Kintore Hydrogen Plant

Environmental Impact Assessment Report
Chapter 8: Ecology and Biodiversity

Date: September 2024

Kintore Hydrogen
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Environmental Impact Assessment Report

Volume 2

Chapter 8

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https://www.kintorehydrogen.co.uk/

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1 Introduction

1.1 Purpose of this chapter

1.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) presents the findings of Environmental Impact Assessment (EIA) work undertaken concerning potential impacts of Kintore Hydrogen Plant on Ecology and Biodiversity.

1.1.2 This chapter aims to identify and describe any likely significant effects to be anticipated upon the site's ecology and that of the wider area, including statutory and non-statutory designated sites. Supporting site studies and this EIA have been completed according to guidance produced by the CIEEM by experienced and competent ecologists who are all Members of CIEEM and follow its Code of Professional Conduct.

1.1.3 Further information is contained within technical appendices in Volume 3:

- Appendix 8.1: Kintore Preliminary Ecological Appraisal.
- Appendix 8.2: Kintore Otter and Water Vole Report.
- Appendix 8.3: Kintore Pine Marten and Red Squirrel Report.
- Appendix 8.4: Kintore Reptile Survey Report.
- Appendix 8.5: Kintore Bat Activity Survey Report.
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- Appendix 8.7: Kintore Bat Transect and Automated Survey Report.
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- Appendix 8.18: Kintore Outline Biodiversity Enhancement and Management Plan

1.1.4 This EIAR chapter aims to:

- identify and describe the baseline for Important Ecological Features (IEFs) which may be impacted by the proposed development, from desk studies, surveys and consultation to date;
- identify all potentially significant ecological impacts arising from Kintore Hydrogen Plant, based on the information gathered and the analysis and assessments undertaken;
- identify any assumptions and limitations encountered in compiling the environmental information;
- set out the mitigation measures required to ensure compliance with nature conservation legislation and to address adverse impacts, with how these can be secured;
- provide an assessment of the significance of any residual impacts;
- detail further actions to be taken to deliver biodiversity enhancements; and
- set out the requirements for post-construction monitoring.

1.2 Legislation, guidance and planning policy context

1.2.1 The preparation of this chapter has taken cognisance of the following legislation, planning policies conservation initiatives and general guidance:

- International Union for the Conservation of Nature (IUCN) Red List of Threatened Species.
- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna (The Habitats Directive).
- Water Framework Directive (WFD) 2000/60/EC of the European Parliament.
- Environmental Impact Assessment (EIA) Directive (2014/52/EU) on assessing the potential effects of projects on the environment.
- The Wildlife and Countryside Act 1981 (as amended) (WCA).
- The Nature Conservation (Scotland) Act 2004.
- The Wildlife and Natural Environment (Scotland) Act 2011 (WANE).
- The Protection of Badgers Act 1992 (as amended by the WANE Act 2011).
- The British Standard for Biodiversity (BS 42020).
- BS 42020:2013: Biodiversity Code of Practice for Planning and Development 2013.
- Scottish Biodiversity List (SBL) (2020) [1].
- National Planning Framework 4 (NPF4) [2].
- Scotland's Biodiversity Strategy to 2045 [3].
- Aberdeenshire Council Local Development Plan 2023 [4].
- Aberdeenshire Council Planning Advice PA2023-10: Securing positive effects for biodiversity in new development (2023) [5]

- North East Scotland Biodiversity Partnership (NESBiP) [6].

1.3 Consultation

1.3.1 Key issues raised during scoping and consultation specific to ecology and biodiversity are listed in Table 1.1, together with how details of how these issues have been considered in the production of this EIAR and cross-references to where this information may be found.

Table 1.1: Key points raised during scoping and consultation to date

Date	Consultee and type of response	Points raised	How and where addressed
June 2023	NatureScot scoping response	Assess impacts on Loch of Skene SPA and Ythan etc. SPA due to potential impact on Greylag and Pink Footed Geese foraging on site	Impacts assessed for Loch of Skene SPA and Ythan Estuary, Sands of Forvie and Meikle Loch SPA has been considered in the HRA and shadow Appropriate Assessment undertaken for both sites, as discussed in Technical Appendix 8.11. Due to the proximity (within 5 km) of the development site to the Loch of Skene, this has also remained scoped into the EIA as discussed in Section 3. Due to the distance (14.5 km) to the Ythan Estuary, Sands of Forvie and Meikle Loch SPA and low numbers of pink-footed geese recorded associated with the development site, this SPA has been scoped out of assessment in the EIA (though remains included in the HRA) as discussed in Section 2.5.
December 2023	Correspondence with NatureScot	Desktop data sources agreed for use in HRA screening and if necessary Appropriate Assessment	A list of resources was provided to NatureScot which was agreed to be appropriate for undertaking the HRA and shadow Appropriate Assessment, addressed in Section 4.1.
June 2023	SEPA scoping response	Comments on minimising water crossings and avoiding impacts on Groundwater Dependent Terrestrial Ecosystems (GWDTE)	The potential to alter Dewsford Burn to minimise crossings of it has been considered, as discussed in Chapter 5: Consideration of Alternatives. Watercourse crossings, where these are necessary, are shown in Figure 13.4.1 in Volume 3, Appendix 13.4: Watercourse Crossings Chapter X. An assessment on GWDTE is also considered in Chapter 13. Impacts on habitat value and species using watercourses are assessed in Section 4, particularly in 4.2, 4.6 and 4.9.
June 2023	SEPA scoping response	If the development would affect peatland or carbon-rich soils, peat survey details and a Peat Management Plan and Habitat Management Plan are required.	The proposed development will not cause disturbance to peatland or carbon-rich soils. Soil conditions are described in Chapter 13: Soils, Geology and the Water Environment.
June 2023	SEPA scoping response	A map of any tree felling and description of the use of timber should be provided.	It is proposed to retain existing trees and woodland within the application site boundary, as shown in the Planning Parameters Plan. Where crossings (for pipelines and electrical cables) of hedges with trees are proposed, the application boundary has flexibility to seek to avoid mature trees or use trenchless crossing techniques.
June 2023	Aberdeen Natural Environment team scoping response	Include Local Nature Conservation Sites, Ancient Woodland and Native Woodland, and NESBiP habitat statement listed habitats and associated species.	Local Nature Conservation Sites, Ancient Woodland and Native Woodland and NESBiP habitat statement listed habitats and associated species have been discussed in Technical Appendix 8.1 and in Section 3.1.
June 2023	Aberdeen Natural Environment team scoping response	A quality landscaping scheme using suitable locally native species is required.	The proposed landscaping and habitat creation design is set out in the Illustrative Landscape Masterplan (within the Design Principles Statement accompanying the planning application) and in the Outline Biodiversity Enhancement and Management Plan (BEMP) in Appendix 8.18 to the EIAR, which includes a suitable native species mix and diverse areas of habitat with input from the ecology team.
June 2023	Aberdeen Natural Environment team scoping response	Aberdeen policy recognises Cat 5 peatland habitats in addition to 1 and 2 (SNH carbon and peatland map) and that there are areas adjacent to the proposed locations	The Carbon and Peatland 2016 map has been considered in relation to the development and the site and adjacent and any areas of Class 5 peatland discussed in Section 3.1. Consideration of peatland categories has also been discussed in Chapter 13, where the Priority peatland mapping published by NatureScot indicates that the Proposed Development is underlain by mineral soils (Class 0) which are not designated as priority peatland habitat. The site walkover survey also confirmed the absence of peat.
Summer 2023	River Don Trust	The River Don Trust noted the value of the Don for fish species and the potential benefits if the project could contribute to river restoration or enhancement opportunities in the Kintore area of the river catchment.	A site walkover of the compensatory area was undertaken and discussion to include aspects including additional tree planting, re-naturalising of the vegetation on the banks through management of livestock intensity and removal of INNS. These opportunities for enhancement/ compensation would provide benefits to fish species within the River Don. The proposals are included in the Outline BEMP in Appendix 8.18.

2 Assessment Approach

2.1 Guidance

2.1.1 In addition to the applicable legislation, policy and general guidance listed in Section 1.2, the methodology for assessment has followed the CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, Version 1.1 [7].

2.2 Baseline study

Desktop study

2.2.1 Information on ecology and biodiversity was collected through a detailed desktop review of existing studies and datasets. These are summarised at Table 2.1 below.

Table 2.1: Summary of desktop study sources

Title	Source	Year	Ref.
Records of: • notable or protected species records; • invasive non-native species (INNS); • ancient woodland; • Local Nature Conservation Sites (LNCS).	North East Scotland Biological Records Centre (NESBReC)	2022	[8]
Information on: • Special Protection Areas (SPA), Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSI) and Ramsar sites up to 5 km of the site (including possible/proposed sites); • National Nature Reserves (NNR) and Local Nature Reserves (LNR) up to 2 km of the site.	NatureScot Sitelink	2023	[9]
Native woodland up to 1 km from the site	Scotland's Environment Web	2023	[10]
Priority Habitats and Species	The Scottish Biodiversity List (SBL)	2023	[11]
Local priority habitats and species	The North East Scotland Biodiversity Partnership (NESBiP)	2023	[6]
Commercially available records of species within 2 km radius of the site and recorded within the past 10 years	The National Biodiversity Network (NBN) Atlas of Scotland	2023	[12]
River Don fishing information	Aberdeenshire Council	2023	[13]
Fly fishing on River Don	Flyfishing the Fly	2023	[14]
Information on River Don	River Don Trust	2023	[15]
Information on fish and freshwater pearl mussel	JBA Consulting	2023	[16]
Information on the distribution of freshwater pearl mussel	Joint Nature Conservation Committee (JNCC) / Habitats Directive	2023	[17]
Obstacles to fish migration	Scottish Environmental Protection Agency (SEPA) Obstacles to fish migration' map data	2023	[18]
Distribution of freshwater pearl mussel	JNCC Freshwater Pearl Mussel distribution	2023	[19]
List of ground water dependent terrestrial ecosystem (GWDTE) communities	SEPA planning guidance (Note 31): Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Ground Water Dependent Terrestrial Ecosystems. LUPS-GU31	2023	[20]
Priority habitat descriptions	NatureScot priority habitat descriptions	2023	[21]
Annex I habitat descriptions	JNCC Annex I habitat descriptors	2023	[22]
Soil class	Scotland's Carbon Peatland Map 2016	2023	[23]
SEPA wetland inventory	Providing locations of Scottish wetlands	2023	[24]
Breeding grounds of birds in North East of Scotland	Scottish Ornithologists' Club, Aberdeen	2023	[25]
Maps of Pink-footed and Iceland Greylag Geese distribution in Scotland	Wildfowl and Wetlands Trust / NatureScot	2023	[26]
Assessing connectivity of Special Protection Areas	NatureScot Guidance document	2023	[27]
Mean of peak counts of Greylag Goose and Pink-footed Goose	WeBS Report Online	2023	[28]
Mammal Society Red List for Scotland's Mammals	International Union for Conservation of Nature (IUCN) compliant Red List for Scotland's Terrestrial Mammals	2020	[29]
Birds of Conservation Concern (BoCC)	Review of the status of bird in the UK, Channel Islands and Isle of Man to provide list of conservation concern.	2021	[30]

Site specific surveys

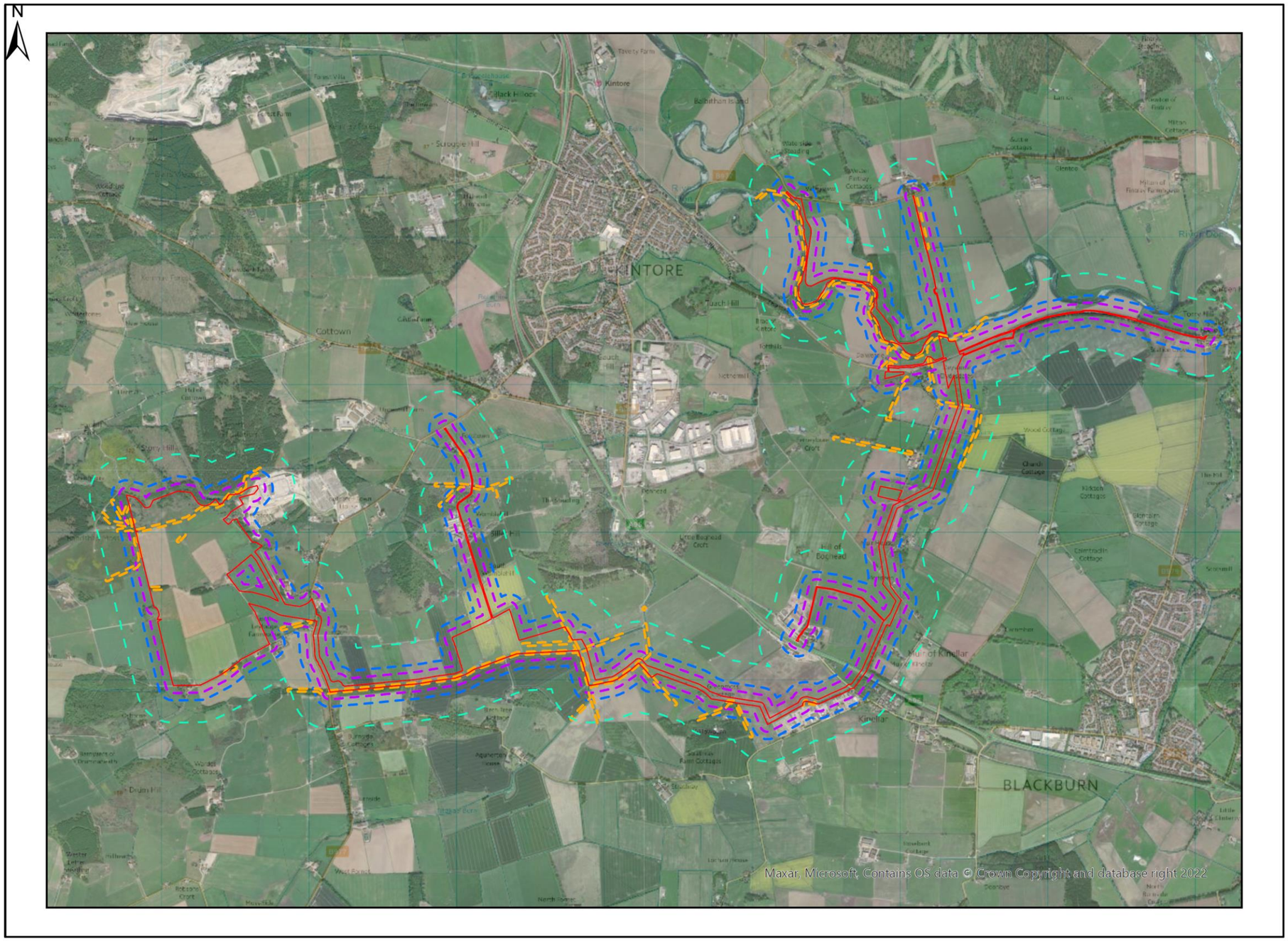
Study area

2.2.2 The study area for the ecology and biodiversity chapter covers the Kintore Hydrogen Plant boundary plus appropriate buffers. Table 2.2 provides an overview of the areas surveyed for specific habitats, species and species groups.

Table 2.2: Survey areas

Habitat / species / species group	Survey area (where accessible)
Habitats	Site
Groundwater Dependent Terrestrial Ecosystems (GWDTE)	Site + assessment of up to a 250 m buffer
Invasive Non-Native Species (INNS)	Site + 50 m buffer
Bats (*Chroptera spp.*)	Site + 50 m buffer
Otter (*Lutra lutra*)	Site + watercourses up to a 250 m buffer
Water Vole (*Arvicola amphibius*)	Site + watercourses up to a 250 m buffer
Red Squirrel (*Sciurus vulgaris*)	Site + 50 m buffer
Pine Marten (*Martes martes*)	Site + 50 m buffer
Badger (*Meles meles*)	Site + up to 1 km buffer
West European Hedgehog (*Erinaceus europaeus*)	Site + 50 m buffer
Brown Hare (*Lepus europaeus*)	Site + 50 m buffer
Reptiles	Site + 50 m buffer
Amphibians	Site + 50 m buffer
Birds	Site + 50 m buffer
Invertebrates	Site
Fish habitat assessment (specifically Salmonids)	Site + watercourses up to a 250 m buffer
Freshwater Pearl Mussel (*Margaritifera margaritifera*)	Site + watercourses up to a 250 m buffer

2.2.3 The study area is presented in Figure 2.1 below. The site-specific surveys undertaken are then listed in in Table 2.3.



KINTORE HYDROGEN PLANT

Date:	20/09/2024
Paper size:	A3
Scale:	

0 2550 100 150 200
Kilometers

Key:
- PAN boundary
- 50m PAN boundary buffer
- 100m PAN boundary buffer
- 250m PAN boundary buffer
- Watercourse buffer

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376782-GIS026
Site and Survey Area

Status:	FINAL
Revision:	V2
Drawn by:	JAS
Approved by:	JP

Figure 2.1: Site and survey areas plan

Table 2.3: Summary of site-specific surveys undertaken

Title	Extent of survey	Overview of survey	Survey provider	Date	Reference to further information
Preliminary Ecological Appraisal (PEA)	The original site boundary plus appropriate buffers (up to 250 m)	A walkover of the site and appropriate buffers recording broad habitat types, suitable habitats for protected species and any evidence or field sign of protected species, as well as highlighting any areas with may be potential Ground Water Dependent Terrestrial Ecosystems (GWDTEs) and any Invasive Non-Native species (INNS).	EnviroCentre	30th May, 1st June and 25th July 2023	Appendix 8.1
Otter and water vole survey	All suitable habitat within the site boundary plus a 250 m buffer upstream and downstream of watercourses where accessible.	Walkover of areas of suitable habitat searching for field evidence of otter and water vole.	EnviroCentre	24th-27th July 2023	Appendix 8.2
Pine marten and red squirrel survey	A search of all suitable habitat within the site boundary plus a 50 m buffer where accessible.	Walkover of areas of suitable habitat searching for field evidence of pine marten and red squirrel.	EnviroCentre	24th-27th July 2023	Appendix 8.3
Reptile survey	Four areas within the site consisting of suitable habitat for reptiles.	78 artificial refugia were placed across four areas of suitable habitat. Artificial refugia comprised 0.5 m squares of bitumen roofing felt. Edge habitat, potential basking locations, and intersections between grassland, scrub and woodland mosaics were among the locations prioritised. The refugia were left untouched for two weeks prior to the first survey visit. Any reptiles present on or under the refugia were recorded along with passive sightings.	EnviroCentre	12th and 31st July, 28th August and 11th September 2023	Appendix 8.4
Bat activity survey	Three buildings (residential cottage, outbuilding and ruined building) within the site.	Bat activity surveys aim to establish roost presence or absence and characterise any roosts found within, or adjacent to the site. Foraging and commuting routes in the surrounding landscape are also noted. surveyors were positioned at vantage points to gain visual and audible coverage of all features which offer potential roosting sites to bats. Frequency division bat detectors (Bat Box Duet) were utilised during the surveys, as well as Full Spectrum detectors (Echo Meter Touch (EMT)) and an infra-red camera. Observations of bat activity were recorded with species, time identified, location and behaviour all noted. A detailed endoscope inspection was undertaken during the summer and winter months for bats and aimed to identify the presence/ absence of any bats and a search for any field evidence, with the use of an endoscope.	EnviroCentre	20th June, 19th July, 8th and 9th August and 12th December 2023	Appendix 8.5
Potential Roost Feature (PRF) Survey	Trees with PRFs within the site plus 50 m buffer where accessible.	A total of 36 trees were inspected through detailed inspection undertaken by a certified tree climber applying methods in accordance with Arboricultural Association/FASTCo Guide to Good Climbing Practice. Features in trees, that bats could potentially utilise to roost were identified from ground level with the aid of close- focus binoculars and then investigated via digital endoscope and climbed to inspect further where necessary, to confirm suitability and record any field evidence of bats.	EnviroCentre	8th and 10th October 2023	Appendix 8.6
Bat transect and automated surveys (Year 1)	Transect surveys covered the three main areas of the site, whilst automated static detectors were deployed at six locations within the main areas and the connecting routes.	Transect routes covered a range of habitats on site, with those identified as having moderate or high suitability for bats being prioritised. Surveys commenced at sunset, stopping at 15 pre-determined spot counts and recording any bat activity over a 3-minute period before continuing to the next spot count. Frequency division (Bat Box Duet) and full spectrum (EMT on both iPhone and Android devices) bat detectors were used to record the sound files and provide accurate location data for bat movements. Six static bat detectors (Anabat Swifts) were deployed in varying habitats along and between transects and left in-situ for five days July, August and September.	EnviroCentre	18th ,19th and 24th July, 8th and 14th August and 5th, 11th September 2023	Appendix 8.7
Bird surveys	The site (plus survey 50 m survey buffer).	Bird species identified during site visits from July 2023 – July 2024 and any other evidence was recorded. In addition, habitats within the survey area were assessed for their suitability to support breeding and overwintering birds.	EnviroCentre	All survey dates July 2023 – July 2024	Appendix 8.8

Title	Extent of survey	Overview of survey	Survey provider	Date	Reference to further information
Fish habitat assessment and freshwater pearl mussel survey	The River Don was surveyed up to 100 m upstream and 250 m downstream of the site boundary for fish and 100 m upstream and 500 m downstream of the site boundary for freshwater pearl mussels.	A walkover fish habitat survey undertaken according to the Scottish Fisheries Co-ordination Centre guidelines alongside a modified Hedry and Gragg-Hine (1997) approach, which requires the surveyor to map riparian vegetation, approximate channel dimensions, migration obstacles, and substrates to inform the quality and utilisation potential of different fish species and age classes. A methodical search was made for freshwater pearl mussels, using polarised glasses and a glass-bottomed bucket, with the aim of ascertaining their presence/absence. In some places, especially where habitat was deemed suitable, substrate was lightly disturbed to search for deeper buried mussels or juveniles.	EnviroCentre	18th October 2023	Appendix 8.9
National Vegetation Classification (NVC) survey	Within habitats identified within the PEA as being wetlands with potential for being GWDTEs or Priority Habitats. Three locations required a NVC survey, one within the west (wetland area north of the electrolysis plant footprint) and two within the east (one near the River Don in an area of wet woodland and one a patch of marshy grassland which sits at the top of a small gorse covered hill which is grazed by cattle).	A site walkover was conducted to gain an overview of the vegetation present. Homogenous stands were then identified by eye and mapped digitally onto aerial imagery using the QFIELD application. Notes on the species composition and frequency, structure, and any apparent management were taken. Observations of local topography and features such as springs, diffuse ground water emergence and floristic indicators of base enrichment were also made. This data, alongside the keys and floristic tables presented in Volumes 1 to 5 of the British Plant Communities, were used to determine the NVC communities. The communities were identified to the sub-community level where sufficient data was available to do so.	EnviroCentre	12th July and 8th August 2023	Appendix 8.10
Geese survey	Surveys were focused on the western side of the site (west of the A96) until January 2023, with limited coverage of the proposed pumping station location and associated water pipe route prior to this. Permission to access certain areas was restricted by the landowner during the survey period, but these could be adequately viewed from surrounding areas. Appendix 8.12 provides further detail of the survey areas.	Surveys were undertaken by scanning the site boundary and surrounding fields from farm tracks and the public road using binoculars and telescope to locate and count any feeding flocks of geese.	EnviroCentre	4th and 29th November and 20th December, 2022, 23rd January, 21st February and 23rd March 2023	Appendix 8.12
Habitat and protected species survey	The updated site boundary pipeline route, temporary compounds and access routes, plus appropriate buffers up to 250m.	A walkover of the site and appropriate buffers recording broad habitat types, suitable habitats for protected species and any evidence or field sign of protected species, as well as highlighting any areas with may be potential Ground Water Dependent Terrestrial Ecosystems (GWDTEs) and any Invasive Non-Native species (INNS).	EnviroCentre	8th and 12th March 2024	Appendix 8.13
Targeted badger survey	Up to a 1 km buffer surrounding Main sett 1 (M1) and Annexe 1 (A1), within the area proposed for the electrolysis plant.	A walkover of the survey area looking for additional sett features and any evidence of badger, to determine territory boundaries and ascertain locations for sett creation.	EnviroCentre	17th April 2024	Appendix 8.14
Indicative Biodiversity Net Gain (BNG) Feasibility Assessment	The whole application site boundary.	A walkover of the site boundary undertaking a condition assessment of habitats to inform the BNG feasibility calculation.	EnviroCentre	30th April, 1st ,2nd, 8th and 9th May 2024	Appendix 8.15

Title	Extent of survey	Overview of survey	Survey provider	Date	Reference to further information
Bat transect and automated surveys (Year 2)	Transect surveys covered the three main areas of the site (same areas as Year 1), whilst automated static detectors were deployed at six locations within the main areas and the connecting routes (same locations as Year 1).	Transect routes covered a range of habitats on site, with those identified as having moderate or high suitability for bat being prioritised. Surveys commenced at sunset, stopping at 15 pre-determined spot counts and recording any bat activity over a 3-minute period before continuing to the next spot count. Frequency division (Bat Box Duet) and full spectrum (EMT on both iPhone and Android devices) bat detectors were used to record the sound files and provide accurate location data for bat movements. Six static bat detectors (Anabat Swifts) were deployed in varying habitats along and between transects and left in-situ for five days May, June and July.	EnviroCentre	16th and 21st May, 11th and 17th June, 2nd and 8th July 2024	Appendix 8.16

2.3 Uncertainties and/or data limitations

2.3.1 Desk studies are limited by the reliability of third-party information and the geographical availability of biological and/or ecological records and data. This emphasises the need to collate up-to-date, site-specific data based on field surveys by experienced surveyors, as has been undertaken (see Table 2.3). The absence of a species from biological records cannot be taken to represent actual absence. Species distribution patterns should be interpreted with caution as they may reflect survey/reporting effort rather than actual distribution.

2.3.2 Some of the trees within woodland adjacent to the site in an area proposed for the hydrogen pipeline and gas grid connection did not undergo any elevated inspections due to accessibility issues (presence of cattle). This has been addressed through incorporating 30 m no-development buffers from trees and woodland in this area of the development, for the parameters-based outline development design at this stage, as detailed in Section 2.9.

2.3.3 Access into the roof space of the cottage building (located adjacent to the access route in the central region of the site) was constrained due to the false ceiling and small entry point, however this was unlikely to have affected bat survey findings due to the activity survey results recording no roosting bats in the building. The outbuilding was full of gardening equipment and therefore could not be fully accessed, however again based on the activity survey findings this is unlikely to have had any impact on the results and assessment. During the first dusk survey, a rain shower began at 22:27 continuing until 23:00 when the survey was ended as a result. The rain shower was not considered to have impacted the survey findings due to the survey results being consistent over the two surveys (no roosting bats identified during the second survey when there was no rain).

2.3.4 Some sections of the River Don could not be safely accessed due to the depth (>1.5 m) of the water and the substrate type (soft sediment). These areas were instead walked via the bankside. The flow in these areas were relatively slow and the bed substrate comprised predominantly fine sand or silt, with little pebbles, cobbles and boulders. Therefore, based on these observed conditions and its dismissal from physical search it was not considered to affect the survey findings or assessments for fish or freshwater pearl mussels.

2.3.5 The NVC survey was conducted within the main growth season. However, the peak times for growth and flowering vary between species, so it is possible that some species were missed as their vegetative and/or flowering parts were not visible at the time of survey. It is considered unlikely that this would alter the NVC communities assigned or the evaluation of GWDTEs.

2.3.6 Some areas of woodland could not be directly accessed during the target badger surveys due to sections of windthrow / windsnap. Although this is considered to have constrained access, it is not considered to have had a major impact on the survey findings and assessment, which gives sufficient confidence in the outline badger mitigation strategy (Appendix 8.14) at this stage. It is expected that further badger surveys would be required in due course as part of a future badger licence application.

2.3.7 Although baseline survey limitations were experienced, these were not considered to affect the survey assessments and therefore it is considered that the data and information used to complete this assessment is robust and there are no significant data gaps or limitations.

2.4 Zone of influence (ZoI) and study area

Zone of Influence

2.4.1 The CIEEM Guidelines identify the Zone of Influence (ZoI) as the area over which ecological features may be subject to significant effects as a result of the proposed development and associated activities. This is likely to extend beyond the project site, for example where there are mobile species or hydrological links beyond the site boundaries. Features found to be present or likely to be present within the predicted ZoI and which have potential to be significantly affected (positively and negatively) by the proposed development are included within the scope of this assessment.

2.5 Features scoped in and out of the assessment

2.5.1 The features listed in Table 2.4 have been scoped in and out of the assessment for ecology and biodiversity as agreed through the EIA scoping process detailed in Chapter 5: Scoping and Consultation.

2.5.2 Additional features have been scoped in and out following further survey work assessments, with the justification for this given in Table 2.4.

Table 2.4: Features scoped in and out of the assessment

Features	ZoI	Scoping decision	Justification
Construction and operational phases			
The Ythan Estuary, Sands of Forvie and Meikle Loch SPA • Common Tern (*Sterna hirundo*) • Eider (*Somateria mollissima*) • Lapwing (*Vanellus vanellus*) • Little Tern (*Sternula albifrons*) • Pink-footed Goose (*Anser brachyrhynchus*) • Redshank (*Tringa totanus*) • Sandwich Tern (*Sterna sandvicensis*)	Within the development and up to 20 km from the boundary (considered to be the furthest foraging distance for bird species)	Scoped out	The Ythan Estuary, Sands of Forvie and Meikle Loch SPA is located 14.5 km north east of the development site at its nearest point. Common Tern, Eider, Lapwing, Little Tern, Redshank and Sandwich Tern are all considered to be outwith the ZoI as disturbance distance for these bird species is 500 m or less [31] and therefore no significant effects are predicted for these designated features. Geese from the SPA may frequent the development site and adjacent habitats to forage during the winter season as they can commute up to 20 km to forage. However, from the 2022-2023 winter geese surveys undertaken and desk study information to support these, concluded that the main feeding grounds for the Pink-footed Goose roosts associated with the SPA are identified as widely spread, especially to the northeast of the roosts, to the south along the Aberdeenshire coast to Balmedie and west to Ellon and likely around Oldmeldrum. This area does not extend as far as the proposed development site. In addition, a relatively low percentage of Pink-Footed Goose were recorded using the site and surrounding fields (maximum numbers observed equal 6% of the SPA population) and it is considered that there is sufficient alternative habitat for them in the area. Therefore, no significant effects are predicted for the Ythan Estuary, Sands of Forvie and Meikle Loch SPA and as such has been scoped out of the EIA. Further detail regarding the assessment of the SPA can be found in the HRA (Appendix 8.11).
The Loch of Skene Site of Special Scientific Interest (SSSI), RAMSAR and Special Protection Area (SPA) • Common Gull (*Larus canus*) • Goldeneye (*Bucephala clangula*) • Greylag Goose (*Anser anser*) • Pink-footed Goose (*Bucephala clangula*) RAMSAR and SSSI only features: • Goosander (*Mergus merganser*)	Within the development and up to 20 km from the boundary (considered to be the furthest commuting distance for bird species)	**Scoped in: Greylag Goose and Pink-footed Goose only**	Loch of Skene SSSI, RAMSAR and SPA is located approximately 5 km south of site. Goosander and Goldeneye are considered to be outside of the ZoI as disturbance distance for these bird species is 800 m or less [31] and therefore no significant effects are predicted for these designated features and thus have been scoped out. Non-breeding Common Gull within the SSSI may frequent the development site and adjacent habitats to forage, however only small numbers of Common Gull have been recorded within the site during any surveys and thus they have been scoped out. Greylag Goose and Pink-footed Goose have been recorded frequenting the development site and adjacent habitats to forage during the winter season, as they can commute up to 20 km to forage and thus have been scoped in to both the EIA and HRA.

Features	ZoI	Scoping decision	Justification
Kinaldie Den Local Nature Conservation Site (LNCS)	Within the development and up to 2 km	Scoped out	Kinaldie Den LNCS – Located 140 m east of the site boundary. Treelines within the site connect to the LNCS. However, this area of the site is for access and will not require widening, or removal of any trees. In addition, the Aberdeen to Inverness railway line spans this access track so species would be accustomed to regular disturbance via noise and vibration from passing trains and as such occasional additional vehicles would be considered to produce less noise and vibration in comparison. Therefore, although LNCS is considered to be within the ZoI no significant impacts relating to connectivity of habitats and commuting and foraging habitat for species such as red squirrel are predicted.
Cottown Woods LNCS	Within the development and up to 2 km	Scoped out	Cottown Woods LNCS – Located 140 m east of the site boundary. Treelines within the site connect to the LNCS. However, this area of the site is for access and will not require widening, or removal of any trees. In addition, the Aberdeen to Inverness railway line spans this access track so species would be accustomed to regular disturbance via noise and vibration from passing trains and as such occasional additional vehicles would be considered to produce less noise and vibration in comparison. Therefore, although the LNCS is considered to be within the ZoI no significant impacts relating to connectivity of habitats and commuting and foraging habitat for species such as red squirrel are predicted.
Rollo Mire LNCS	Within the development and up to 2 km	Scoped out	Rollo Mire LNCS – Located 1 km north of the site. The Rollomire Burn flows into the Tuach Burn which dissects an access route of the site, c.3.5 km downstream of the site boundary. Although it is within the ZoI, due to the direction of water flow from the Rollomire into the Tuach, i.e. upstream of the site, given the distance and the limited nature of any potential pollution events as a result of the development, no significant impacts relating to pollution or other hydrological impacts are predicted.
Aberdeen to Inverness and Kittybrewster Railway Line LNCS	Within the development and up to 2 km	Scoped out	Aberdeen to Inverness and Kittybrewster Railway Line LNCS – Located 1.7 km north east of the site boundary. No alterations to the railway line itself are proposed, only temporary construction haul roads running adjacent to the railway are proposed for the development. The LNCS is considered to be within the ZoI, however no significant impacts are predicted for the LNCS.
Ancient and native woodland	Within the development and adjacent to the site	Scoped out	There are three areas of ancient woodland classified as Long-established plantation origin (LEPO) on the Ancient Woodland Inventory within the site and an additional LEPO area directly adjacent to the boundary. A number of blocks of woodland on the Ancient Woodland Inventory are located within a 1 km radius of the site. Four blocks of woodland classified as native woodland on the native woodland survey of Scotland (NWSS) are present within the site and an additional five blocks of woodland are present adjacent to the boundary. A number of blocks of woodland on the NWSS are located within a 1 km radius of the site. The areas of ancient woodland and native woodland are predominantly located along boundaries of the development site and as a matter of committed mitigation in the outline development design (as specified in Section 2.9), no areas of ancient or native woodland are to be removed to facilitate the proposed development. Therefore, potential significant impacts are not considered to be present for these features.

Terrestrial habitats • Arable field margins • Temporary grass and clover leys; • Cereal crops; • Lowland fens • Purple moor-grass and rush pasture • Lowland acid grassland • Other neutral grassland; • Deschampsia neutral grassland • Holcus-juncus neutral grassland • Modified grassland; • Gorse scrub; • Mixed scrub; • Rivers (priority habitat); • Other rivers and streams; • Other standing water; • Buildings; • Built linear features; • Wet woodland • Lowland mixed deciduous woodland • Other broadleaved woodland; • Native pine woodlands • Other coniferous woodland.	Within the development boundary	**Scoped in** • ***Holcus-juncus* neutral grassland;** • **Rivers (priority habitat);** • **Other rivers and streams;** • **Lowland mixed deciduous woodland** • **Gorse scrub;** • **Mixed scrub** Scoped out: • Lowland fens • Purple moor-grass and rush pasture • *Deschampsia* neutral grassland • Other neutral grassland; • Arable field margins • Temporary grass and clover leys; • Cereal crops • Modified grassland; • Buildings; • Built linear features; • Other coniferous woodland; • Native pine woodlands; • Other broadleaved woodland; • Wet woodland • Other standing water; • Lowland acid grassland	***Holcus*-juncus neutral grassland, rivers (priority habitat), other rivers and streams, lowland mixed deciduous woodland, gorse scrub and mixed scrub scoped in are either of conservation importance and/ or will be wholly or partially lost within the site, to facilitate the development.** Lowland fens, purple moor-grass and rush pasture, other lowland acid grassland, native pine woodlands and wet woodland are SBL priority habitats and are present within the development boundary but are to be retained as part of the development design. Therefore, no significant impacts are predicted. Other standing water, other coniferous woodland and other broadleaved woodland are NESBiP important habitats present within the development boundary but are to be retained as part of the development design. Therefore, no significant impacts are predicted. *Deschampsia* neutral grassland is a NESBiP important habitat and is to be partially lost as part of the development design but is considered to be common and widespread. Given the high proportion of habitat available in the wider landscape, it is not predicted that the area lost within the site will have significant impacts for biodiversity. Other neutral grassland is a NESBiP important habitat but is considered to be common and widespread. Only a very small proportion will be permanently removed as part of the development design. Given the high proportion of habitat available in the wider landscape, it is not predicted that the area lost within the site will have significant impacts for biodiversity. Temporary grass and clover leys are a NESBiP important habitat and are to be temporarily removed and reinstated (associated with the pipeline corridor, temporary construction compounds (one south of the railway line and one c. 1 km south of the railway line), temporary access routes along the railway line and from A96 to the water pipework corridor) or permanently removed as part of the development design but are considered to be common and widespread (with some habitats being highly managed each year) and are therefore scoped out as the associated impacts are considered negligible. Cereal crops are to be temporarily removed and reinstated (associated with the pipeline corridor, temporary construction compounds (one south of the railway line and one c. 1 km south of the railway line), temporary access routes along the railway line and from A96 to the water pipework corridor) and permanently removed as part of the development design but are considered to be common and widespread and of limited benefit to biodiversity. Given the high proportion of habitat available in the wider landscape, it is not predicted that the area lost within the site will have significant impacts for biodiversity. Modified grassland is a NESBiP important habitat and are to be temporarily removed and reinstated (associated with the pipeline corridor, temporary construction compounds (one south of the railway line and one c. 1 km south of the railway line), temporary access routes along the railway line and from A96 to the water pipework corridor) or permanently removed as part of the development design, however, this habitat is considered to be common and widespread. Given the high proportion of habitat available in the wider landscape, it is not predicted that the area lost within the site will have significant impacts for biodiversity. Built linear features, such as existing roads and tracks are to be retained and some walls are to be permanently removed as part of the development design but are considered to be common and widespread and are therefore scoped out therefore as the associated impacts are considered negligible. Arable field margins are a SBL priority habitat, however only a very small proportion will be removed as a result of the development (with some habitats being highly managed each year associated with crop rotation). Given the high proportion of habitat available in the wider landscape, it is not predicted that the area lost within the site will have significant impacts for biodiversity. Buildings are a NESBiP important habitat, with one ruined building being present within the development boundary which is to be removed as part of the development design. This building is in a dilapidated state. The building has been inspected for bats, but no evidence of bats was identified. Therefore, there will be no significant impacts predicted on this habitat.

Features	ZoI	Scoping decision	Justification
Invasive Non-Native Species (INNS)	Within the development boundary	**Scoped in**	INNS have been recorded within the ZoI.
Bats	Within the development and up to 50 m from the boundary	**Scoped in**	Buildings, structures and trees which offer suitability for roosting bats are present within the ZoI. High quality habitats on site provide commuting and foraging habitats for bats in the locale, with the wetland in the area north of the electrolysis plant considered to be a core sustenance zone for bats
Otter	Within the development and up to 200 m from the boundary	**Scoped in**	There are potential rest sites along the River Don and there is suitable habitat for otter foraging and commuting within the ZoI
Badger	Within the development and up to 100 m from the boundary	**Scoped in**	A main sett, annexe sett and outlier setts are to be destroyed to facilitate the development and other sett features are present within the development site and surrounding area. There is suitable habitat for foraging and commuting badger within the ZoI.
Reptiles	Within the development and up to 50 m from the boundary	**Scoped in**	High-quality reptile refugia are present throughout the ZoI, via rock piles, stone piles, stone dykes, heathland, wetland and grassland, which provide a range of basking resources as well as foraging and commuting habitat. Common lizard (*Zootoca vivipara*) were identified in the northern area of the electrolysis plant location, equating to a “Good” population. This area is to be partially removed to facilitate the development; therefore, reptiles may be significantly affected.
Birds Full list of species identified during baseline surveys are presented in Technical Appendix 8.8. Notable results that are not part of the SPA include: • Whitefronted Goose (*Anser albifrons*) • Barn Owl (Tyto alba) • Meadow pipit (Anthus pratensis) • Skylark (Alauda arvensis)	Within the development and up to 800 m from the boundary	**Scoped in**	Impacts to species associated with the Designated sites are included within the relevant SPAs. There is the potential for impacts to foraging and roosting barn owl, foraging and nesting meadow pipit and skylark within the ZoI.
Fish	Within the development and up to 100 m upstream and 200 m downstream from the boundary	**Scoped in**	Water is to be abstracted from the River Don, therefore there is potential for fish species residing, commuting or foraging in the ZoI to be affected by the development.
Water vole	Within the development and up to 200 m from the boundary	Scoped out	There are no records of water vole present within a 2 km radius of the development and no evidence of water vole was identified during survey work. Water vole are not predicted to be significantly impacted by the development.

Features	ZoI	Scoping decision	Justification
Pine marten	Within the development and up to 50 m from the boundary	Scoped out	There is suitable habitat for pine marten and pine marten have been identified within the ZoI. However, from the development design, a large proportion of the habitats suitable for pine marten will be retained, including commuting features such as drystone dykes (specifically along the west of the area proposed for the electrolysis plant) and blocks of coniferous woodland which could be used for resting and foraging. In addition, no breeding/ den sites were identified during any surveys. In addition, a large proportion of suitable habitat is present for pine marten outside the ZoI. Agreed mitigation including green corridors and additional planting schemes will be implemented to further bolster these features/ areas of habitat for pine marten. Therefore, pine marten are not predicted to be significantly impacted by the development.
Red squirrel	Within the development and up to 50 m from the boundary	Scoped out	There is suitable habitat for red squirrel, red squirrel have been identified and potential drey features have been identified within the ZoI. However, from the development design, the areas with potential dreys will be retained and a large proportion of the habitats suitable for red squirrel will be retained, including commuting features such as drystone dykes and blocks of coniferous woodland which could be used for drey creation as well as foraging. In addition, a large proportion of suitable habitat is present for red squirrel outside the ZoI. Agreed mitigation including green corridors and additional planting schemes will be implemented to further bolster these features/ areas of habitat for red squirrel. Therefore, red squirrel are not predicted to be significantly impacted by the development.
Hedgehog	Within the development and up to 50 m from the boundary	Scoped out	Woodland habitats are to be retained (as specified in Section 2.9) and only small areas of scrub, arable margins and grassland will be removed to facilitate the development which would be unlikely to fragment habitats for hedgehog. Therefore, hedgehog are not predicted to be significantly impacted by the development.
Brown hare	Within the development and up to 50 m from the boundary	Scoped out	Brown hare have been sighted in the arable fields along the water pipeline route. The habitat in this area will be reinstated following underground water pipeline connection being installed. Suitable habitat exists for brown hare throughout the ZoI via arable fields. Although predominantly temporary removal of some foraging and commuting habitat due to land use change from arable land would occur, brown hare are not predicted to be significantly impacted by the development as there is sufficient alternative habitat in the wider landscape.
Amphibians	Within the development boundary	Scoped out	Suitable habitat exists for amphibians via ponds, woodland and riparian habitat along small burns and drainage ditches, throughout the ZoI. The majority of these features will be retained and therefore amphibians are not predicted to be significantly impacted by the development.
Freshwater pearl mussel	Within the development and up to 500 m downstream from the boundary	Scoped out	No suitable habitat exists for freshwater pearl mussel within the ZoI and therefore are not predicted to be significantly impacted by the development.
Invertebrates	Within the development boundary	Scoped out	The site partially falls within a B-Line. B-Lines are a series of ‘insect pathways’ which are being restored to create a series of wildflower-rich habitat stepping stones, linking existing wildlife areas together to create a network across the UK landscape and provide large areas of brand new habitat for bees and butterflies as well as a range of other wildlife. A range of butterflies, moths, bees, flies, spiders, snails, slugs, beetle, grasshoppers, ants and wasps were observed throughout the site during the survey (with a large proportion associated with the wetland/ grassland area in the north west of the site to be retained). However, no observed species were of specific interest (e.g. no SBL priority species). The scrub, wetland, grassland, woodland, stone walls and stone piles, watercourse and arable habitats provide suitable habitat for basking, foraging and breeding invertebrates. A large proportion of these habitats will be retained as part of the development and habitats will also be enhanced and created on and offsite, as well as feature created and installed (bug hotels and woodpiles) providing additional resources for invertebrates. The restoring and enhancement of habitats will also help to enhance and expand the B-Line which partially falls within the site. Therefore, invertebrates are not predicted to be significantly impacted by the development.

2.6 Assessment methodology

Evaluation of important ecological features (IEFs)

2.6.1 The evaluations are applied to those sites, habitats and species that have been scoped into the assessment. These are termed Important Ecological Features (IEFs).

2.6.2 European, national and local governments and specialist organisations have together identified a large number of sites, habitats and species that provide the key focus for biodiversity conservation in the UK and Ireland, supported by policy and legislation. These provide an objective starting point for identifying the important ecological features that need to be considered.

2.6.3 Table 2.5 shows a procedure for determining the geographical level of importance of site designations, habitats and species. Where a feature is important at more than one level in the table, its overriding importance is that of the highest level. Usually only the highest level of legal protection is listed.

Table 2.5: Geographical level of IEFs

Level of importance	Sites	Habitat	Species
International	Designated, candidate or proposed Special Areas of Conservation, Special Protection Areas and Ramsar sites; UNESCO (Ecological) World Heritage Sites; UNESCO Biosphere Reserves; Biogenetic Reserves.	A viable area of habitat included in Annex I of the EC Habitats Directive; a habitat area that is critical for a part of the life cycle of an internationally important species.	A European Protected Species; an IUCN Red Data Book species that is globally Vulnerable, Endangered or Critically Endangered.
National (UK)	Sites of Special Scientific Interest; National Nature Reserve; Marine Conservation Zones (UK offshore).	An area of habitat fulfilling the criteria for designation as an SSSI or MCZ; a habitat area that is critical for a part of the life cycle of a nationally important species.	An IUCN Red Data Book species that is Vulnerable, Endangered or Critically Endangered in the UK; a species that is Rare in the UK (<15 10km grid squares); a Schedule 5 (animal) or Schedule 8 (plant) species included in the Wildlife and Countryside Act (WCA) 1981; any species protected under national (UK) legislation where there is the potential for a breach of the legislation; a species that is Vulnerable, Endangered or Critically Endangered in The Vascular Plant Red Data List for Great Britain [32].
National (Scotland)	National Parks; Marine Protected Areas; Marine Consultation Areas.	Scottish Biodiversity List (SBL) Priority Habitats and Priority Marine Features (PMFs) (Scotland).	Species of principal importance for biodiversity in the relevant countries[1], including; SBL Priority Species (Scotland).
Regional	Regional Parks (Scotland).	Regional Local Biodiversity Action Plan habitats noted as requiring protection.	A species that is Nationally Scarce in the UK (present in 16-100 10km grid squares); a species that is included in the Regional LBAP; an assemblage of regionally scarce species.
County / Metropolitan	Woodland Trust Sites; Royal Society for the Protection of Birds Sites; Scottish Wildlife Sites.	County LBAP habitats noted as requiring protection; semi-natural, ancient woodland	A species that is included in the County LBAP; an assemblage of species that are scarce at the county level.
Local	-	Semi-natural habitats that are unique or important in the local area	Species as defined by Local Authority lists (if available).

[1] These are all the species that were identified as requiring action in the UKBAP and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework, including any additions.

Level of importance	Sites	Habitat	Species
Site	-	Common and widespread habitats not covered above.	Common and widespread species not covered above.
Negative	-	-	An Invasive Non-Native Species (INNS) as defined by the GB Non-Native Species Secretariat (NNSS) and supported by the GB Invasive Non-native Species Strategy (2015).

2.7 Impact assessment criteria

2.7.1 The assessment of impacts describes how the baseline conditions would change as a result of the project and its associated activities and from other developments. The term 'impact' is used commonly throughout the EIA process and is usually defined as a change experienced by a receptor (this can be positive, neutral or negative). The term 'effect' is commonly used at the conclusion of the EIA process and is usually defined as the consequences for the receptor of an impact after mitigation measures have been taken into account. The EIA Regulations specifically require all likely significant effects to be considered. Therefore, impacts and effects are described separately and the effects for the IEFs are assessed as being either significant or not according to the importance and sensitivity of the IEF.

2.7.2 Significant cumulative effects can result from the individually insignificant but collectively significant effects of actions taking place over a period of time or concentrated in a location, for example:

- additive / incremental; or
- associated / connected.

Magnitude of impact

2.7.3 The CIEEM guidance states that when describing changes/activities and positive or negative impacts, reference should be made to the following parameters where relevant:

- magnitude;
- extent;
- duration;
- reversibility; and/or
- timing and frequency.

2.7.4 Magnitude refers to the size, amount, intensity and volume of an impact, determined on a quantitative basis if possible, but typically expressed in terms of relative severity, such as major, moderate, low or negligible. Extent, duration, reversibility, timing and frequency of the impact can be assessed separately but they tie in to determine the overall magnitude. Criteria for describing the magnitude of an impact are presented in Table 2.6, based on the change that the proposed development would have upon the resource/receptor. The descriptive terms used are within the range of major, moderate, minor, negligible and no change. Consideration is given to scale, duration and frequency of impact, and reversibility with reference to the definitions in Table 2.6.

Table 2.6: Criteria for magnitude of impact

Magnitude	Description
Major	Total or major loss or alteration to the IEF, such that it will be fundamentally changed and may be lost from the site altogether; and/or loss of a very high or high proportion of the known population or range of the IEF
Moderate	Loss or alteration to the IEF, such that it will be partially changed; and/or loss of a moderate proportion of the known population or range of the IEF
Low	Minor shift away from the existing or predicted future baseline conditions. Change arising from the loss or alteration will be discernible but the condition of the IEF will be similar to the pre-development conditions; and/or having a minor impact on the known population or range of the IEF
Negligible	Very slight change from the existing or predicted future baseline conditions. Change barely discernible, approximating to the 'no change' situation; and/or having a negligible impact on the known population or range of the IEF

Significance of effect

2.7.5 Significance is a concept related to the weight that is attached to effects when decisions are made. For the purposes of Ecological Impact Assessment (EcIA), a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for IEFs. In broad terms, significant effects encompass effects on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).

2.7.6 Significant effects are quantified with reference to an appropriate geographic scale (see Table 2.5 above). The CIEEM guidance has one 'level of importance' and a geographical 'scale of significance'. This is to deal with the fact that the geographical scale at which the effect is significant is not necessarily the same as the geographic level of importance of the IEF.

2.7.7 A sensitivity scale is used to assist in the determine the significance of effects, as shown in Table 2.7.

Sensitivity of receptors

2.7.8 The criteria for defining sensitivity in this chapter are stated in Table 2.7.

Table 2.7: Criteria for receptor sensitivity

Sensitivity	Definition
High	Tolerance: the IEF has a very limited tolerance of the effect
	Adaptability: the IEF is unable to adapt to the effect
	Recoverability: the IEF is unable to recover, resulting in permanent or long term (>10 years) change
Medium	Tolerance: the IEF has limited tolerance of the effect
	Adaptability: the IEF has limited ability to adapt to the effect
	Recoverability: the IEF is able to recover to an acceptable status over the medium term (5-10 years)
Low	Tolerance: the IEF has some tolerance of the effect
	Adaptability: the IEF has some ability to adapt to the effect
	Recoverability: the IEF is able to recover to an acceptable status over the short term (1-5 years)
Negligible	Tolerance: the IEF is generally tolerant of the effect
	Adaptability: the IEF can completely adapt to the effect with no detectable changes
	Recoverability: the IEF is able to recover to an acceptable status near instantaneously (<1 year)

2.7.9 Consideration of conservation status is important for assessing the significance of effects of impacts on individual habitats and species. The Habitats Directive [33] provides a helpful definition of conservation status for habitats and species (as defined by Articles 1 I and 1(i)):

"For habitats, conservation status is determined by the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area; and

The conservation status of natural habitats will be taken as 'favourable' when:

ii. its natural range and areas it covers within that range are stable or increasing, and

ii. the species structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future, and

iii. the conservation status of its typical species is favourable as defined in Article 1(i).

For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area.

The conservation status of species will be taken as 'favourable' when:

iv. population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and

ii. the natural range of the species is neither being reduced for the foreseeable future, and

v. there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis."

Confidence

2.7.10 CIEEM does not cover levels of confidence in predictions, therefore an approach has been adopted based on river conservation evaluation [34] which provides a simple, qualitative index which can be assigned to each predicted effect as follows:

- high confidence;
- intermediate confidence; or
- low confidence.

2.7.11 Factors influencing the professional judgement of the confidence levels include:

- the frequency and effort of field sampling;
- constraints to the field survey;
- the completeness of the data (field and desk);
- the age of the data (although recent data are not necessarily always more reliable than old data);
- the state of scientific knowledge relating to the predicted effects of development activities on the IEF (the accuracy of the magnitude assessment); and
- the accuracy of the assessment of significance.

Success of mitigation

2.7.12 The word ‘mitigation’ has developed a wider meaning and common usage in environmental assessment than its strict meaning related to reducing the severity of something. Mitigation can sometimes be used as a generic term for a wide range of counter-acting measures, all of which, as the Directive and Regulations prescribe, are intended to prevent, reduce and where possible offset any significant adverse effect on the environment. Mitigation can be used to encompass measures intended to avoid, minimise or compensate for adverse effects (this is the ‘mitigation hierarchy’).

2.7.13 Mitigation and compensation measures often carry a degree of uncertainty. Uncertainty associated with a design will vary according to a number of factors, such as:

- the technical feasibility of what is proposed;
- the overall quantity of what is proposed;
- the overall quality of what is proposed;
- the level of commitment provided to achieve what is proposed;
- the provision of long-term management; and
- the timescale for predicted benefits.

2.7.14 The following objective scale is used for the success of mitigation:

- certain/near certain: probability estimated at 95% chance or higher.
- probable: probability estimated above 50% but below 95%.
- unlikely: probability estimated above 5% but less than 50%.
- extremely unlikely: probability estimated at less than 5%.

2.8 Maximum design envelope parameters for assessment

2.8.1 The maximum design envelope parameters identified in Table 2.8 have been selected as those having the potential to result in the greatest effect on an identified receptors or receptor groups. These parameters have been identified based on the overview description of the development provided in Chapter 2: Project Description and Site Setting.

2.8.2 Effects of greater adverse significance are not predicted to arise should other development designs, within the project design envelope parameters, be taken forward.

Table 2.8: Maximum design envelope parameters assessed

Potential impact	Maximum design parameter	Justification
General		
The maximum design envelope parameters specified in Chapter 2: Project Description and Site Setting are applicable to the ecology and biodiversity assessment. In addition, the following further parameters or assumptions have been made when applying the design envelope to this assessment.		
Construction phase		
Permanent habitat loss	Electrolysis plant area, Above Ground Installation (AGI) area and abstraction and discharge area.	At the Planning Permission in Principle stage, prior to detailed development design, as a worst case scenario, any areas within the electrolysis plant area, AGI area and abstraction and discharge area which are not highlighted as being retained are assumed to be fully removed to facilitate the development. However, in reality this is likely to be less.
Temporary loss of habitats	Proposed temporary compound areas and pipeline route.	It is assumed that the method of pipe installation will include some sections of trenching, with habitats in those sections being lost/ altered temporarily during works. It is also assumed that habitats within temporary compound areas will be removed/ altered temporarily during the construction phase. As a worst case scenario it is assumed these will be reinstated within two years of works commencing.
Watercourse re-route	Proposed re-route of watercourse (Dewsford Burn) associated with the main electrolysis plant area	It is assumed for the assessment that the burn re-route option will be implemented as a worst case scenario.
Pollution or disruption to water environment	Watercourses present within the site.	It is assumed that crossings of watercourses will be required during construction, which may include culverts or pipe crossings. It is also assumed that in-channel works will be undertaken for the abstraction area.
Road traffic accidents with species from increased vehicles	Whole site.	It is assumed that an increased number of heavy goods vehicles (HGVs) would be present during the construction phase than the current level of vehicles associated with the site. Total HGV traffic movement is expected to increase by 39.50% on the most-affected road link (B977 to the north of Leylodge) during construction, which is an addition of 258 vehicle movements (HGVs and LGVs) per day or typically 26 two-way movements per hour.
Operation phase		
Pollution or disruption to water environment	Watercourses present within the site.	It is assumed as a worst case scenario, that during operation, maintenance works will likely be required and as a result, there is a risk that pollution or discharge of sediments may occur.
Reduction in River Don water levels	Abstraction point and River Don.	During operational phased, it is assumed that a maximum abstraction rate of up to 2,808 m^3/hour could be used, subject to the CAR licence which controls abstraction rate depending on river flow and hence water levels.
Increased temperature of River Don during water discharge	Abstraction point and River Don.	It is assumed as a worst case scenario that 40ºC will be the discharge water temperature into the River Don, based on parameters provided, which has the potential to increase water temperature of the River Don within the discharge area and downstream for a short period.
Road traffic accidents with species from increased vehicles	Electrolysis plant area.	It is assumed that an increased number of heavy vehicles (primarily shuttle buses for staff access but also goods vehicles for occasional deliveries) would be present during the operational phase. Across a typical day it is estimated that there could be in the order of 124 two way vehicle movements including staff journeys and visitors / general site deliveries to the electrolysis plant site.
Pollution or disruption to water environment	Electrolysis plant area, AGI area and abstraction and discharge area.	It is assumed that maintenance of the electrolysis plant, AGI and abstraction area will be required during the operational phase and therefore potential pollution (e.g. fuel spills) or disruptions to the water environment (e.g. sedimentation) may occur as a result.

2.9 Mitigation measures adopted as part of Kintore Hydrogen Plant

2.9.1 A number of measures have been designed into Kintore Hydrogen Plant to avoid and reduce the potential for impacts on ecology and biodiversity. These are listed in Table 2.9.

Table 2.9: Designed-in mitigation measures

Measures adopted as part of Kintore Hydrogen Plant	Justification
Retention of Ancient woodland, native woodland, other broadleaved woodland, other coniferous woodland, native pine woods and wet woodland within the development design, including the highest habitat value areas in the north part of the electrolysis plant site.	To retain irreplaceable habitat, SBL priority habitat, NESBiP important habitats and GWDTE.
Intake/ outflow will have a self-cleaning fish and debris screen with a concrete structure to support it.	This design will reduce direct impacts to fish (mortality and injury).
Terrestrial habitats outwith the footprint of the development will be retained and clearly delimited from the works area.	To reduce the risk of damage.

Measures adopted as part of Kintore Hydrogen Plant	Justification
Blocks of coniferous woodland will be retained within the development design.	To retain suitable and connected habitat for native faunal species, such as bats, red squirrel, pine marten and invertebrates.
Site boundary includes additional land, not required for development, acquired to enable riparian habitat enhancement along the River Don	To provide positive effects for biodiversity and an overall improvement in habitat value, over and above mitigation and compensation for development impacts, and in line with suggestions from the River Don Trust.
A contractual management requirement of the successful Principal Contractor would be the development and implementation of a comprehensive and site-specific Construction and Environmental Management Plan. An Outline CEMP is provided with the application, to be developed into a detailed CEMP prior to construction works.	This document would detail how the successful Principal Contractor would manage the works in accordance with all commitments and mitigation detailed in the EIA Report, statutory consents and authorisations, and industry best practise and guidance, including pollution prevention guidance. The following good practice guidance for pollution prevention (GPPs) shall be adhered to and incorporated into the CEMP: • GPP 5: Works and maintenance in or near water; • GPP 6: Working at construction and demolition sites; • GPP 7: Safe Storage – The safe operation of refuelling facilities; • GPP 21: Pollution and incident response planning; and • GPP 22: Dealing with spills.

3 Baseline environment

3.1 Current baseline

3.1.1 The following sections summarise the baseline data ascertained from the desk study and field surveys conducted in 2023 and 2024. Protected species data is valid for 12 months and therefore would require updating prior to the start of construction in 2026 where necessary to inform specific species management plans or licence applications, or in some cases may form part of the ecological clerk of works role at the site clearance stage. Further detail can be found in the Technical Appendices 8.1 – 8.16.

Designated Sites

3.1.2 Loch of Skene Special Site of Scientific Interest (SSSI), RAMSAR and Special Protection Area (SPA) is located approximately 5 km south of site. Greylag Goose and Pink-footed Goose have been recorded frequenting the development site and adjacent habitats to forage during the winter season, as they can commute up to 20 km to forage. The number of Greylag Goose and Pink-footed Goose that were recorded frequenting the site comprised approximately 3% and 3.3% (respectively) of the Loch of Skene SPA population. Greylag Goose was last assessed in 2014 as unfavourable declining. This is likely due to the fact that 60% of the wintering Greylag Geese are now found on Orkney, indicating a northward shift in the distribution of wintering greylags in Scotland. Pink-footed Geese was last assessed in 2014 as favourable maintained condition.

Habitats

3.1.3 This section should be read in conjunction with Technical Appendices 8.1 and 8.10.

3.1.4 In this overview, ‘the site’ refers to the land within the application boundary, which is varied and comprises a range of habitats. Furthermore, specific references to the varied land uses, habitats and species within different parts of the application boundary (such as the main electrolysis plant site, or water intake and outfall area) are given in the appendices and in the discussion of specific species in sections below.

3.1.5 The predominant land use is agricultural, with habitat types across the site being dominated by cereal crops, temporary grass and clover leys and modified grassland. Grasslands in the north east of Scotland are known to be largely maintained and managed for agricultural production. Hard standing ground is present within in the site, and approximately 1.5% of the north east of Scotland is classified as urban. Gorse and mixed scrub, as well as other broadleaved woodland and river and streams are scattered throughout the site. Localised areas of arable field margins, other neutral grassland, purple moor-grass and rush pasture, lowland fen, lowland dry acid grassland, *Deschampsia* neutral grassland, *Holcus-juncus* neutral grassland, other standing water (ponds), buildings, wet woodland, lowland mixed deciduous woodland, native pine woodland and other coniferous woodland. Approximately 18% of the land cover in the north east of Scotland is wooded, however is not considered to be spread evenly across the region.

3.1.6 Of the habitats taken forward for the assessment, *Holcus-Juncus* neutral grassland, gorse scrub, mixed scrub, other rivers and streams are locally important and considered common across Scotland and lowland mixed deciduous woodland, is an SBL priority habitat and is considered to be less common in the local area. The NESBiP woodland habitat statement estimates there is just 1,539 ha of Lowland Mixed Deciduous Woodland out of c.37,855 ha of woodland in Aberdeenshire.

3.1.7 The lowland mixed deciduous woodland on the site was assessed during the Tree Survey (Technical Appendix 8.17) to comprise an early mature to mature predominantly silver birch woodland with mature beech mixed in and goat willow within the understory. This woodland block was afforded a categorisation ‘B’ which are in relation to those of moderate quality with an estimated remaining life expectancy of at least 20 years and was advised that it should be retained.

3.1.8 The Carbon and Peatland map 2016 shows an area of Class 5 covering the southern section of the wetland and extending southwards into the adjacent arable and grassland fields where the electrolysis plant is proposed. The remainder of the site is covered by Class 0. An area of Class 5 peatland is present to the south of the site but is unlikely to be impacted by the development due to the presence of a road network which would likely act as a barrier.

3.1.9 Table 3.1 provides a summary of habitats which have been taken forward for assessment, along with the area present and Ground Water Dependent Terrestrial Ecosystem (GWDTE) status (corroborated by Table 3.1 in Chapter 13: Hydrology). Carbon and peatland potential classes have also been included for GWDTEs and include:

- Class 0 – Mineral soil – Peatland habitats are not typically found on such soils.
- Class 5 – Soil formation takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat.

Table 3.1: Habitat summary

UKHab habitat	NVC community (or equivalent)	GWDTE assessment	Carbon and peatland 2016	Area present within the site that could be lost (ha)[2]
Holcus-juncus neutral grassland	MG10 *Holcus lanatus* – *Juncus effusus* rush-pasture	No ground water dependence	Class 5	0.1 ha
Rivers (priority habitat)	-	-	Class 0	N/A
Other rivers and streams	-	-	Class 0	N/A
Lowland mixed deciduous woodland	-	-	Class 0	0.8 ha
Gorse scrub	-	-	Class 0	2.3 ha
Mixed scrub	-	-	Class 0	1.1 ha

3.1.10 Invasive non-native species (INNS) were identified during the habitat surveys, inclusive of:

- Giant hogweed (*Heracleum mantegazzianum*) recorded along both banks of the River Don, within the site, and downstream of the site boundary. Giant hogweed was also present along the lower reaches of the downstream tributary of the River Don (Silver Burn) in the site;
- Japanese knotweed (*Reynoutria japonica*) in the west of the site adjacent to the proposed electrolysis plant, within woodland adjacent to the access track, which is to be retained;
- Monkeyflower (*Mimulus guttatus*) associated with the wet woodland and Silver Burn near the intake/ outflow area as well as at the top of the gorse covered slope in the wetland area north of the proposed electrolysis plant;
- White butterbur (*Petasites albus*) recorded downstream of the intake/ outflow area along the River Don;
- Himalayan balsam (*Impatiens glandulifera*) recorded near the intake/ outflow area in the north east of the site within wet woodland and Silver Burn;
- Water crowfoot *(Ranunculus sp. hybrid*) recorded within the River Don upstream of the intake/ outflow area.

Faunal Species

Bats

3.1.11 Historic records and regular recordings and sightings of common pipistrelle, soprano pipistrelle, brown long eared, Daubenton's and Natterer's bat, as well as rarely observed Leisler's bat during 2023-2024 survey have been returned from within the site boundary and locale.

3.1.12 The site is predominantly comprised of arable and pasture farmland, but also includes (and is also immediately adjacent to) watercourses, woodland (including irreplaceable ancient Long – Established Woodland (of Plantation Origin), wetland, scrub, grassland and built-up habitats. Thus, ecological connectivity throughout the site is extensive providing opportunities for commuting and foraging bats. Overall, these habitats were assessed as offering high suitability for foraging and commuting bats.

3.1.13 One building is present within he site and two additional buildings are present within the ZoI. No confirmed roosting bats were identified during surveys.

3.1.14 A total of 36 trees were considered to offer suitability for roosting bats, with seven trees identified as containing high suitability for roosting bats, 17 trees considered to offer moderate suitability for roosting bats and 12 trees considered to offer low suitability for roosting bats following detailed PRF inspections.

3.1.15 Transect and static data suggest nearby roosts. The wetland area in the north of the west transect (in the site, within the area defined for retained habitat and no development) was considered to be a core sustenance zone for bats with high levels of activity of common pipistrelle, soprano pipistrelle, brown long-eared bat, Daubenton's bat and Natterer's bat. Leisler's bats were identified on three occasions along the west and east transects. Common pipistrelle, soprano pipistrelle, brown long-eared bat, Daubenton's bat and Natterer's bat are considered of least concern on the Red List for Scotland's Mammals. Leisler's bats are rarely recorded in the north east of Scotland and considered Near Threatened on the Red List for Scotland's Mammals.

[2] This area to be lost is based on the worst case scenario according to the Planning Parameters Plan, however in reality, the loss of habitats will likely be less

Badger

3.1.16 Three main badger setts, with associated annexe, subsidiary and outlier setts are present within the proposed area for the electrolysis plant. Other outlier setts are associated with the compensatory area and near access tracks and pipeline routes as well as within 100 m of the site. Badger latrines, dung, foraging, snuffling have also been recorded.

3.1.17 Badger are common and widespread in Scotland, with moderately high densities being estimated for main setts in the Grampian region [35] and badger are considered of least concern on the Red List for Scotland's Mammals.

Otter

3.1.18 One 'moderate' status holt and one otter couch and two otter lay-ups assessed as 'low' status rest sites were identified along the bank of the River Don and considered to offer temporary 'stop offs' for otter moving through their territory. A number of spraints of varying age classes were present along the River Don and Silver Burn. No evidence of otter was identified throughout the remainder of the site, however it is considered that otter will likely use the majority of watercourses on site to commute and forage.

3.1.19 The majority of the otter population of the UK occurs in Scotland, due to the range of otters being reduced due to persecution, habitat loss and reduction of prey species. A significant proportion of otter are found in the north of Scotland, where numbers are considered to be flourishing [36]. The overall population is estimated to be c.8000 individuals with a distribution covering the majority of Scotland, particularly in coastal and riparian habitats. Otter are considered vulnerable on the Red List for Scotland's Mammals.

Reptiles

3.1.20 Records of common lizard were returned from the desk study in locations outside the site. Common lizard are considered to be widespread over Scotland and common in the north east of Scotland, whilst adder (*Vipera berus*) and slow worm (*Anguis fragilis*) are rarer. High-quality reptile refugia was present predominantly within the habitat in the northern area proposed for the electrolysis plant but also throughout the remainder of the site, via rock piles, stone piles, stone dykes, woodland and grassland, which provide a range of basking resources as well as foraging, breeding and commuting habitat.

3.1.21 A total of 16 common lizard were observed within the north area, associated with the electrolysis plant location, during the reptile survey period, with a peak count of five individuals recorded during two of the refugia checks, equating to a "good" population. No other reptile species were recorded on site during the surveys, though slow worm and adder are likely to be present in the wider environment and may utilise the suitable habitats in and adjacent to the site.

3.1.22 Common lizard, adder and slow worm are listed as least concern on the IUCN red list.

Birds

3.1.23 A range of bird species have been recorded on the site. Full lists of species identified during baseline surveys are presented in Technical Appendix 8.8.

3.1.24 Suitable habitat for nesting, loafing and foraging birds is present within the woodland, scrub, agricultural fields and grassland habitats within the site.

3.1.25 A Barn Owl breeding roost is present in a tree within the electrolysis plant and grid connection area of the site. Barn Owl feature on BoCC green list and c. 200 pairs of Barn Owls are considered to be present in the north east of Scotland.

3.1.26 One White-fronted Goose (an uncommon winter visitor), Meadow Pipit and Skylark were notable species recorded on the site. White-fronted Goose are red listed on BoCC and are winter visitors whose numbers have increased in the north of Scotland. Meadow Pipit are amber listed BoCC and are considered to be widespread. Skylark are red listed BoCC, with Skylark showing signs of a recovery, with significant increases in five years (8%) and 10 years (9%) in the UK [37].

Fish

3.1.27 Opportunities for migrating, foraging and sheltering are present within the watercourses which are present within the site for fish. A lack of spawning suitability was present in the watercourses within the site.

3.1.28 Overall, the River Don offers the greatest opportunities for a range of fish species and has good sheltering, foraging and residing habitat for salmonids (Atlantic salmon (*Salmo salar*) and trout). However, limited spawning habitat is present in the section surveyed. More suitable spawning habitat may be present upstream.

3.1.29 The River Don also provides suitable habitat for brook (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*) and eel (*Anguilla Anguilla*) (limited spawning and ammocete).

3.1.30 Due to suitable residing, sheltering and foraging habitats present within the River Don and records of species, Atlantic salmon, sea trout (*Salmo trutta trutta*), brown trout (*Salmo trutta*), brook, river and sea lamprey and eel are all considered to be present within the River Don system and therefore have the ability to be present within the site.

3.1.31 Atlantic Salmon within Scotland are declining with the IUCN conservation status recently updated to 'Endangered' within Great Britain (as a result of a 30-50% decline in British populations since 2006 and 50-80% projected between 2010-2025) [38]. There is also a decline in returning Atlantic salmon to the River Don (2021 annual catches marking a continuation of low catches seen since 2013) [39]. Sea trout similarly have a declining population with rod catches at the lowest ever recorded in 2020 (92% of the previous 5-year average) [40]. The River Don also follows the decline seen at a national level, with sea trout annual catches over the last decade (2010-2019) being well below catches seen in the previous decade (2000-2009) [39]. European eel are listed as critically endangered on the IUCN red list and although not heavily fished within Scotland, eel numbers in Scotland are thought to have fallen drastically (by more than 90% since the 1990s) [41]. Brown trout, brook lamprey, river lamprey and sea lamprey are listed as least concern on the IUCN red list.

3.2 Evaluation

3.2.1 The assessment of effects presented in the subsequent sections of this chapter have been applied only to those designated sites, habitats and species that have been scoped into the assessment, found to be present in the baseline records and surveys, and where there is the potential for impacts that could result in significant adverse ecological effects as a result of the proposed development. The IEFs and the evaluations are presented in Table 3.2.

Table 3.2: Evaluation table

IEF	Present on site?	Present in wider area?	Importance	Justification
Loch of Skene SSSI RAMSAR and SPA	N	Y	International	European designated site
Holcus-juncus neutral grassland	Y	Y	Regional	LBAP priority habitat supporting biodiversity
Rivers (priority habitat) (Annex 1)	Y	Y	International	Annex I habitat
Other rivers and streams	Y	Y	Regional	LBAP priority habitat supporting biodiversity
Lowland mixed deciduous woodland	Y	Y	National (Scotland)	SBL priority habitat
Gorse scrub	Y	Y	Regional	LBAP priority habitat supporting priority bird species
Mixed scrub	Y	Y	Regional	LBAP priority habitat supporting priority bird species
Bats	Y	Y	International	European protected species (EPS)
Otter	Y	Y	International	EPS
Badger	Y	Y	National (UK)	Protected under Badger Protection Act 1992
Reptiles	Y	Y	National (Scotland)	SBL priority species
Birds: Barn Owl, Meadow Pipit, Skylark and White-fronted Goose	Y	Y	National (UK) – Barn Owl, white-fronted Goose and Skylark	Annex I (Barn Owl) and Birds of Conservation Concern (BoCC) Red list
			Regional – Meadow Pipit	BoCC Amber list
Fish	Y	Y	International – Atlantic salmon, brook lamprey and European eel	Atlantic salon and brook lamprey are listed in Annex II of Habitats Directive European eel are critically endangered on IUCN red list
			National (Scotland) – sea trout, brown trout, river lamprey and sea lamprey	SBL priority species

3.3 Future baseline

3.3.1 The predicted future changes to the current baseline, without intervention are as follows.

- Climate change altering the distribution of animal populations within the site and ultimately altering ecosystem functions.
- Deterioration of fish populations through continued increase in water temperatures, especially during sensitive breeding periods, resulting in reduced success of egg survival.
- Non-Native Species introductions and expansion are likely to continue, and established species may become more widespread with a decline in native species.
- Continued development or management of woodlands may occur throughout the landscape, which would likely result in a loss of available habitat to species and reductions in connectivity throughout the landscape.
- With the implementation of Biodiversity Net Gain as future requirement for developments, habitat losses are not anticipated to lead to any major changes as compensation and enhancement measures will need to be a consideration in any future development plans.

3.3.2 It is not predicted that the potential changes in the future baseline above would impact the current assessment undertaken, as habitat and species sensitivity has already been considered conservatively with a view to conservation pressures.

4 Assessment of Effects

4.1 Loch of Skene Special Site of Scientific Interest (SSSI), RAMSAR and Special Protection Area (SPA)

Construction phase

4.1.1 The designated site is slightly more than 5 km from the southernmost point of the proposed development application boundary; therefore, it is not anticipated that there will be any disturbance to the features or their habitats within the designated site itself. However, geese can commute up to 20 km to forage.

4.1.2 Construction activities will lead to some loss in winter foraging habitat via vegetation removal (modified grassland and cropland). Approximately 48 ha will be permanently removed and approximately 32 ha will be temporarily removed and reinstated. Maximum counts associated with the site over the 2022-2023 winter season identified (185 Greylag Goose (3% SPA population) and 1050 Pink-footed Goose (4% SPA population), suggesting the site isn't favoured by a significant proportion of the SPA population. Additionally, the loss of habitat within the site will be minor, in the context of extensive similar habitats within the 5 km distance between the designated sites and the development site (as well as surrounding the site) that Greylag Goose and Pink-footed Goose could utilise. In addition, consideration of the land use (farmland) within the areas where temporary habitat removal will occur, currently results in alterations to these habitats on a regular basis. It is therefore considered that whilst the area to be impacted may support SPA/SSSI/RAMSAR populations, it is unlikely to be critical habitat.

4.1.3 Construction works may cause a temporary displacement to a low number of foraging or resting Greylag Goose and Pink-footed Goose only during the winter season, from noise, vibration increased human presence, vehicle movements and lighting associated with the works. If the proposed development is constructed in a single phase, with the highest level of activity on site, construction works throughout the site are anticipated to be undertaken over around 36 months (during 2026 to 2029).

4.1.4 Human presence is estimated to be an average of 857 workers per day during the construction period, concentrated on the main electrolysis plant site but with workers throughout the development are for different aspects of the works. During the peak of construction activity, it is expected a maximum of 278 vehicles (56 movements of cars and 212 movements of heavy goods vehicles (HGVs)) will be present per day, which could be within the winter season for geese, depending on the programme.

4.1.5 Vehicle movements will be lower on average, and the Transport and Access assessment (Chapter 9) concludes that although there will be a temporary increase in traffic volumes within the study area during construction phase, this can be appropriately and effectively managed.

4.1.6 Greylag Goose are considered to be more tolerant towards human presence compared with other geese species in the UK but will tend to move away from areas that have high levels of human activity (such as roads and human habitation). Pink-footed Geese are considered to be sensitive to human disturbance, with previous studies finding that pink-footed geese were disturbed at a distance of 500 m when more than 20 cars per day used a road during autumn and that as few as 10 cars per day affected habitat use by geese [31]. However, given that geese are mobile, there is extensive further suitable habitat in the locale, traffic would be using the existing road network plus dedicated access points into development areas and the impacts would only be relevant for a part of the year (overwintering birds), the described impacts are likely to be fairly localised to the proposed works thus affecting a small proportion of the available area for geese.

Magnitude of impact

4.1.7 The impacts during the construction phase will include a small area of permanent and temporary vegetation removal (relative to the overall availability of this for geese), as well as displacement to a low number of foraging or resting geese.

4.1.8 Impacts during the construction phase are considered to be **low** in magnitude.

Sensitivity of the receptor

4.1.9 Geese are mobile and have the ability to move into alternative suitable habitat.

4.1.10 The designated features of the Loch of Skene SSSI/ RAMSAR/ SPA is therefore considered to be of **negligible–low** sensitivity.

Significance of effect

4.1.11 The construction impacts are considered to be of low magnitude and the IEF to be of negligible-low sensitivity. A **significant** effect is predicted at **site level**. The confidence level for the assessment is high.

Operational phase

4.1.12 During operational works there will be increased activity within the proposed development site in terms of vehicle movements and human presence primarily within the electrolysis plant area, with occasional access also to the AGI and intake/outfall point. There will also be lighting at the electrolysis plant area. This may cause displacement to a low number of foraging or resting Greylag Goose and Pink-footed

Goose associated with the operation of the facility. The total human presence during the operational phase is considered to be around 100-200 people split over a two or three shift pattern each day. The total vehicle movements would be up to 124 vehicles per day (including an allowance for visitors and general deliveries). The Transport and Access assessment (Chapter 9), concludes that the level of traffic generated during the operational phase will be low.

4.1.13 Greylag Goose are considered to be more tolerant towards human presence, whilst Pink-footed Goose are highly sensitive to human presence. However, given that geese are mobile, there is extensive suitable habitat in the locale, and the impacts would only be relevant for a part of the year (overwintering birds), the described impacts are likely to be fairly localised to the proposed development thus affecting a small proportion of geese. Disturbance is considered to be temporary (from people and vehicle movements) and to reduce over time with a degree of tolerance. Any impacts arising from such events would not be considered likely to affect the conservation status of Pink-footed Goose or Greylag Goose population in the longer term.

4.1.14 Changes in ambient nitrogen dioxide concentration due to emission of oxides of nitrogen from the hydrogen flare at the electrolysis plant (which would be more than 6 km north of the Loch of Skene SPA) have been assessed in Chapter 11: Air Quality. This concluded that there would be a negligible change in air quality at this location and no appreciable effect on nutrient nitrogen or acid gas deposition. With respect to the applicable Critical Levels and Critical Loads for the habitats associated with the designated features of the SPA/SSSI/RAMSAR, no adverse effect is therefore predicted.

Magnitude of impact

4.1.15 The impacts during the operational phase will include disturbance to a low number of foraging or resting geese from increase vehicle movement and human presence.

4.1.16 Impacts during the operational phase (human/ vehicle disturbance) will be temporary and are considered to be **negligible** in magnitude.

Sensitivity of the receptor

4.1.17 Geese are mobile and have the ability to move into alternative suitable habitat.

4.1.18 The Loch of Skene SSSI/ RAMSAR/ SPA is therefore considered to be of **negligible-low** sensitivity.

Significance of effect

4.1.19 The operational impacts are considered to be of negligible magnitude and the IEF to be of negligible-low sensitivity. A significant effect is therefore not predicted at any geographic level. The confidence level for the assessment is high.

4.2 Habitats

Construction phase

4.2.1 Areas of the terrestrial habitats present within the electrolysis plant area and gas connection compound area that will be developed for buildings, equipment, roads and hardstanding and the intake/ outfall areas associated with the abstraction point from the River Don, will be permanently removed to facilitate the development.

4.2.2 Areas of gorse scrub and mixed scrub will be partially removed. These habitats are considered to be widespread in the north east of Scotland. Thus, the impact is likely to be fairly localised to the proposed works and as such affecting a small proportion of these habitats available in the wider landscape.

4.2.3 *Holcus-Juncus* neutral grassland will be fully permanently removed. However, this habitat has the potential to reestablish in any area of impeded drainage. This habitat type is also considered to be widespread in the north east of Scotland. Thus, the impact is likely to be fairly localised to the proposed works and as such affecting a small proportion of these habitats available in the wider landscape.

4.2.4 Areas of lowland mixed deciduous woodland habitats will be removed to facilitate the development of the electrolysis plant. These are considered to be rarer in the local area. A total of 0.17 ha of lowland mixed deciduous woodland is to be removed from the site, which equates to 0.01% of the estimated 1,539 ha of lowland mixed deciduous woodland in Aberdeenshire.

4.2.5 A section of the River Don bank and bed will be altered to facilitate intake/ outflow infrastructure. The area that would require altering during construction would be small in relation to the full extent of the river system. Thus, the impact is likely to be fairly localised to the proposed works and as such affecting a small proportion of the available habitat in the wider landscape.

4.2.6 A section of the Dewsford Burn (other rivers and streams) in the north of the proposed electrolysis plant area may be re-routed or a bridge/ culvert installed as a crossing point to facilitate the building of the electrolysis plant (attenuation basin). The length of the burn would change from approximately 700 m to approximately 800 m if re-routing were to occur.

4.2.7 Habitat within the areas of the electrolysis plant site not required for removal are proposed for retention and/ or enhancement, as shown in the Outline Biodiversity Enhancement and Management Plan (BEMP) in Appendix 8.18.

4.2.8 Where habitats are only being partially removed, the retained habitat may be subject to temporary damage as a result of plant movement, trampling by site personnel or pollution incidents.

4.2.9 Table 4.1 shows the total and percentage area of habitats to be permanently lost or retained within the site.

Table 4.1: Habitats to be lost to development

UKHab habitat	NVC community (or equivalent)	Area permanently lost (ha) / (%)	Area retained (ha) / (%)
Holcus-juncus neutral grassland	MG10 *Holcus lanatus* – *Juncus effusus* rush-pasture	0.13 ha / 100 %	0 ha/ 0 %
Lowland mixed deciduous woodland (SBL priority habitat)	-	0.17 ha / 21 %	0.63 ha / 79 %
Gorse scrub	-	1.9 ha / 83 %	0.4 ha / 17 %
Mixed scrub	-	0.28 ha / 26 %	0.82 ha / 74 %

Magnitude of impact

4.2.10 For lowland mixed deciduous woodland habitats to be lost or damaged, the impact is considered to be of **low** magnitude.

4.2.11 For the River Don (priority River) to be altered, the impact is considered to be of **low** magnitude.

4.2.12 For other rivers and streams habitats to be altered, the impact is considered to be of **low** magnitude.

4.2.13 For gorse scrub and mixed scrub to be partially removed the impact is considered to be **low** magnitude.

4.2.14 For *Holcus-Juncus* neutral grassland to be permanently removed the impact is considered to be **moderate** magnitude

Sensitivity of the receptor

4.2.15 For lowland mixed deciduous woodland habitats the receptor is considered to be of **high** sensitivity.

4.2.16 For all other habitats the receptor is considered to be of **low** sensitivity.

Significance of effect

4.2.17 The construction impacts are considered to be of low-moderate magnitude and the sensitivity of the IEFs low-high, Therefore, a **significant** effect is predicted for lowland mixed deciduous woodland, rivers, gorse, mixed scrub, *Holcus-Juncus* neutral grassland and other rivers and streams at the **site level**. The confidence level for the assessment is high.

Operational phase

4.2.18 During operation, abstraction from the River Don will not cause any significant impacts on the hydrology and flow regime of the river, as assessed in Chapter 13: Soils, Geology and the Water Environment and as regulated by the CAR licence.

4.2.19 During the operational phase pollution (such as from fuel or process chemical spills) could result in the deterioration of habitats within and surrounding the Proposed Development. However, the Proposed Development, under a PPC Permit will benefit from having two separate drainage systems – one for process areas (plus bunding around any chemical etc storage) and one for clean surface water discharge, which will prevent process spillages from reaching watercourses, soils and surface water. This will ensure there is no uncontrolled discharge of potential pollutants to the water environment during operation of the Proposed Development.

4.2.20 There are no operational impacts expected due to increased vehicles numbers accessing the site, for terrestrial habitats, as these will be outside of the site boundary and protected via fencing or already lost to the development.

Magnitude of impact

4.2.21 The impacts to the receptors are considered to be of **negligible** magnitude.

Sensitivity of the receptor

4.2.22 The receptor is considered to be of **high** sensitivity for lowland mixed deciduous woodland habitats.

4.2.23 For all other habitats the receptor is considered to be of **low** sensitivity.

Significance of effect

4.2.24 The operational impacts are considered to be negligible magnitude and low-high sensitivity. A significant effect is not predicted at any geographic level. The confidence level for the assessment is high.

4.2.25

4.3 INNS

Construction phase

4.3.1 INNS could potentially be spread through vegetation removal or in-water works during the construction phase if this is not appropriately managed. However, good practice biosecurity protocols will be in place within the pre-agreed CEMP which would ensure there is no spread of INNS.

Magnitude of impact

4.3.2 The spread of INNS would be considered to be of **low** magnitude.

Sensitivity of the receptor

4.3.3 The sensitivity is considered to be **low**.

Significance of effect

4.3.4 The construction phase impacts are considered low magnitude and low sensitivity. A **significant** effect is predicted at the **site level**. The confidence level for the assessment is high.

Operational phase

4.3.5 INNS could be spread during the operational phase, where fragments are transported during inflow/ outflow of water in the River Don, if this is not appropriately managed.

Magnitude of impact

4.3.6 The spread of INNS would be considered to be of **low** magnitude.

Sensitivity of the receptor

4.3.7 The sensitivity is considered to be **low**.

Significance of effect

4.3.8 The operational phase impacts are considered low magnitude and low sensitivity. A **significant** effect is predicted at the **site level**. The confidence level for the assessment is high.

4.4 Bats

Construction phase

4.4.1 Bats using the trees or buildings with PRFs, or habitats on or adjacent to the site to commute and forage, may be directly disturbed as a result of lighting, noise or vibration during construction. Construction lighting may be required for works in key areas, such as construction of the flare and attenuation pond in the wetland area in the north part of the electrolysis plant, which is a core sustenance zone for bats.

4.4.2 Three trees considered to offer high and low status PRFs for roosting bats and a low status building are to be permanently removed to facilitate the construction of the electrolysis plant. No evidence of bats was identified associated with these features thus no roosts are to be disturbed but loss of potential roosting resources will occur. In addition, disturbance/ displacement for foraging and commuting bats will occur from removal of these trees.

4.4.3 The ruined building assessed to offer low suitability for roosting bats in the grassland associated with proposed electrolysis plant is to be permanently removed to facilitate construction of the electrolysis plant. No evidence of bats was identified associated with this building thus reducing likelihood of direct disturbance. However, this will result in the loss of opportunities for roosting bats.

4.4.4 Bats could be directly and indirectly impacted by habitat loss and fragmentation from the permanent and temporary removal of grassland, scrub, woodland and alteration of watercourses during the construction phase. This will result in disturbances to commuting and foraging bats as well as a reduction in prey availability of invertebrates.

4.4.5 Death or injury to bats could also occur as a result of direct contact during tree removal.

Magnitude of impact

4.4.6 The impacts are considered to be of **low** magnitude for common pipistrelle, soprano pipistrelle, brown long-eared bat, Daubenton's bat, Natterer's bat and Leisler's bat.

Sensitivity of the receptor

4.4.7 The receptor is considered to be of **low** sensitivity for common pipistrelle, soprano pipistrelle, brown long-eared bat, Daubenton's bat, Natterer's bat and Leisler's bat.

Significance of effect

4.4.8 The construction phase impacts are considered low magnitude and low sensitivity. A **significant** effect at **site level** is predicted for all bat species. The confidence level for the assessment is high.

4.4.9

Operational phase

4.4.10 Brown long-eared bats and Natterer's bats are less tolerant to lighting than common pipistrelle, soprano pipistrelle and Leisler's bats. All five species were recorded in the

wetland area (adjacent to electrolysis plant works areas, in the north of the electrolysis plant site) as well as the pipeline connection route nearer the River Don. Increased artificial lighting and any occasional operation of the ground flare within the electrolysis plant site could result in the permanent or temporary avoidance of lit areas, reducing available foraging and commuting habitat. The pipeline corridor will not be lit.

4.4.11 It is unlikely that the majority of area affected would be significant in terms of foraging and commuting, however the wetland area which the electrolysis plant extends up to is considered a core sustenance zone due to the high level of activity recorded in the area over the summer period of 2023 and 2024. However, the wetland area is to be retained. Other areas associated with the pipeline connection route also showed high levels of activity for the aforementioned bat species, however as permanent lighting associated with the development will not be present in these areas, these would not be affected during the operational phase.

4.4.12 Any impacts arising from such events would not be considered likely to affect the conservation status of bat species populations in the longer term.

Magnitude of impact

4.4.13 Operational phase impacts are considered to be **low** in magnitude for Brown long-eared bats and Natterer's bats as these species are more susceptible to artificial light.

4.4.14 Operational impacts are considered to be **negligible–low** in magnitude for common pipistrelle, soprano pipistrelle and Leisler's bats.

Sensitivity of the receptor

4.4.15 The receptor is considered to be of **low** sensitivity for common pipistrelle, soprano pipistrelle, brown long-eared bat, Daubenton's bat, Natterer's bat and Leisler's bat.

Significance of effect

4.4.16 The operational phase impacts are considered negligible-low magnitude and low sensitivity. A **significant** effect is predicted at **site level** for all bat species. The confidence level for the assessment is high.

4.5 Badger

Construction phase

4.5.1 During construction works, a main sett, annexe sett and two outlier setts are to be removed to facilitate the development of the electrolysis plant. This has the potential to create direct disturbances to badger and death or injury to badger during sett exclusion. In addition, three main setts are in proximity to one another, so badger territories may be directly affected during the construction phase.

4.5.2 Badger foraging and commuting in habitats on or adjacent to the site may be directly disturbed as a result of lighting, noise or vibration during construction. Increased human presence may also result in disturbance to badger. However, it is likely that workers will mainly be present during daylight hours and thus would have less impact on badger who are more active at night.

4.5.3 Badger could be directly and indirectly impacted by habitat loss and fragmentation from the removal of grassland, scrub, woodland and alteration of watercourses during the construction phase. This has the potential to create disturbances to commuting route paths as well as a reduction in primary foraging habitat.

4.5.4 During the construction phase vehicle movements are to be increased from current levels with a peak of up to 278 per day (56 movements of cars and 212 movements of heavy goods vehicles (HGVs)) using the local road network to access the site. It was estimated in 1995 that as many as 50,000 badgers are killed on roads each year (equating to a fifth of the adult population) through collisions and in 2019 were recorded to be the numerous mammals associated with RTAs [42]. The increase in vehicle movement has the potential to directly affect badgers through increased risk of collisions.

Magnitude of impact

4.5.5 The impacts are considered to be of **moderate** magnitude for sett removal.

4.5.6 The impacts for habitat loss, disturbance to badger from lighting, vibration and noise and death and injury are considered to be **low** magnitude.

Sensitivity of the receptor

4.5.7 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.5.8 The construction phase impacts are considered low-moderate magnitude and low sensitivity. A **significant** effect at a **local level** is predicted for badger. The confidence level for the assessment is high.

Operational phase

4.5.9 Increased artificial lighting could result in the temporary avoidance of lit areas, reducing available foraging and commuting habitat. The majority of area affected would not be significant in terms of foraging and commuting, as remaining habitat within and surrounding the site could also be utilised by badger.

4.5.10 During operation there will be increased activity within the site in terms of human presence and vehicle movements, which may increase the risk of disturbance and collision which could result in the death or injury of individuals. The total human presence during the operational phase is considered to be around 100-200 people split over a two or three shift pattern each day. The total vehicle movements would be up to 124 vehicles per day (including an allowance for visitors and general deliveries). The Transport and Access assessment (Chapter 9), concludes that the level of traffic generated during the operational phase will be low.

4.5.11 Any impacts arising from such events would not be considered likely to affect the conservation status of the badger population in the longer term.

Magnitude of impact

4.5.12 Operational phase impacts are considered to be **low** in magnitude.

Sensitivity of the receptor

4.5.13 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.5.14 The operational phase impacts are considered low magnitude and low sensitivity. A significant effect is predicted at **local level** for badger during operation. The confidence level for the assessment is high.

4.6 Otter

Construction phase

4.6.1 The vegetation clearance for the abstraction point in the River Don has the potential to create disturbances to otters. Rest sites (holt, lay-ups and couches) were identified along the River Don with the nearest (lay-up) being c. 25m from the site boundary downstream (which is within the NatureScot recommended exclusion zone (30 m)), and all were of low-moderate status and considered to be occasional stop off points. No resting sites were identified within the proposed abstraction location, thus reducing the likelihood of direct disturbances on resting otters.

4.6.2 Construction activities including earthworks, movement of bank reinforcements and in-water works could result in the death or injury of individuals through collision with plant or vehicles onshore. The most likely response to construction activities, however, is avoidance. It is anticipated that alterations to the baseline environment at the site would result in visual and noise disturbance, causing otter that utilise the site for commuting and foraging to avoid it. This may temporarily reduce the overall foraging area available to otter in the locale, but it is considered that there would be sufficient alternative foraging areas and commuting routes to sustain the population. The risk of injury or death occurring is also greatly reduced if they avoid the area.

4.6.3 Evidence of otter has been identified along the River Don throughout the surveys completed in 2023-2024, with no evidence found throughout the remainder of the development boundary or adjacent (although suitable habitat exists for commuting and foraging otter). Therefore, otter foraging and commuting within the River Don on or adjacent to the site may be directly disturbed as a result of lighting, noise or vibration during construction.

4.6.4 Death or injury to otter could also occur as a result of a pollution incident (fuel and oil spills), either through direct contact with a contaminant or indirectly through consumption of affected prey items. Prey populations in the locale could also be temporarily reduced in the short term if they are affected by a pollution incident.

4.6.5 All the construction impacts are considered to be temporary and are only expected to affect a relatively small area of habitat available to otter in the locale, which is not considered to be used for breeding. It is not expected that they will affect the favourable conservation status of the otter population in the locale.

Magnitude of impact

4.6.6 The impacts are considered to be of **low** magnitude.

Sensitivity of the receptor

4.6.7 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.6.8 The construction phase impacts are considered low magnitude and low sensitivity. A **significant** effect at **site level** is predicted. The confidence level for the assessment is high.

Operational phase

4.6.9 During the operational phase pollution (fuel spills) could result in the death or injury of otter or prey items. However, the Proposed Development, under a PPC Permit will benefit from having two separate drainage systems – one for process areas (plus bunding around any chemical etc storage) and one for clean surface water discharge, which will prevent process spillages from reaching watercourses, soils and surface water. This will ensure there is no uncontrolled discharge of potential pollutants to the water environment during operation of the Proposed Development.

4.6.10 During operation, changes in water temperature from the water discharge could result in the avoidance of otter and death and/ or injury or their prey (fish). The maximum allowable temperature for water discharge into the River Don under the PPC Permit is assumed at this stage to be up to 40°C to be conservative (though in practice discharge temperatures associated with the Proposed Development are expected to be lower, around 20°C, and will be subject to authorisation by SEPA under the PPC Permit and Controlled Activities Regulations (CAR) authorisation. At the discharge point, the discharge water temperature would therefore be elevated but would become reduced to the normal river temperature again in mixing with the River Don.

4.6.11 During operation, elevated mineral concentrations from the water discharge could result in the avoidance of otter and death and/ or injury or their prey (fish). Although exact values for mineral content are not available, on the basis that under the CAR authorisation, just over one-third of the water that is abstracted must be returned as discharge, the concentration of minerals in the discharged water could be up to just under three times what it was during the intake. As such, during discharge, the mineral levels would be more concentrated but would then become diluted again in mixing with the River Don. This would result in the mineral levels being no higher by total quantity than was in the river water originally.

4.6.12 The intake/ outflow at the River Don will likely only require occasional maintenance or inspections, however no routine presence would occur in these areas. This increase in presence may increase the risk of disturbance and collision which could result in the death or injury of individuals. Any impacts arising from such events would be temporary and not considered likely to impact the conservation status of the otter population in the longer term.

4.6.13 Any impacts arising from such events would not be considered likely to affect the conservation status of the otter population in the longer term.

Magnitude of impact

4.6.14 Operational phase impacts are considered to be **low** in magnitude in regard to prey items as a result of temperature and mineral effects.

4.6.15 Operational phase impacts are considered to be **negligible** in magnitude in regard to prey items as a result of pollution and human presence.

Sensitivity of the receptor

4.6.16 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.6.17 The operational phase impacts are considered low in magnitude and low sensitivity for temperature and mineral effects. A **significant** effect at **site level** is predicted for otter in regard to prey items as a result of temperature and mineral effects. The confidence level for the assessment is high.

4.6.18 The operational phase impacts are considered negligible in magnitude and low sensitivity for pollution and human presence. No significant effect at any geographical level is predicted for pollution or human presence. The confidence level for the assessment is high.

4.7 Reptiles

Construction phase

4.7.1 The area of habitat known to host a ‘low’ population of common lizard is to be retained (0.6 ha). Construction activities will include permanent removal of vegetation, with an area known to host a ‘good’ population of common lizard, associated with the electrolysis plant area, equalling approximately 4.7 ha of grassland, scrub and lowland fen. Therefore, residing, foraging and breeding habitat may be permanently altered or lost as a result of ground clearance to facilitate the proposed development. However, other suitable habitat for common lizard is present within the site which is also well connected and is to be retained (>7 ha), with other suitable habitats also present adjacent to the site.

4.7.2 Construction activities including earthworks and movement of materials could result in the death or injury of individuals through collision with plant or vehicles. The most likely response to construction activities is avoidance; however, reptiles are small in size and therefore require adequate time to evade. It is therefore anticipated that during the reptile activity season (April-September) alterations to normal site activities would result in visual and noise disturbance, causing reptiles who may utilise the site for commuting, foraging, breeding and, basking to avoid it. The risk of injury or death occurring is also greatly reduced if they avoid the area. However, during early mornings and late evenings and throughout the hibernation period (October-March) reptiles will likely be less mobile (due to lower temperatures and their inability to self-thermoregulate – as they are ectotherms) and thus the risk of death or injury is greater during this time.

4.7.3 Reptiles may also be indirectly affected from vegetation removal through reduction in available invertebrate prey via removal of vegetation they inhabit. However, suitable habitat is present adjacent to the site, which reptiles could utilise for other prey items,

Magnitude of impact

4.7.4 The impacts are considered to be of **low** magnitude due to the good population size recorded.

Sensitivity of the receptor

4.7.5 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.7.6 The construction phase impacts are considered low magnitude and low sensitivity. A **significant** effect is predicted at **site level** for reptiles. The confidence level for the assessment is high.

Operational phase

4.7.7 During operation there will be increased activity within the site in terms of human presence and vehicle movements, which may increase the risk of disturbance of individuals. Any impacts arising from such events would individually be transient, though potentially occurring over the long-term during the operational phase and are not considered likely to impact the conservation status of the reptile population in the longer term.

Magnitude of impact

4.7.8 Operational phase impacts are considered to be **negligible-low** in magnitude.

Sensitivity of the receptor

4.7.9 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.7.10 The operational phase impacts are considered negligible-low in magnitude and low sensitivity. No significant effect is predicted at any geographical level for reptiles. The confidence level for the assessment is high.

4.8 Birds

Construction phase

4.8.1 Construction activities will include vegetation removal. One White-fronted Goose was recorded in a field outside the site boundary, west of the access route to the AGI, and therefore this foraging habitat will not be lost. Meadow Pipit and Skylark were observed displaying and foraging within the fields adjacent to the compensatory area north of the River Don (outside the development boundary), as well as within the fields associated with the AGI area and the pipeline route west of the AGI area. Therefore, only a small area (approximately 1.6 ha) of foraging, and nesting habitat for Meadow Pipit and Skylark will be permanently lost to facilitate the AGI development and 5.2 ha of temporary habitat loss along the pipeline route, which will be reinstated within two years or works commencing. However, due to the extensive similar habitats within the locale and the habitats which support these species being agricultural land which is regularly managed/ changed through crop rotation or other farming practices, the alternation/ loss of habitats for White-fronted Goose, Meadow Pipit and Skylark within the site is considered to be minor.

4.8.2 A Barn Owl roost in a tree within the development area for the electrolysis plant is to be retained, however may be disturbed during construction works nearby which cause noise or vibration and lighting. As approximately 200 pairs of Barn Owls are considered to be present in the north east of Scotland, the impact is considered unlikely to impact the conservation status of the Barn Owl population, however it would be likely to impact the individual Barn Owl by reducing opportunities for roosting in that area of the development. In addition, foraging habitat adjacent to the Barn Owl roost will be reduced to facilitate the development, however in the context of extensive similar habitats within the locale, the loss is considered to be minor.

4.8.3 Birds could be indirectly impacted by habitat loss from the removal of grassland, scrub, woodland and alteration of watercourses during the construction phase, where prey species likely reside. However, due to the extensive similar habitats within the locale, the alternation/ loss of habitats within the site will be minor in relation to prey availability.

4.8.4 Construction activities including earthworks, vegetation removal and movement of materials could result in the death or injury of individuals through collision with plant or vehicles. The most likely response to construction activities, however, is avoidance. It is anticipated that alterations to normal site activities would result in visual and noise disturbance, causing birds who may utilise the site for commuting, foraging and resting to avoid it. The risk of injury or death occurring is also greatly reduced if they avoid the area.

4.8.5 Vegetation removal undertaken during the nesting bird season, may result in direct disturbance, injury or death of nesting birds with young or fledgelings.

Magnitude of impact

4.8.6 The impacts are considered to be of **low** magnitude.

Sensitivity of the receptor

4.8.7 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.8.8 The construction phase impacts are considered low magnitude and low sensitivity. A **significant** effect is predicted at **site level** for birds. The confidence level for the assessment is high.

4.8.9

Operational phase

4.8.10 During operation there will be increased activity within the site in terms of human presence and vehicle movements, which may increase the risk of disturbance and collision which could result in the death or injury of individuals (especially young birds). Any impacts arising from such events would be temporary and not considered likely to impact the conservation status of the bird population in the longer term.

Magnitude of impact

4.8.11 Operational phase impacts are considered to be **negligible–low** in magnitude.

Sensitivity of the receptor

4.8.12 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.8.13 The operational phase impacts are considered negligible-low magnitude and low sensitivity. No significant effect is predicted at any geographical level for birds. The confidence level for the assessment is high.

4.9 Fish

Construction phase

4.9.1 Detailed design and methodology for construction of the intake/ outflow pipe will be controlled under the CAR licence. In overview, de-watering of the works area will be required to install the infrastructure, likely via temporary sheet piles followed by excavation, with pipe jacking being used to install the pipeline under the riverbank. Therefore, as piling is anticipated to facilitate the development and underwater noise should be considered, as this can be an issue to fish species.

4.9.2 The main impacts to fish species could arise from any pollution (such as oil or fuel spills). These impacts could result in injury or mortality of individual fish. Pollution events could also have an indirect effect by reducing the quality of the habitat for residing, nursing or feeding within the site or downstream.

4.9.3 Sedimentation within the intake/ outflow area could also affect fish. Salmon will actively avoid turbid waters and so their ability to migrate back to spawning grounds could be affected depending on the time of year the installation of the abstraction infrastructure takes place. Salmon spawning usually occurs from November to December, but based on the River Don closed season for salmon, it likely occurs from November to early February. Similarly post-smolt fish migrating back to sea could also be affected (late spring – June). Sedimentation may also have indirect effects on prey items.

4.9.4 Removal of sheltering habitat during the installation of the abstraction infrastructure may result in direct disturbance to fish and death or injury to individuals residing. However, given that fish are mobile, the described impact is likely to be fairly localised to the proposed works thus affecting a small proportion of the available area for fish.

4.9.5 During in-water works, fish may be impacted by underwater noise and vibration, which could result in the death or injury of individuals. The effects of underwater noise and vibration on fish are not well understood, however fish are mobile, and the most likely response would be avoidance. Therefore, it is anticipated that any alterations to normal site activities would result in sensory disturbance, causing fish to avoid it. The risk of injury or death occurring is also greatly reduced if they avoid the area.

Magnitude of impact

4.9.6 The impacts are considered to be of **low** magnitude.

Sensitivity of the receptor

4.9.7 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.9.8 The construction phase impacts are considered low magnitude and low sensitivity. A **significant** effect is predicted at **site level** for fish. The confidence level for the assessment is high.

Operational phase

4.9.9 During the operational phase, pollution (fuel spills) could result in the death or injury of fish. However, the proposed development will benefit from a positive drainage system and incident rainfall, and any spills or pollutants will be collected and passed to the proposed oil interceptor and water attenuation system. This will ensure there is no uncontrolled discharge of potential pollutants to the water environment during operation of the Proposed Development.

4.9.10 During operation, changes in water temperature from the water discharge could result in the avoidance, death and/ or injury of fish in the area surrounding the abstraction

point and surrounds. The maximum allowable temperature for water discharge into the River Don under the PPC Permit is anticipated to be up to 40°C, but in practice discharge temperatures associated with the Proposed Development are expected to be lower, around 20°C. At the discharge point, the discharge water temperature would therefore be elevated but would become reduced to the normal river temperature again in mixing with the River Don. Atlantic salmon exhibit thermal stress at approximately 23ºC, with mortality at approximately 33ºC [43]. As such, where temperatures are not managed properly, this has the potential for impacts on salmon.

4.9.11 During operation, changes in elevated mineral concentrations from the water discharge could result in the avoidance, death and/ or injury of fish in the area surrounding the abstraction point and surrounds. Although exact values for mineral content are not available, on the basis that under the CAR licence, just over one-third of the water that is abstracted must be returned as discharge, the concentration of minerals in the discharged water could be up to just under three times what it was during the intake. As such, during discharge, the mineral levels would be more concentrated but would then become diluted again in mixing with the River Don. This would result in the mineral levels being no higher by total quantity than was in the river water originally.

4.9.12 During intake/ outflow sedimentation in the River Don may occur. These impacts could result in disturbance to fish from the area. Sedimentation may also have indirect effects on prey items.

4.9.13 Fish species could be killed though impingement on poorly designed screens at intakes / outfalls or by screens not functioning correctly due to the accumulation of debris. In addition, discharge flow may distract seasonal upstream migration of fish species. A self-cleaning fish and debris screen with a concrete structure to support it will be installed on the intake/ outflow point which would reduce injury or mortality of individual fish during intake of water from the River Don.

4.9.14 Although exact fish population counts for the River Don and therefore the site, are not known, it is considered that due to the small area of the site that watercourses are present, for most of the species, the habitat and number of individuals present within these areas will be a small proportion of the total population and habitat within the wider range and that overall conservation status is unlikely to be affected.

Magnitude of impact

4.9.15 Operational phase impacts are considered to be **low** in magnitude in relation to sedimentation, temperature and mineral effects.

4.9.16 Operational impacts are considered to be **negligible** in relation to pollution and impingement.

Sensitivity of the receptor

4.9.17 The receptor is considered to be of **low** sensitivity.

Significance of effect

4.9.18 The operational phase impacts are considered low in magnitude and low sensitivity. A **significant** effect at **site level** is predicted for fish in regard to sedimentation, temperature and mineral effects. The confidence level for the assessment is high.

4.9.19 The operational phase impacts are considered negligible in magnitude and low sensitivity. No significant effect at any geographic level is predicted in regard to pollution and impingement. The confidence level for the assessment is high.

4.10 Inter-related effects

4.10.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the construction or operation of Kintore Hydrogen Plant on the same receptor.

Project lifetime effects

4.10.2 This section provides the assessment of the potential for effects that occur during more than one stage of the development's lifetime (such as phases of construction, operation or decommissioning) to interact such that they may create a more significant effect on a receptor than when assessed in isolation for each stage.

4.10.3 Subject to appropriate mitigation measures being implemented and good practice construction and operational methods being adhered to, the effects identified with this chapter are predicted to be minor and not significant (except for otter and fish considered to have residual effects significant at site level). Due to the localised nature and short-term duration of the majority of the potential effects, there is not considered to be potential for effects of greater significance to occur from the inter-relationship of construction and operational phase impacts.

Receptor-led effects

4.10.4 This section provides the assessment of the potential for effects via multiple environmental or social pathways to interact, spatially and temporally, to create a greater inter-related effect on a receptor than is predicted for each pathway (in its respective topic chapter) individually.

4.10.5 The key inter-relationship is for the water environment and any affects to ecological receptors (habitats and species), which could be affected by changes on groundwater quality or availability, surface water quality, changes in the hydrological regime and

morphology of watercourses, or loss of soils and soil contamination. These inter-relationships have been assessed through the consideration of ecological status and protection of the habitats, vegetation surveys and protected species surveys as detailed in the assessment sections above. Similarly, Chapter 13 has assessed impacts to sensitive receptors such as hydrological receptors and soil quality.

4.10.6 Air quality and any effects to ecological receptors (e.g. designated sites), which could be affected by changes in nitrogen concentrations. These inter-relationships have been assessed in the assessment section above.

4.10.7 No receptor-lead inter-related effects of greater significance than already assessed are expected to occur.

5 Mitigation and Monitoring

5.1 Mitigation

5.1.1 The following good practice mitigation measures will be implemented in order to avoid, mitigate or compensate for adverse impacts identified in Section 4.

5.1.2 A number of these measures are part of mitigation commitments made through the Outline CEMP or are designed-in to the proposed development as embedded mitigation. However, where applicable, further mitigation and enhancement recommendations are also made, which includes recommending further detail of management plans or design measures to be approved prior to construction.

5.1.3 Note that the mitigation measures set out here and in the Outline CEMP are those resulting from the assessment, and therefore they prevail and supersede (where there is any conflict) with potential mitigation initially identified through surveys reported in the appendices to this chapter.

5.1.4 Although many measures form part of existing project commitments, the magnitude of impact and significance of effect assessed in Section 4 was made initially prior to implementation of mitigation (other than that physically forming part of the proposed development design). This is in line with guidance for ecology and biodiversity assessment to identify potentially significant effects even when these will be mitigated. The confidence in further mitigation success and significance of residual effects with that mitigation in place are summarised in Table 5.1 at the end of this section.

Construction phase

5.1.5 Details of management and monitoring measures for the construction phase, to be undertaken under the supervision of a qualified Ecological Clerk of Works (ECoW) are included within the Outline CEMP submitted with the planning application. An overview of the approach is given here.

ECoW monitoring, pre-works checks and management

5.1.6 An ECoW will be appointed to oversee construction works including adherence to the CEMP as well as any other relevant planning consents, environmental permits, legislation and mitigation.

5.1.7 All personnel on the site will be made aware of the environmental sensitivities of the site (proximity to designated sites) via the site induction and additional task specific toolbox talks as required.

5.1.8 Pre-works checks for protected species will be undertaken by a suitably qualified and licenced ecologist prior to vegetation clearance, including trees with potential bat roost features.

5.1.9 Vegetation clearance and translocation of species will be undertaken in line with seasonal limitations, for example arising from the breeding bird season, overwintering geese season and reptile hibernation season.

Protective buffers

5.1.10 Protective buffer zones (demarcated with fencing or markers to exclude construction machinery and personnel access) will be established around retained woodland and trees (following British Standard 5837:2012), retained badger setts (30 m) and any identified otter rest sites (30m). These buffers will be communicated to all site contractors for avoidance, to avoid disturbing or destroying features. Where these buffer zones cannot be met, Species Protection Plans (SPP), appropriate licensing and watching brief for works will be required.

5.1.11 SPP for bats, otter, badger and reptiles will include detailed measures proposed to minimise impacts to these species pre- during and post works.

Reptile

5.1.12 Altering of the habitat considered as hosting a ‘good’ population of common lizard through careful strimming to a short sward to displace reptiles, with access to a safe area nearby that they can easily move to, under the watch of a qualified ecologist. Temporary, secure reptile fencing will be installed to prevent reptiles moving into areas affected by works. Any remaining reptiles identified during fence installation or prior to works commencing will be safely removed and relocated into the area of suitable habitat remaining.

5.1.13 Potential reptile refugia habitat will not be removed during hibernation period (November to March inclusive) and only undertaken two hours after sunrise and two hours before sunset and during optimal conditions (11-18 degrees, no heavy rain). Works regarding reptiles or habitat will be undertaken in accordance with ARGUK’s Advice Note 10: Reptile survey and mitigation guidance for peatland habitats [44].

Lighting

5.1.14 Sensitive temporary construction lighting design will be implemented, to minimise potential impacts on foraging bats in particular, in line with the principles set out in the Lighting Principles Statement accompanying the planning application.

Speed limits

5.1.15 A speed limit of 15 mph or less will in place along access and site roads for the electrolysis plant, AGI area or intake/ outfall area.

Badger

5.1.16 Artificial sett creation (six months in advance of main sett removal, prior to the construction phase and baited) and sett exclusion works will be undertaken under licence from NatureScot and will follow a detailed badger management plan to be developed for the licence application.

Bats

5.1.17 Pre-works checks will be conducted by a suitably licensed ecologist for trees with PRFs, to avoid unforeseen damage to any trees with PRFs prior to removal and to prevent any death or injury to any bats.

5.1.18 Bat roost boxes will be provided on established trees/woodland and retained buildings within the application site boundary, on a phased basis.

Birds

5.1.19 Vegetation removal of scrub, trees, woodland and farmed field (grass and crop) habitats should be avoided during the nesting bird season (March-August). Where this cannot be avoided, checks should be made an ecologist within 48 hrs before vegetation removal is required to determine the presence of any nesting birds.

5.1.20 Where farm land is cleared during the winter, this will be phased, insofar as feasible, as further mitigation to minimise the effect on geese. The areas of habitat clearance will be kept to a minimum and phased to reduce the total area of temporary habitat loss at any one time.

5.1.21 Site contractors will be made aware of the presence of nesting birds during the nesting bird season (March-August) on site and in the locale, as part of their onsite induction material. If a nesting bird is suspected or discovered during works, works in that area will cease and the project ecologist/ECoW will be contacted for advice.

5.1.22 Updated surveys pre-construction will confirm whether the Barn Owl roost is still active. The Barn Owl tree roost will require a disturbance buffer to be implemented during the breeding season (March-August). The size of the buffer will depend on the nature of the disturbance and should be advised by a suitably qualified ecologist. However, this would likely be between 50-100 m during the breeding season and 50 m outside the breeding season. Where works are required within the buffers, a bird monitoring licence will be obtained for the project and watching brief be undertaken during any works.

5.1.23 A no-stop zone should be implemented near the Barn Owl roost for vehicles to avoid any disturbance.

5.1.24 A Toolbox Talk to mitigate against collision risk for any works outside of daylight hours should be implemented as this is a major factor for Barn Owls.

5.1.25 Owl boxes will be installed into woodland habitats on a phased basis, to increase overall nesting provisions for owl species. Further bird boxes will be installed into woodland and on retained trees on a phased basis to increase provisions for a range of other bird species.

Invertebrates

5.1.26 Woodcrete and reed insect blocks or ‘bug hotels’’ will be installed to provide shelter for insects which may be present. Bug hotels may be installed on retained trees or fence posts as attracting insects to the site increases prey resource for bat, reptiles and birds species.

5.1.27 For any trees required to be felled/limbed as part of construction works, a suitable proportion of the felled wood will be retained to construct log piles within the proposed development, as well as maintaining standing and buried deadwood within the site. Log piles, standing and buried deadwood provides a feeding and housing resource for insects which are a prey source for bats and other species.

INNS and biosecurity plan

5.1.28 An INNS management and biosecurity plan will be developed and implemented to control the INNS on site and avoid spread.

Fish

5.1.29 Modelling of sediment plume and thermal plume will be undertaken to inform the PPC Permit application, and this will in turn be regulated through both the CAR and PPC Permit to avoid adverse effects on river hydrology and ecology.

5.1.30 The discharge temperatures should be monitored in accordance with the Fisheries Management Scotland guidance [45] in regard to thermal discharge. This notes that discharge of thermal effluents is regulated by SEPA through the CAR and recommends that *“a discharge should not increase the ambient temperature by more than 2°C in waters of high ecological status or 3°C in waters of good ecological status. In addition, a maximum 10°C during spawning is designed to protect spawning of salmonids”*.

5.1.31 The fish screens associated with the inflow and outflow structures will be designed to prevent fish impingement. Traditional passive mesh screens should be utilised, with a rectangular mesh size of 12.5 mm (vertical) x 25 mm (horizontal) being commonplace

in Scotland [46]. As part of the Proposed Development the CAR licence for water abstraction will have a maximum fish screen spacing of 10 mm.

5.1.32 To ensure the discharge reinforces the attraction flow from the remainder of the river and that outfall screening remains effective even when the outfalls are not discharging, the following will be considered within the design for outfall screens:

- mesh or bar spacings for adult Atlantic salmon are 40 mm horizontal spacings and 30 mm for adult sea trout;
- outfall screens located at the most downstream point of the discharge; and
- the height and extent of the screen should take into account of topography and flood levels.

5.1.33 Soft-start techniques will be implemented for any works within watercourse channels to allow fish and other species time to flee, to avoid injury or death.

Operational phase

5.1.34 During the operational phase of the development, the following further mitigation measures will be implemented.

INNS

5.1.35 The site-specific INNS and biosecurity plan will continue to be followed, reviewed at regular intervals in line with operational needs, to provide for continued management of INNS risks.

Speed limits

5.1.36 Internal site access roads will be subject to at most a 15 mph speed limit to reduce collision risk and disturbance from vehicle traffic.

Lighting

5.1.37 Permanent lighting will be designed and operated such as to minimise potential impacts on foraging bats in particular, in line with the principles set out in the Lighting Principles Statement accompanying the planning application, which incorporates Bats and Lighting guidance [47].

Biodiversity

5.1.38 Loss of woodland, cropland, grassland, treelines and scrub habitats will be compensated for via the enhancement and creation of habitats within the main electrolysis plant area and within the compensatory area.

5.1.39 The following will also aid in compensation for the lost protected species habitat:

- planting of native tree, shrub and scrub species within the site and along boundaries to offer sheltered and connective commuting habitat for a range of species;
- inclusion of rock and stone piles and creation of reptile hibernacula and invertebrate refugia using stones from stone walls and soil from existing site.

5.2 Biodiversity enhancements

5.2.1 In order to meet NPF4 Policy 3, the development is required to deliver biodiversity enhancements which increase connectivity to habitats in the wider landscape. In order to demonstrate the development's ability to meet these criteria in relation to habitats, an indicative Biodiversity Net Gain (BNG) Feasibility Assessment was conducted using the DEFRA Biodiversity Statutory Metric Tool, based on the principles of an indictive site plan. The full methodology and results can be found in Volume 3, Appendix 8.15: Indicative Biodiversity Net Gain Feasibility Assessment. Actions proposed to meet biodiversity gains comprise the following.

- Creation of 26.69 ha of wildflower grassland to moderate condition
- Enhancement of 6.9 ha of other neutral grassland to good condition
- Creation of 3.23 ha mixed scrub to moderate condition
- Creation of 6.02 ha of lowland mixed deciduous woodland to poor condition
- Creation of 1.06 ha mixed woodland to poor condition
- Creation of 1.41 ha attenuation basin and enhancement of attenuation basin to moderate condition through planting of aquatic vegetation
- Creation of 0.67 km of coniferous and broadleaved treelines to moderate condition
- Creation of 0.36 km of native hedgerows to moderate condition
- Removal of INNS associated with watercourses

5.2.2 Based on the proposed on-site enhancement, including those within the compensatory area north of the River Don, the indicative BNG feasibility assessment considered that the proposed development (based on the principles of an indicative design) could achieve 15.61% net gains for the terrestrial habitats on site, 14.05% net gains for the linear (treelines and hedgerows) on site and 2.68% net gains for the watercourses on site.

5.2.3 To secure the above actions, as well as further actions which would benefit biodiversity on the site (not considered within the BNG metric calculation), an outline Biodiversity Enhancement and Management Plan (BEMP) has been developed for the site. This is presented in Volume 3, Appendix 8.18 and includes measurable objectives for habitat creation and management and cover a period of 30 years, with management to be reviewed regularly and informed by monitoring data.

5.2.4 As the BNG and BEMP are based on the principles of an indicative design which provides an indication of what is achievable for the Proposed Development, at this current stage, upon a more detailed design concept being submitted, these plans shall require updating.

5.3 Monitoring

5.3.1 Monitoring is required to determine the success of mitigation and enhancement measures and provide data on which to base adaptive management when objectives are not being achieved. It is anticipated that the following monitoring will be required during and/or post-construction:

- Monitoring of the site for any new badger setts and monitoring of the compensatory sett features will be required prior to and during the construction phase.
- Monitoring required for compensatory badger sett use during operational phase.
- Monitoring of the River Don for any new otter rest sites and monitoring of the existing/ new features will be required prior to and during the construction phase.
- Monitoring the Barn Owl roost during the construction phase
- Monitoring of trees with PRFs prior to development and during construction for those to be felled/ undergo arboricultural works.
- In order to determine if the aims of the BEMP are being met, monitoring of the habitat should be conducted. This should comprise repeating the condition assessment, including collection of quadrat data and fixed photography to assess changes over time. Monitoring for the BEMP will also include checks on the uptake of bird and owl nest boxes and bat boxes.
- Surveillance monitoring for the presence of INNS will be undertaken to ensure early action can be taken in the event of new introductions. Monitoring will be done via visual searches.
- Monitoring of the discharge water quality should be undertaken in line with requirements of the Controlled Activities Regulations (CAR) and PPC Permit from SEPA, to ensure compliance with discharge water quality parameter limits (temperature and mineral concentrations) relevant to the protection of aquatic habitat suitability for fish.

5.4 Residual effects

5.4.1 Residual effects comprise those which remain after incorporating the mitigation measures as provided in Section 5. The residual effects identified in this section are adverse unless otherwise stated.

5.4.2 The assessment of environmental parameters has found that there are no significant adverse residual effects to:

- Loch of Skene SPA
- Terrestrial habitats
- INNS
- Bats
- Badger
- Reptiles
- Birds
- Otter
- Fish

5.4.3 The significance of residual effects considered to be likely, once mitigation has been taken into consideration, is summarised in Table 5.1.

Table 5.1: Residual effects summery

IEF	Importance of IEF	Type of impact	Nature	Source	Duration	Magnitude (pre-mitigation)	Sensitivity	Significance of effect following mitigation (residual effect)	Confidence	Success of mitigation
Construction phase										
Loch of Skene SPA (qualifying goose species foraging outside the SPA)	International	Construction negative	Habitat loss	Vegetation removal	Permanent/ Temporary	Low	Negligible-low	No significant effect at any geographic level	High	Near certain
Loch of Skene SPA (qualifying goose species foraging outside the SPA)	International	Construction negative	Disturbance	Noise, vibration and lighting	Temporary	Low	Negligible-low	No significant effect at any geographic level	High	Near certain
Terrestrial habitats: lowland mixed deciduous woodland, rivers (priority habitat), other rivers and streams, gorse scrub, mixed scrub and *Holcus-Juncus* neutral grassland	International/ National/ Regional	Construction negative	Habitat loss	Vegetation removal	Permanent	Low-moderate	Low-high	No significant effect at any geographic level	High	Near certain
INNS	Negative	Construction negative	Spread of INNS	Vegetation removal and in-water works	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Bats	International	Construction negative	Disturbance	Noise, vibration and lighting	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Bats	International	Construction negative	Roost opportunities lost	Vegetation removal	Permanent	Low	Low	No significant effect at any geographic level	High	Near certain
Bats	International	Construction negative	Habitat loss	Vegetation removal	Permanent	Low	Low	No significant effect at any geographic level	High	Near certain
Bats	International	Construction negative	Death or injury	Vegetation removal	Permanent	Low	Low	No significant effect at any geographic level	High	Near certain
Badger	National	Construction negative	Disturbance	Removal of main sett and annexe sett	Permanent	Moderate	Low	No significant effect at any geographic level	High	Probable
Badger	National	Construction negative	Disturbance	High vibration works effecting remaining setts	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Badger	National	Construction negative	Disturbance	Noise, human presence, vibration and lighting	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Badger	National	Construction negative	Habitat loss	Vegetation removal	Permanent/ Temporary	Low	Low	No significant effect at any geographic level	High	Near certain

IEF	Importance of IEF	Type of impact	Nature	Source	Duration	Magnitude (pre-mitigation)	Sensitivity	Significance of effect following mitigation (residual effect)	Confidence	Success of mitigation
Badger	National	Construction negative	Death or injury	Vehicle movement	Permanent	Low	Low	No significant effect at any geographic level	High	Near certain
Otter	International	Construction negative	Disturbance	Vegetation removal	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Otter	International	Construction negative	Death or injury	Vehicle movement	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Otter	International	Construction negative	Death or injury	Pollution	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Otter	International	Construction negative	Disturbance	Noise, vibration and lighting	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Reptiles	National	Construction negative	Habitat loss	Vegetation removal	Permanent/ Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Reptiles	National	Construction negative	Disturbance	Vegetation removal	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Reptiles	National	Construction negative	Death or injury	Vehicle movement and vegetation removal	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Birds (nesting and geese)	National/ Regional	Construction negative	Disturbance to roosting and foraging Barn Owl	Noise, vibration and lighting	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Birds (nesting and geese)	National/ Regional	Construction negative	Disturbance to nesting birds	Noise, vibration and lighting	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Birds (nesting and geese)	National/ Regional	Construction negative	Habitat loss	Vegetation removal	Permanent/ Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Birds (nesting and geese)	National/ Regional	Construction negative	Death or injury	Vehicle movement	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Fish	International/ National	Construction negative	Death or injury	Pollution	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Fish	International/ National	Construction negative	Sedimentation	Construction of intake/ outflow	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Fish	International/ National	Construction negative	Habitat loss	Bankside vegetation removal	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain

IEF	Importance of IEF	Type of impact	Nature	Source	Duration	Magnitude (pre-mitigation)	Sensitivity	Significance of effect following mitigation (residual effect)	Confidence	Success of mitigation
Fish	International/ National	Construction negative	Death or injury	Underwater noise	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Operation phase										
Loch of Skene SPA (qualifying goose species foraging outside the SPA)	International	Operational negative	Disturbance	Noise, vibration, lighting, human presence and vehicle presence	Temporary	Negligible	Negligible-low	No significant effect at any geographic level	High	Near certain
Terrestrial habitats: lowland mixed deciduous woodland, rivers (priority habitat), other rivers and streams, gorse scrub, mixed scrub and *Holcus-Juncus* neutral grassland	International/ National/ Regional	Operational negative	Damage	Pollution	Temporary	Negligible	Low-high	No significant effect at any geographic level	High	Near certain
INNS	Negative	Operational negative	Spread of INNS	Operation of intake/ outflow	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Bats	International	Operational negative	Disturbance	Noise and lighting	Permanent	Negligible-low	Low	No significant effect at any geographic level	High	Near certain
Badger	National	Operational negative	Disturbance	Lighting	Permanent	Low	Low	No significant effect at any geographic level	High	Near certain
Badger	National	Operational negative	Death or injury	Vehicle movement	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Otter	International	Operational negative	Death or injury	Pollution	Temporary	Negligible	Low	No significant effect at any geographic level	High	Near certain
Otter	International	Operational negative	Reduced prey availability	Changes in water temperature and elevated mineral concentrations at outflow	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Otter	International	Operational negative	Disturbance	Human presence	Temporary	Negligible	Low	No significant effect at any geographic level	High	Near certain
Reptiles	National	Operational negative	Death or injury	Vehicle movement	Temporary	Negligible-low	Low	No significant effect at any geographic level	High	Near certain
Birds (nesting and geese)	National/ Regional	Operational negative	Death or injury	Vehicle movement	Temporary	Negligible-low	Low	No significant effect at any geographic level	High	Near certain
Fish	International/ National	Operational negative	Death or injury	Pollution	Temporary	Negligible	Low	No significant effect at any geographic level	High	Near certain

IEF	Importance of IEF	Type of impact	Nature	Source	Duration	Magnitude (pre-mitigation)	Sensitivity	Significance of effect following mitigation (residual effect)	Confidence	Success of mitigation
Fish	International/ National	Operational negative	Death or injury	Changes in water temperature and elevated mineral concentrations at outflow and sedimentation	Temporary	Low	Low	No significant effect at any geographic level	High	Near certain
Fish	International/ National	Operational negative	Death or injury	Design of intake/ outflow point	Permanent	Negligible	Low	No significant effect at any geographic level	High	Near certain

6 Cumulative Effects Assessment

6.1.1 The cumulative developments in Table 6.1 are considered relevant to ecology and biodiversity impacts.

6.1.2 Development IDs 1, 2, 5, 6, 7 and 10 have already been approved and works have commenced on 5 and 10. If the construction phases are sequential with the proposed hydrogen plant development, then the period these receptors are exposed to impacts may be prolonged. During the operational phase projects are expected to result in increased vehicle movements and therefore cumulative effects associated with impacts resulting from vehicle movements are predicted.

6.1.3 The applicant is also aware of a potential proposal for a 200 MW battery storage facility that could be located on farm land north of the proposed Kintore Hydrogen Plant AGI for the hydrogen export connection. No documents or details concerning the development are available at the time of undertaking the CEA. It is anticipated that the battery storage plant applicant, in the course of undertaking its EIA including CEA, would identify and mitigate any adverse effects of the battery storage plant together with Kintore Hydrogen Plant.

6.1.4 For all the receptors considered in this chapter, the magnitude of impacts from the cumulative developments are considered to be low – negligible and affecting a small area of the relative IEFs' range for both projects. On this basis, the cumulative effects together with the proposed hydrogen plant development are not considered likely to be of greater significance such as to alter the overall conservation status of the features.

Table 6.1: Cumulative developments identified for inclusion within the ecology and biodiversity cumulative assessment

ID	Planning ref.	Description	Address
1	APP/2022/2022	Scheme comprises formation of battery energy storage system (BESS) (49.9 megawatts), construction of substation, welfare facility, security fencing, CCTV, floodlighting, formation of access, attenuation basin and associated infrastructure.	South Leylodge Farmhouse, Kintore, Inverurie, Grampian
2	APP/2023/2310 (prev. ENQ/2023/0382)	Installation of Battery Energy Storage System (BESS) with Installed Capacity of 49.9MW, Substation and Associated Infrastructure.	Kintore Substation Kintore, Kintore, Inverurie, Grampian
5	APP/2022/0651	Scheme comprises national for construction of enclosed 132kv gas insulated switchgear substation and associated infrastructure (formation of substation platform, fenced compound with cctv, siting of battery storage container, formation of access tracks, sustainable urban drainage system basin, temporary construction of compound and landscaping electricity substation comprising platform area, control building, battery storage container, associated plant and infrastructure, fencing, cctv, access tracks, sustainable urban drainage system basin and landscaping.	Land South-east Kintore Grid E, Kintore, Inverurie, Grampian
6	APP/2020/1437	Scheme comprises national for electricity substation comprising platform area, control building, associated plant and infrastructure, ancillary facilities, landscape works and road alterations and improvement works.	Land To The West Of Kintore El, Kintore, Inverurie, Grampian
10	APP/2022/2613	Scheme comprises construction of 4 holiday cabins, associated car parking and associated service buildings (amended layout to planning permission app/2021/1327).	Deystone, Kintore, Inverurie, Grampian

7 Conclusion and Summary

7.1 Construction and operational effects

7.1.1 The assessment of effects prior to mitigation has predicted potentially significant adverse effect at a site level during the construction phase for the foraging geese associated with the Loch of Skene Special Protection Area, terrestrial habitats, bats, badger, otter, reptiles, birds and fish. During the operational phase, potentially significant adverse effects at a site level have only been identified for otter, fish and invasive and non-native species (INNS).

7.1.2 Once the embedded and further mitigation has been taken into consideration, no significant effects on Important Ecological Features are predicted. Whilst there are some uncertainties or limitations in the assessments and/or mitigation proposed, it is anticipated that monitoring both during construction and through operation will allow for mitigation to be adapted as necessary. The mitigation recommendations identify monitoring responsibilities, including through an Ecological Clerk of Works role during construction, Species Protection Plans and protected species licensing from NatureScot where applicable, and the Controlled Activities Regulations and Pollution Prevention and Control permits from SEPA during operation.

7.1.3 The assessment of residual effects indicates that while there is a possibility of a small number of individual birds (geese), bats, otter, badger, reptiles and fish experiencing disturbance or being displaced from a small area of their habitat, but this is not considered likely to affect the favourable conservation status of populations in a local, national or international context.

7.2 Positive effects for biodiversity

7.2.1 The outline Biodiversity Enhancement and Management Plan (outline BEMP), based on the indicative biodiversity net gain (BNG) assessment, includes the creation of woodland, grassland, scrub, tree planting and removal of INNS from watercourses. It is considered that significant positive effects are achievable for the site based on principles of an indicative design. This is not stated as a residual effect in Table 5.1 and Table 7.1 as it depends on the details of the BEMP and level of BNG to be approved post-consent.

7.2.2 Following updates to the BEMP at the detailed design stage and subject to the successful implementation of the finalised BEMP, the biodiversity enhancements should provide benefits to the local biodiversity, creating habitats suitable for a variety of floral and faunal terrestrial and freshwater species. In addition, the creation and enhancement of habitats will improve connectivity throughout the site and landscape, which will benefit a range of species as well as restoring landscape quality. This would constitute a significant beneficial effect in the long term.

7.3 Cumulative effects summary

7.3.1 Although some developments have already been approved, there is not considered to be a significant effect anticipated for all the receptors considered in this chapter, with the magnitude of impacts considered to be low – negligible. The cumulative effects together with the proposed hydrogen plant development are not considered likely to be of greater significance such as to alter the overall conservation status of the features.

Table 7.1: Summary of potential environment effects, mitigation and monitoring

IEF	Nature	Description of impact	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional mitigation measures	Residual effect	Proposed monitoring
Construction phase								
Loch of Skene SPA (qualifying goose species foraging outside the SPA)	Habitat loss	Vegetation removal	Low	Negligible-low	Significant at site level	Phased removal of habitat	No significant effect at any geographic level	N/A
Loch of Skene SPA (qualifying goose species foraging outside the SPA)	Disturbance	Noise, vibration and lighting	Low	Negligible-low	Significant at site level	N/A	No significant effect at any geographic level	N/A
Terrestrial habitats: lowland mixed deciduous woodland, rivers (priority habitat), other rivers and streams, gorse scrub, mixed scrub and Holcus-Juncus neutral grassland	Habitat loss	Vegetation removal	Low-moderate	Low-high	Significant at site level	Compensatory habitats and habitat creation for biodiversity net gain via Biodiversity Enhancement and Management Plan	No significant effect at any geographic level	Monitoring of habitats created/ replaced
INNS	Spread of INNS	Vegetation removal	Low	Low	Significant at site level	INNS management plan	No significant effect at any geographic level	Monitoring for INNS during construction
Bats	Disturbance	Noise, vibration and lighting	Low	Low	Significant at site level	SPP for bats, sensitive lighting scheme, avoiding works which require lighting or high levels of vibration outside of daylight hours	Not significant at any geographic level	N/A
Bats	Roost opportunities lost	Vegetation removal	Low	Low	Significant at site level	Provision of bat boxes to provide additional roost features prior to removal of trees	Not significant at any geographic level	Monitoring of bat box uptake and use by bats during construction
Bats	Habitat loss	Vegetation removal	Low	Low	Significant at site level	Compensatory habitats and creation of biodiversity enhancement and management plan, installation of bat boxes	Not significant at any geographic level	Monitoring of habitats created/ replaced
Bats	Death or injury	Vegetation removal	Low	Low	Significant at site level	SPP for bats and pre-works checks prior to removal of trees with PRFs	Not significant at any geographic level	N/A
Badger	Disturbance	Removal of main sett and annexe sett	Low	Low	Significant at local level	SPP for badger, compensatory sett created six months prior to construction and baited to attract badger	Not significant at any geographic level	Monitoring of sett uptake and main and annexe setts to be removed six months prior to construction and continuing during construction period

IEF	Nature	Description of impact	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional mitigation measures	Residual effect	Proposed monitoring
Badger	Disturbance	High vibration works effecting remaining setts	Low	Low	Significant at local level	SPP for badger, minimum 30 m buffers to be implemented around retained badger setts, ECoW to oversee any high vibration works in proximity to buffer of badger setts.	Not significant at any geographic level	Monitoring of badger setts on sites during construction
Badger	Disturbance	Noise, vibration and lighting	Low	Low	Significant at local level	Sensitive lighting scheme, avoiding works which require lighting or high levels of vibration outside of daylight hours.	Not significant at any geographic level	N/A
Badger	Habitat loss	Vegetation removal	Low	Low	Significant at local level	Compensatory habitats and creation of biodiversity enhancement and management plan	Not significant at any geographic level	Monitoring of habitats created/ replaced
Badger	Death or injury	Vehicle movement	Low	Low	Significant at local level	15mph speed limit to be implemented	Not significant at any geographic level	N/A
Otter	Disturbance	Vegetation removal	Low	Low	Significant at site level	SPP for otter and pre-works checks	Not significant at any geographic level	Monitoring for otter in locale throughout construction phase
Otter	Death or injury	Vehicle movement	Low	Low	Significant at site level	Pre-works checks and speed limits of 15 mph	Not significant at any geographic level	Monitoring for otter in locale throughout construction phase
Otter	Death or injury	Pollution	Low	Low	Significant at site level	CEMP with adherence to SEPA GPPs	Not significant at any geographic level	ECoW to monitor compliance with CEMP during construction
Otter	Disturbance	Noise, vibration and lighting	Low	Low	Significant at site level	SPP for otter, sensitive lighting scheme, avoiding works which require lighting or high levels of vibration outside of daylight hours.	Not significant at any geographic level	Monitoring for otter in locale throughout construction phase
Reptiles	Habitat loss	Vegetation removal	Low	Low	Significant at site level	SPP for reptiles, compensatory habitats and creation of biodiversity enhancement and management plan	Not significant at any geographic level	Monitoring of habitat creation/ enhancement
Reptiles	Disturbance	Vegetation removal	Low	Low	Significant at site level	SPP for reptiles, strimming of vegetation, installation of fencing and relocation of reptiles, pre-works checks prior to works commencing.	Not significant at any geographic level	ECoW to monitor site for reptiles pre and during construction

IEF	Nature	Description of impact	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional mitigation measures	Residual effect	Proposed monitoring
Reptiles	Death or injury	Vehicle movement and vegetation removal	Low	Low	Significant at site level	SPP for reptiles, strimming of vegetation, installation of fencing and relocation of reptiles pre-works checks prior to works commencing. 15 mph speed limit.	Not significant at any geographic level	ECoW to monitor site for reptiles pre and during construction
Birds (nesting and geese)	Disturbance to roosting and foraging Barn Owl	Noise, vibration and lighting	Low	Low	Significant at site level	SPP for barn owl, update surveys, appropriate buffers, license applied for, pre-works checks and watching briefs prior to works commencing, sensitive lighting scheme, avoiding works which require lighting or high levels of vibration outside of daylight hours.	Not significant at any geographic level	ECoW to monitor barn owl roost pre and during construction
Birds (nesting and geese)	Disturbance to nesting birds	Noise, vibration and lighting	Low	Low	Significant at site level	Pre-works checks for nesting birds during nesting bird season	Not significant at any geographic level	ECoW to monitor for nesting birds during nesting bird season
Birds (nesting and geese)	Habitat loss	Vegetation removal	Low	Low	Significant at site level	Compensatory habitats and creation of biodiversity enhancement and management plan, installation of bird and owl boxes	Not significant at any geographic level	Monitoring of habitat creation/ enhancement and bird/owl box uptake
Birds (nesting and geese)	Death or injury	Vehicle movement	Low	Low	Significant at site level	15 mph speed limit to be implemented	Not significant at any geographic level	N/A
Fish	Death or injury	Pollution	Low	Low	Significant at site level	CEMP with adherence to SEPA GPPs	Not significant at any geographic level	ECoW to monitor compliance with CEMP during construction
Fish	Sedimentation	Construction of intake/ outflow	Low	Low	Significant at site level	CEMP with adherence to SEPA GPPs	Not significant at any geographic level	ECoW to monitor compliance with CEMP during construction
Fish	Habitat loss	Bankside vegetation removal	Low	Low	Significant at site level	Compensatory habitats and creation of biodiversity enhancement and management plan	Not significant at any geographic level	Monitoring of habitat creation/ enhancement
Fish	Death or injury	Underwater noise	Low	Low	Significant at site level	Soft-start techniques for machinery used in watercourses	Not significant at any geographic level	Monitoring for fish
Operational phase								
Loch of Skene SPA (qualifying goose species foraging outside the SPA)	Disturbance	Noise, vibration and lighting	Negligible	Negligible-low	Not significant at any geographic level	N/A	Not significant at any geographic level	N/A

IEF	Nature	Description of impact	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional mitigation measures	Residual effect	Proposed monitoring
Terrestrial habitats: lowland mixed deciduous woodland, rivers (priority habitat), other rivers and streams, gorse scrub, mixed scrub and Holcus-Juncus neutral grassland	Damage	Pollution	Negligible	Low-high	No significant at any geographic level	Adherence to PPC Permit in operation	Not significant at any geographic level	N/A
INNS	Damage	Spread of INNS through operation of intake/ outflow	Low	Low	Significant at site level	Implementing INNS management plan	Not significant at any geographic level	Monitoring for INNS
Bats	Disturbance	Noise and lighting	Negligible-low	Low	Significant at site level	Sensitive lighting scheme	Not significant at any geographic level	N/A
Badger	Disturbance	Lighting	Low	Low	Significant at local level	Sensitive lighting scheme	Not significant at any geographic level	N/A
Badger	Death or injury	Vehicle movement	Low	Low	Significant at local level	Speed limit of 15 mph	Not significant at any geographic level	N/A
Otter	Death or injury	Pollution	Negligible	Low	Not significant at any geographic level	Positive drainage system with oil interceptor	Not significant at any geographic level	Monitoring for pollution (water quality monitoring)
Otter	Reduced prey availability	Changes in water temperature and elevated mineral concentrations at outflow and sedimentation from change in flow characteristics	Low	Low	Significant at site level	Adhering to SEPA PPC Permit and CAR authorisation requirements; thermal plume modelling and control of discharge temperature as required	Not significant at any geographic level	Monitoring water quality and temperature
Otter	Disturbance	Human presence	Negligible	Low	Not significant at any geographic level	N/A	Not significant at any geographic level	N/A
Reptiles	Disturbance	Vehicle movement	Negligible-low	Low	Not significant at any geographic level	Speed limit of 15 mph	Not significant at any geographic level	N/A
Birds (nesting and geese)	Death or injury	Vehicle movement	Negligible-low	Low	Not significant at any geographic level	Speed limit of 15 mph	Not significant at any geographic level	N/A
Fish	Death or injury	Pollution	Negligible	Low	Not significant at any geographic level	Positive drainage system with oil interceptor	Not significant at any geographic level	Monitoring for pollution (water quality monitoring)

IEF	Nature	Description of impact	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional mitigation measures	Residual effect	Proposed monitoring
Fish	Death or injury	Changes in water temperature and elevated mineral concentrations at outflow and sedimentation from change in flow characteristics	Low	Low	Significant at site level	Adhering to SEPA PPC Permit and CAR authorisation requirements; thermal plume modelling and control of discharge temperature as required	Not significant at any geographic level	Monitoring water quality and temperature
Fish	Death or injury	Entrainment in intake / outflow point	Negligible	Low	Not significant at any geographic level	Self-cleaning debris screen installed on intake/ outflow pipe	Not significant at any geographic level	Monitoring intake/outfall screen condition

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