	N/A
Loch of Isbister SAC. Mortality of qualifying species: otter	Minor and not significant at an international scale	Adverse	Implementation of Species protection plan.	Negligible and not significant at an international scale	Adverse
Loss/Drying effect on: West Mainland Moorlands SSSI and associated habitat blanket bog	Negligible and not significant at a national scale	N/A	Adoption of good practice and CEMP. ECoW advising on micro-siting requirements to ensure impacts on blanket bog are reduced further where possible.	Negligible and not significant at a national scale	N/A
Loss/Drying effect on: Loch of Swannay LNCS wet heath.	Moderate and significant at a council area scale	Adverse	Adoption of good practice and CEMP. ECoW advising on micro-siting requirements to ensure impacts on habitats are reduced further where possible.	Minor and not significant at a council area scale	Adverse
Loss/Drying effect on: Loch of Swannay LNCS lowland fen.	Minor and significant at a council area scale	Adverse	Adoption of good practice and CEMP. ECoW advising on micro-siting requirements to ensure impacts on habitats are reduced further where possible.	Minor and not significant at a council area scale	Adverse
Loss/Drying effect on: Loch of Swannay LNCS burns and canalised burns.	Negligible and not significant at a council area scale	N/A	None required. However, good practice and CEMP will be in place.	Negligible and not significant at a council area scale	N/A
Mortality to: Loch of Swannay LNCS brown trout	Negligible and not significant at a council area scale	N/A	Adoption of good practice and CEMP	Negligible and not significant at a council area scale	N/A

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Loss/Drying effect on: Blanket bog	Moderate and significant at a council area scale	Adverse	Implementation of CEMP and demarcation of sensitive areas during construction.	Negligible and not significant at a council area scale	N/A
Wet heath/acid grassland mosaic	Moderate and significant at a local area scale	Adverse	Implementation of CEMP and demarcation of sensitive areas during construction.	Negligible and not significant at a local area scale	N/A
Operation					
Loss/Drying effect on: Loch of Swannay LNCS: Habitats and species	Moderate and significant at a council area scale	Adverse	Implementation of Grazing Management Plan that will reduce grazing pressure within the site and therefore enhance biodiversity.	Negligible and not significant at a council area scale	N/A
Loss/Drying effect on: blanket bog habitats	Moderate and significant at a council area scale	Adverse	Implementation of Grazing Management Plan that will reduce grazing pressure within the site and therefore enhance biodiversity.	Negligible and not significant at a council area scale	N/A
Loss/Drying effect on: Wet heath/acid grassland mosaic	Moderate and significant at a local area scale	Adverse	Implementation of Grazing Management Plan that will reduce grazing pressure within the site and therefore enhance biodiversity.	Negligible and not significant at a local area scale	N/A

Table 7.12 – Summary of Cumulative Effects

Receptor	Effect	Cumulative Developments	Significance of Cumulative Effect	
			Significance	Beneficial/ Adverse
Loch of Swannay LNCS wet heath and lowland fen	Loss/drying of special features	Burger Hill, Hammers Hill, Holodykes and Costa Head	No impact, not significant at a council area scale	n/a
West Mainland Moorland SSSI	Loss/drying of special features	Burgar Hill, Hammers Hill, Holodykes and Costa Head	No impact, not significant at a national area scale	n/a

7.13 References

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