12. Ecology and Nature Conservation

12.1 Introduction

12.1.1 This chapter presents the results of the Design Manual for Roads and Bridges (DMRB) Stage 3 Ecological Impact Assessment for the Proposed Scheme and considers both terrestrial and aquatic ecological receptors, which includes designated sites, terrestrial and freshwater habitats and species.

12.1.2 This DMRB Stage 3 Assessment has been informed by desk study, field survey and the DMRB Stage 2 Assessment. Field surveys targeted those habitats and species that have the potential to be affected by the Proposed Scheme. The DMRB Stage 3 Assessment has been undertaken in accordance with the Interim Advice Note 130/10[i], DMRB Volume 11, Section 3, Part 4[ii] with consideration of Chartered Institute of Ecology and Environmental Management (CIEEM) guidance[iii].

12.1.3 This chapter summarises the detailed habitat and species assessments that are documented in ES Appendices 12.2-12.11. The Study Areas and methodology are outlined, followed by a summary of key findings of the desk study and field surveys and the associated nature conservation evaluation of each ecological receptor. The impact assessment is then summarised across the ecological receptors, highlighting key mitigation actions and the overall residual impact significance (Table 12.8).

Study Area

12.1.4 The Study Areas for desk study and field surveys have been determined in accordance with standard best practice and in consultation with Scottish Natural Heritage (SNH) and are based on site-specific approaches required for the scale of the Proposed Scheme, appropriate to each habitat and species.

12.1.5 The Proposed Scheme refers to the combined infrastructure and construction footprints where the latter is the land made available for construction.

12.1.6 The desk and field survey Study Areas are defined separately for each receptor, based on a distance from the Proposed Scheme. Desk Study Areas range from 1-10km for statutory and non-statutory designated sites and from 500m-5km for habitats and species. Field survey Study Areas range from 50m-250m from the Proposed Scheme.

12.1.7 The DMRB guidance indicates that consideration should be given to Special Areas of Conservation (SACs) where bats are the qualifying interest within 30km of the Scheme. There are no SACs designated for bats within Scotland and as such, impacts on bats are considered only within 2km of the Scheme (this distance is considered appropriate to assess the impacts of road widening on bats, although local ecological and hydrological connectivity has also been considered with respect to wider effects).

12.1.8 Desk and field survey Study Areas for each receptor are listed in Table 12.1 and shown on Figures 12.2 to 12.25.

12.2 Approach and Methods

Overview

12.2.1 The assessment has been undertaken in accordance with the following DMRB guidance:

- DMRB Volume 11, Section 3, Part 4: Ecology and Nature Conservation[ii]; and
- DMRB Interim Advice Note (IAN) 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment[i] (hereafter referenced as IAN 130/10).

12.2.2 In addition to DMRB guidance, other policy documents and guidance have been considered during the assessment, including:

- CIEEM Guidelines for Ecological Impact Assessment in the United Kingdom[iii]; and
- SNH handbook on Environmental Impact Assessment[iv].

12.2.3 Relevant legislation and policy considered as part of this assessment relating to nature conservation, protected species and designated sites is provided in ES Appendix 12.1. Further details on relevant national and local planning policy are provided in ES Chapter 19: Policies and Plans.

12.2.4 Air quality impacts affecting ecological receptors have been considered but ruled out; air quality modelling undertaken during the Stage 3 assessment indicated that there will be no significant impacts on habitats from any changes in NO_x levels associated with the Proposed Scheme (ES Chapter 16: Air Quality).

Baseline Data Collection

12.2.5 The desk study and field survey methodologies are detailed in:

- ES Appendix 12.2 – terrestrial habitats;
- ES Appendix 12.3 – aquatic receptors; and
- ES Appendices 12.4-12.11 – protected and other notable terrestrial species.

12.2.6 The ES Appendices explain the rationale for, and details of, the survey methodologies which are in accord with the approaches to surveys as agreed through the A9 Environmental Steering Group (ESG), which comprises the following stakeholders:

- SNH;
- The Highland Council;
- Cairngorm National Park Authority (CNPA); and
- Scottish Environment Protection Agency (SEPA).

Desk Study and Consultation

12.2.7 Baseline data relating to the Study Areas has been gathered from a range of sources through data requests, consultation and using online resources as outlined below.

12.2.8 The following online resources were accessed:

- SNH Site Link[v];
- SNH Ancient Woodland Inventory (AWI)[vi];
- Scotland's Environment website[vii];
- Joint Nature Conservation Committee (JNCC) website[viii];
- Forestry Commission Scotland Native Woodland Survey of Scotland[ix];
- SEPA River Basin Management Plans Interactive Map[x]; and
- Ordnance Survey (OS) maps and the Where's the Path website[xi].

12.2.9 The following organisations were contacted to request relevant desk study data, including details of non-statutory designated sites:

- British Trust for Ornithology (BTO);
- Bat Conservation Trust Scotland (BCT);
- CNPA;
- Fungal Records Database of Britain and Ireland (managed by the British Mycological Society);
- Forestry Commission Scotland (FCS);
- Highland Biological Recording Group Centre (HBRG);
- North East Scotland Biodiversity Records Centre (NESBReC);
- Raptor specialists from the Roy Dennis Foundation;
- Royal Society for the Protection of Birds (RSPB);
- Scottish Badgers;
- Scotland Transerv;
- Scottish Wildcat Association;
- Scottish Wildlife Trust (SWT);
- SEPA;
- SNH; and
- Spey Fishery Board.

12.2.10 In addition, a review of the North Scheme Preliminary Ecological Appraisal[xii] has been undertaken.

12.2.11 Additional consultation was also undertaken with relevant bodies or experts for specific features and/or survey and assessment methods, such the RSPB for bird surveys.

12.2.12 During the consultation, the CNPA provided details of locations where notable species are present that are not legally protected, or where suitable habitat for them may exist. These species are considered important to the Cairngorms National Park as they are scarce and the Cairngorms hold a significant proportion of the UK population. This list contains invertebrates, plants, fungi and lichens. Red areas have been defined where there are known records of priority species, for example aspen trees, or confirmed records of a CNPA[xiii] species. Amber locations have no confirmed records but an indication of habitat suitability has been provided by an expert in that particular group, for example grassland habitat which has the potential to provide habitat for waxcap fungi.

Field Surveys

12.2.13 This DMRB Stage 3 Assessment has been informed by a series of technical field surveys, including surveys of terrestrial habitats, aquatic receptors and protected and notable species.

12.2.14 A list of the field surveys and Study Areas, as agreed through the A9 Environmental Steering Group, are provided in Table 12.1 and the methodologies are briefly summarised below.

Terrestrial Habitats

12.2.15 The terrestrial habitat assessment (ES Appendix 12.2) included a National Vegetation Community (NVC) survey which identified equivalent units from the JNCC Phase 1 habitat types, Habitats Directive (92/43/EEC) Annex I habitats and Scottish Biodiversity List (SBL) priority habitats, as well as areas listed on the AWI and specialised habitats such as areas dominated by aspen and potential Groundwater Dependent Terrestrial Ecosystems (GWDTE).

12.2.16 Detailed site data was collected during these surveys which included extensive botanical species lists, information on habitat quality and character and qualitative information on impacts and pressures. For areas listed on the AWI, data was collected on ancient woodland characteristics such as abundance of mature and ancient trees, diversity of ground-flora, identification of ancient woodland indicator species, and notes on disturbance/degradation.

12.2.17 The detailed site data were used to inform the subsequent nature conservation evaluation. This approach allowed for the identification of important areas of habitat rather than assigning the habitat type a blanket nature conservation importance based solely on its designation (e.g. Annex I, SBL or ancient woodland).

Aquatic Habitats

12.2.18 Watercourses and waterbodies were identified from desk study and selected for detailed field survey following screening using criteria provided in full in ES Appendix 12.3 (e.g. size, permanence and modification for watercourses and habitat suitability for waterbodies). This ensured proportional survey effort by excluding e.g. ephemeral drains and (unsuitable) road drainage infrastructure from detailed aquatic ecology surveys. Detailed survey methods included, for rivers; River Habitat Survey (RHS[xiv]); a bespoke Fish Habitat Survey (FHS); aquatic macroinvertebrate survey; and freshwater pearl mussel survey. Waterbodies were surveyed using the National Pond Survey (NPS[xv]) method.

12.2.19 Field surveys were undertaken only in the absence of existing baseline data (or suitable proxies, for example SEPA biological monitoring points), ensuring that survey effort was proportionate to the requirement for ecological impact assessment.

12.2.20 Species level macroinvertebrate identification was undertaken to allow for the calculation of the Community Conservation Index (CCI)[xvi] which was used to inform the subsequent nature conservation evaluation.

Protected and other Notable Terrestrial Species

12.2.21 Field survey methods generally included a habitat suitability assessment across the Study Area followed by more detailed surveys of suitable habitat for evidence of species occupancy/activity.

12.2.22 In accordance with IAN 130/10i, deer and invasive non-native species (INNS) were scoped out from ecological evaluation due to their lack of conservation status and so are not discussed further in that context. INNS are discussed in the context of their potential risk to biodiversity and, under the Wildlife and Countryside Act 1981 (as amended), legal responsibilities to prevent their transfer.

Table 12.1: Desk Study Search Area and Field Surveys Conducted for the DMRB Stage 3 Assessment

Receptor	Desk Study Search Area[1]	Field Survey - Type	Field Survey - Dates	Field Survey - Study Area	ES Appendix
International designated sites	Modified 10km[2]	N/A	N/A	N/A	12.2, 12.6
National statutory designated sites	2km	N/A	N/A	N/A	12.2
Non-statutory designated sites	1km	N/A	N/A	N/A	12.2
Habitats (including ancient woodland)	1km	NVC survey	April and May 2017	Proposed Scheme + 250m	12.2
		Ancient woodland	April and May 2017	Proposed Scheme + 100m	
Aquatic habitats	2km	River and fish habitat surveys and aquatic macrophytes surveys	April and May 2017	Proposed Scheme + 150m up and downstream	12.3
		Aquatic macroinvertebrate surveys	April 2017		
		Waterbody National Pond Survey (NPS)	June 2017		
Fresh water pearl mussel	2km	Presence/likely absence surveys	April 2017 and April 2018	100m upstream and 500m downstream of Proposed Scheme design elements (watercourse crossings and outfalls)	12.3
Badger	1km	Detailed badger surveys	August 2015 and May 2017	Proposed Scheme + 150m	12.4
		Sand/camera trap surveys	July to September 2017		
Bats	2km	Habitat suitability assessment	October 2015	Proposed Scheme + 50m	12.5
		Detailed tree inspections	April to October 2017		
		Internal and external inspections of	May 2017		

[1] Distance from existing A9.
[2] This Study Area was modified to include Anagach Wood SPA, which is 4km outwith the 10km buffer, as it forms an important part of the habitat network for Capercaillie.

Receptor	Desk Study Search Area[1]	Field Survey - Type	Field Survey - Dates	Field Survey - Study Area	ES Appendix
		buildings/structures			
		Roost emergence and return surveys	May to September 2017		
		Crossing point surveys	May to September 2017		
		Static bat detector monitoring of rock faces	May to November 2017		
		Detailed rock face inspections	September to December 2017		
Birds	2km	Wintering bird surveys	December 2015 to March 2016	Combined Route Options at Stage 2 + 250m 2018 update surveys – selected areas of Proposed Scheme + 250m. These surveys focused on recording Target and Secondary species (see ES Appendix 12.6 for definition).	12.6
		Wetland Bird Surveys (WeBS)	September 2015 to March 2016.		
		Breeding bird surveys	April to July 2016 and March to July 2018		
		Capercaillie habitat suitability assessment	March 2017		
		Capercaillie presence/absence surveys	March to July 2017		
Great crested newt	1km	Habitat Suitability Index (HSI[xvii])	June 2015 and May 2017	Proposed Scheme + 250m	12.7
		eDNA analysis	April and May 2016 June 2017 (Pond 28)		
		Presence/likely absence	May and June 2017		
Reptiles	1km	Habitat suitability assessment	June 2017	Proposed Scheme + 200m or 100m from access tracks/SuDS	12.8
Pine marten	1km	Den and scat search	May and June 2017	Proposed Scheme + 100m	12.9
		Habitat suitability assessment	June 2017		
Red squirrel	1km	Detailed transect survey	May and June 2017	Proposed Scheme + 100m	12.9
		Habitat suitability assessment	June 2017		

Receptor	Desk Study Search Area[1]	Field Survey - Type	Field Survey - Dates	Field Survey - Study Area	ES Appendix
Wildcat	5km	Habitat suitability assessment	April – July 2016 and 2017	Proposed Scheme + 200m	12.9
Otter	1km	Detailed survey of watercourses	April to July 2017	Proposed Scheme + 100m (extending to 250m along watercourses)	12.10
Water vole	1km	Detailed survey of watercourses	April to July 2017	Proposed Scheme + 150m	12.10
Invertebrates	1km	Records made of wood ant nest locations during other surveys. No field survey for other invertebrates	April to July 2017 for wood ant nest locations. N/A for other species.	Proposed Scheme + 250m for wood ant nest locations. N/A for other species.	12.11
Fungi	1km	No field survey	N/A	N/A	12.11

Ecological Zone of Influence

12.2.23 The Ecological Zone of Influence (EZoI) of the Proposed Scheme has been determined for each ecological feature and described within the ES Appendices. The Study Areas underpinned by the EZoI are based on the potential impacts and effects of the Proposed Scheme, and are provided in Table 12.1.

Temporal Scope

12.2.24 Potential impacts on ecological features have been assessed in the context of how the predicted baseline conditions within the Study Area might change between the surveys and the start of construction.

12.2.25 Once construction is complete, the assessment has assumed that the operational phase of the development will be permanent.

Nature Conservation Evaluation

12.2.26 The general approach to defining the importance of ecological features follows that of CIEEM[iii]. The approach is also in line with advice given in DMRB Interim Advice Note 130/10 'Ecology and Nature Conservation: Criteria for Impact Assessment'[i].

12.2.27 Ecosystems, habitats and species within the EZoI are assigned levels of importance for nature conservation based on the criteria set out in Table 12.2.

12.2.28 The rarity, ability to resist or recover from environmental change, and uniqueness of an ecological feature, function/role within an ecosystem, and level of legal protection or designation afforded to a given ecological feature are all factors taken into account in determining its importance.

Table 12.2: Importance Criteria

Importance	Criteria
International	**Ecosystems and Habitats** Ecosystems or habitats essential for the maintenance of: • internationally designated areas or undesignated areas that meet the criteria for designation; and/or • viable populations of species of international conservation concern. **Species** Species whose presence contributes to: • the maintenance of qualifying habitats, communities and assemblages that occur within internationally designated sites or within undesignated areas that meet the criteria for such designation.
National	**Ecosystems and Habitats** Ecosystems or habitats essential for the maintenance of: • qualifying communities and assemblages that occur within nationally designated sites or within undesignated areas that meet the criteria for such designation; and/or • viable populations of species of national conservation concern. **Species** Species whose presence contributes to: • the maintenance of qualifying habitats, communities and assemblages that occur within nationally designated sites or within undesignated areas that meet the criteria for such designation; or

Importance	Criteria
	• the maintenance and restoration of biodiversity and ecosystems at a national level, as defined in the Scottish Biodiversity Strategy (SBS)[xviii].
Regional	**Ecosystems and Habitats** Ecosystems or habitats essential for the maintenance of: • communities and assemblages that occur within regionally important sites or localities listed as being of conservation importance in the Highland Biodiversity Action Plan (BAP) or Cairngorms Nature Action Plan (CNAP) (including Local Nature Reserves (LNR)) or within undesignated areas that meet the criteria for such designation; and/or • viable populations of species of regional conservation concern. **Species** Species whose presence contributes to: • the maintenance and restoration of biodiversity and ecosystems at a regional level, as defined in the Highland BAP or CNAP.
Authority Area	**Ecosystems and Habitats** Ecosystems or habitats essential for the maintenance of: • populations of species of conservation concern within the authority area. **Species** Species whose presence contributes to: • the maintenance and restoration of biodiversity and ecosystems within a relevant area such as Aviemore in the CNAP.
Local	**Ecosystems and Habitats** Ecosystems or habitats essential for the maintenance of: • populations of species of conservation concern within the local area (for example a Local Nature Reserve). **Species** Species whose presence contributes to: • the maintenance and restoration of biodiversity and ecosystems at a local level.
Less than Local	**Ecosystems and Habitats** • Ecosystems or habitats that do not meet the above criteria, i.e., supporting at least populations of species of conservation concern within the local area. **Species** • Features that are considered to be absent or do not meet any of the above criteria.

Impact Assessment

12.2.29 Impact significance was assessed taking into account the nature and magnitude of potential impacts (including duration, extent and reversibility) and their consequent impacts on important ecological features.

Impact Characterisation

12.2.30 For the purposes of this assessment, the impact descriptors in Table 12.3 are taken to summarise the overall characterisation of positive or negative impacts in accordance with CIEEM[iii], including:

- impact extent/scale (e.g. entire habitat loss, partial habitat loss or indication over specific area affected);

- direct or indirect impact (e.g. direct mortality of individuals from vehicle collisions, or indirect mortality of individuals from reduced prey resources due to pollution of watercourses);
- reversibility of impact (reversible or irreversible);
- frequency of impact (single event, recurring or constant);
- duration of impact (short-term, medium-term, long-term or permanent); and
- likelihood of occurrence (certain/near certain, probable, unlikely or extremely unlikely).

12.2.31 The character of impacts is defined using the criteria set out in Table 12.3 as High, Medium, Low or Negligible, following the above impact characterisation approach.

Table 12.3: Impact Magnitude and Character for Ecological Features

Impact Descriptor	Impact Characterisation
High	An impact resulting in a permanent effect on the distribution and/or abundance of a habitat, species assemblage/community or population, in such a way as to alter the integrity of the feature and its conservation status. If negative, this type of effect would reduce the integrity of the feature and its conservation status. If positive, it would result in an improvement to the conservation status of the feature.
Medium	An impact resulting in a long-term but reversible effect on the distribution and/or abundance of a habitat, species assemblage/community or population. If negative, this type of effect would have neutral long-term implications for the integrity of the feature or its conservation status. If positive, it would not alter the long-term conservation status of the feature.
Low	An impact resulting in a short-term reversible effect on the distribution and/or abundance of a habitat, species assemblage/community or population.
Negligible	No discernible impact on the distribution and/or abundance of a habitat, species assemblage/community or population.

Impact Significance

12.2.32 Each feature's importance and the potential impacts upon it have been determined through surveys and consultation, to provide a robust basis for making a professional decision on the appropriate focus of the impact assessment. The assessment is then focused on those impacts that result in potentially significant effects on important ecological features. For example, an area of amenity grassland would not meet the criteria for local ecological importance and would not progress through the assessment process, as the assessment only includes features of local importance or above. However, any impact on a Site of Special Scientific Interest (SSSI) would progress through the assessment process as these sites are designated as nationally important. Habitats, species and species groups that are considered to have a nature conservation value of less than local are not considered important ecological features[3] in the context of this assessment. Any impact on such a feature as a result of the Proposed Scheme is considered unlikely to have a significant effect on the conservation status of such habitats or species on a local, regional, national or international scale. Therefore, features assessed to be of less than local nature conservation value have been scoped out of the ecological impact assessment.

[3] An ecological feature is considered important based on many factors including its rarity, diversity, naturalness, context in the wider landscape, size and distribution as set out in A Nature Conservation Review (Ratcliffe, 1977).

12.2.33 CIEEMiii notes that impacts that are likely to be relevant in an assessment are those that are predicted to lead to significant effects (negative or positive) on important ecological features. Significant effects are those that undermine the conservation status[4] of important ecological features. Knowledge and assessment of construction methods and operational activities, together with the ecological knowledge of ecologists with experience of similar large-scale infrastructure projects, has been used to identify the potential impacts of the project on ecological features.

12.2.34 Following the above approach, the assessment aims to characterise ecological impacts rather than placing a reliance only on magnitude. The character of an impact is used to inform the determination of whether or not the impact on the feature in question is a significant one.

12.2.35 Where impacts on internationally, nationally or regionally important ecological features are characterised as 'Medium' or 'High', they are considered to be potentially significant in the context of the EIA Regulations[xix].

12.2.36 Impacts characterised as 'Low' on internationally important features, can be determined as potentially significant as can impacts characterised as 'High' on features of Authority Area importance. There may in addition be a number of impacts on a feature that, whilst not of a character to be significant in themselves, may cumulatively result in a significant effect on that feature.

12.2.37 Where significant impacts are identified, mitigation will be developed to reduce impacts where feasible and is taken into account in the assessment of residual effects.

Mitigation

12.2.38 The principles of the mitigation hierarchy[xx] have been applied when considering potential impacts and subsequent effects on ecological receptors within the EZoI. The principles of the mitigation hierarchy are that impacts on biodiversity should be subject to the following sequential mitigation actions:

- avoidance;
- mitigation;
- compensation; and
- enhancement.

12.2.39 For the purpose of this assessment, mitigation refers to measures that are considered essential to avoid and reduce negative impacts of the Proposed Scheme. Compensation refers to measures taken to make up for the loss of, or permanent damage to, biological resources through the provision of replacement areas. Unless otherwise stated, all compensatory measures are considered to be part of the essential mitigation package.

12.2.40 The mitigation measures described within this EcIA have been incorporated into the design and construction programme and taken into account in the assessment of residual effects. The mitigation aims to avoid or negate impacts on ecological features in accordance with best practice guidance and UK, Scottish and local government environmental impact, planning and sustainability policies. These mitigation measures include those required to achieve the minimum standard of established good practice together with additional measures to further reduce any negative impacts of the

[4] Conservation status for habitats 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 function as well as the long-term distribution and abundance of its population within a given geographical area. Conservation status for species is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its population within a given geographical area.

Scheme. The mitigation measures include those required to reduce or avoid the risk of committing legal offences.

12.2.41 Mitigation is also designed to produce a net gain for biodiversity where practicable in line with policy and guidelinesiii.

12.2.42 Mitigation measures set out in this ES will be specified as environmental commitments in the contract documents to ensure implementation by the appointed Contractor.

12.2.43 Impacts that are not significant (including those where compliance with regulation is required) would be expected to be avoided or reduced through the application of a Construction Environmental Management Plan (CEMP) and best working practice (e.g. mitigation of potential pollution impacts through adherence to standard best practice and guidelines). Significant ecological impacts are expected to be mitigated through a combination of best practice and typical, proven mitigation methods along with mitigation targeted to specific locations as described in the assessment.

Habitat Regulations Assessment

12.2.44 Habitats Regulation Assessment (HRA) is required by Regulation 48 of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the 1994 Habitats Regulations) for all plans and projects which may have likely significant effects on a European site and are not directly connected with or necessary for the management of the European site.

12.2.45 European sites include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). HRA is also required, as a matter of UK Government policy for potential SPAs (pSPAs), candidate SACs (cSACs) and listed Wetlands of International Importance (Ramsar sites) and proposed Ramsar sites (pRamsar) for the purposes of considering plans and projects, which may affect them. In Scotland, this is applied under National Planning Policy Guidance[xxi]. Hereafter all of the above designated nature conservation sites are referred to as ‘international sites’.

12.2.46 Habitats Regulations Assessment (HRA) has been carried out for 15[5] international sites (listed in Table 12.4) and documented in the HRA for the Proposed Scheme. Ten of these sites were carried forward to Appropriate Assessment (AA).

Limitations

12.2.47 Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. The ecological surveys undertaken to support this EIA have not therefore produced a complete list of plants and animals and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

12.2.48 The Proposed Scheme has undergone several (increasingly minor) design iterations alongside the development of the EIA. In most instances, existing survey information has been extrapolated based on desk study information (e.g. contemporary aerial photography) to inform the valuation and impact assessment. In a few instances (for example, otter), the Study Area has been extended to take account of these changes but has not necessarily been subject to detailed field survey. In these areas, the assessment of impacts and need for mitigation has been assessed on a precautionary basis, taking into account existing knowledge and professional judgement. Details are provided in each ES Appendix to which this is applicable.

[5] This is the number of individual designations ignoring overlapping areas.

12.2.49 Other specific limitations relating to the desk study and field surveys are referred to within ES Appendices 12.2 to 12.11.

12.3 Baseline Conditions

Statutory Designated Sites

12.3.1 Information on designated sites was collected as part of the desk study and as part of the terrestrial habitat (ES Appendix 12.2), aquatic (ES Appendix 12.3) and bird (ES Appendix 12.6) assessments. Information on the internationally designated sites is also collated in the HRA. The distribution of statutory sites within the Study Area is shown in Figure 12.1a and Figure 12.1b.

12.3.2 Table 12.4 includes a summary of designated sites situated within the Study Area, their distance and direction from the Proposed Scheme and their associated values and importance.

12.3.3 There are 15 individual internationally designated sites at 12 locations[6] within the 10km Study Area[7] that are evaluated as International importance. There are also eight nationally designated sites at seven locations within the 2km Study Area. These sites are evaluated as National importance at the three locations they do not coincide with an internationally designated site.

Aquatic Habitats

12.3.4 ES Appendix 12.3 provides full details of the survey results and evaluation of aquatic receptors across the Study Area. Figures 12.11 and 12.12 show the locations of the survey sites.

12.3.5 Table 12.4 includes a summary of the aquatic receptors and associated desk and field surveys.

12.3.6 A total of 28 watercourses were identified in the aquatic receptor Study Area from the desk study. These include 18 watercourses that are crossed by the Proposed Scheme and 10 that are within 150m of the Proposed Scheme, but are not crossed by it. Nine were subject to detailed survey following screening.

12.3.7 Survey identified no live or dead freshwater pearl mussels in any river subject to crossing or drainage discharge by the Proposed Scheme. In addition, fifty-six freshwater pearl mussel habitat suitability transects across the Study Area were assessed, with 27 classed as ‘unsuitable’, 10 ‘poor’, 13 ‘moderate’ and six ‘good’.

12.3.8 Therefore, direct impacts on freshwater pearl mussels within the Study Area have been scoped out of the assessment, although further consideration has been given to potential indirect impacts (e.g. barrier effects for host salmonid species) on the species within the wider EZoI in the impact assessment detailed in ES Appendix 12.3.

12.3.9 A total of 38 waterbodies were identified within the Study Area from the desk study, of which 14 were selected for detailed survey following screening.

12.3.10 Where aquatic receptors fall within statutory designated sites, their nature conservation evaluation is cognisant of whether they provide supporting habitat or function for the designated site features (Table 12.4). Watercourses and waterbodies outside of

[6] Several locations have overlapping designated sites
[7] The Study Area was expanded outwith the 10km buffer to include Anagach Wood SPA, as it forms an important part of the habitat network for Capercaillie, along with the other SPAs designated for the species within the 10km Study Area.

statutory designated sites that are within the Study Area and meet the criteria for inclusion in the assessment of the Proposed Scheme are considered to be at a minimum of Local importance, and up to National importance for nature conservation.

12.3.11 The valuation of watercourses and waterbodies within the Study Area is also cognisant of whether they meet Priority Habitat definitions for rivers[xxii] and ponds[xxiii] based on survey data.

12.3.12 All watercourses and waterbodies not meeting the criteria for inclusion in the assessment of the Proposed Scheme are assumed to be Less than Local importance.

12.3.13 The valuations applied to aquatic receptors consider the receptor importance in the context of both intrinsic habitat quality and the species it has been identified to support. Had specific notable species, or species protected under specific legislation been identified during the DMRB Stage 3 Assessment, these may have been considered important enough to value in their own right, i.e. separately from the receptor. For example, a viable population of freshwater pearl mussel could be accorded a higher valuation than the watercourse in which it is found. Based on the survey results there was no requirement for aquatic species/population valuation beyond that applied to the receptor with which they were associated.

Ancient Woodland

12.3.14 The results of the detailed assessment of ancient woodland including site survey and nature conservation evaluation of individual ancient woodland blocks are presented in ES Appendix 12.2. The distribution of areas included on the AWI across the Study Area is shown on Figure 12.2.

12.3.15 The nature conservation evaluation, using detailed site data collected during the field survey, classified each area of ancient woodland individually and is summarised in Table 12.4. The nature conservation value of individual areas of ancient woodland is incorporated into the habitat valuation map shown in Figure 12.8.

12.3.16 Thirty-two different areas listed on the AWI were identified within the Study Area. The nature conservation valuation of these areas ranged from Authority Area to National importance. During field survey the boundaries of the woodland listed on the AWI were often found to deviate from existing woodland boundaries and many areas may not be considered ancient woodland for a number of reasons; e.g. having over time been converted to grassland. However, these non-wooded sites may still possess a soil seed bank that could be re-used in mitigations areas.

Other Terrestrial Habitats

12.3.17 Survey results and nature conservation evaluation of terrestrial habitats is detailed in ES Appendix 12.2. Figure 12.3 and 12.4 show the distribution of Phase 1 habitat types and NVC communities across the Study Area.

12.3.18 Table 12.4 includes a summary of the nature conservation evaluation of non-designated terrestrial habitats from the Study Area. This includes areas of dry heath around Slochd which are valued of Authority Area importance and remaining areas of SBL and Annex 1 habitats as valued of Local importance.

12.3.19 The nature conservation value of individual areas of terrestrial habitat is presented in the habitat valuation map shown on Figure 12.8.

12.3.20 Woodland, including semi-natural broad-leaved woodland and coniferous plantation, accounts for approximately half the habitat recorded within the Study Area. Notable examples are located in the vicinity of Aviemore and Kinveachy.

12.3.21 Dry dwarf shrub heath, unimproved acid grassland, and neutral grassland also cover a substantial proportion of the Study Area, accounting for approximately a quarter of the habitat recorded. The majority of the bog habitat within the Study Area is modified and occurs just south of Slochd Summit, on the southern side of the existing A9.

12.3.22 Other notable habitats recorded within the Study Area, which are more limited in extent relative to the above habitats, include marsh/marshy grassland, wet dwarf shrub heath, unmodified blanket bog, and swamp.

12.3.23 Many of the NVC types equate to Annex 1 and SBL habitats. The distribution of Annex 1 and SBL habitats based on NVC across the Study Area is shown in Figure 12.5 and Figure 12.7 respectively.

Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

12.3.24 The habitat assessment, reported in ES Appendix 12.2, recorded a number of vegetation communities which may, depending on hydrogeological setting, be considered GWDTEs.

12.3.25 GWDTE sensitivity has been assigned solely on SEPA guidance[xxiv]. However, depending on a number of factors such as underlying geology, superficial geology, presence of peat and topography, many of the potential GWDTE communities recorded may in fact be only partially groundwater fed or not dependent on groundwater. The groundwater dependency of particular areas and/or habitats, is assessed in ES Chapter 10 Geology Soils and Groundwater.

12.3.26 The locations and extents of all identified potential GWDTE are provided on Figure 12.6.

12.3.27 A total of 486 locations were identified as being potentially groundwater dependent within the Study Area. Nineteen areas have been screened out of assessment where they are located more than 250m from the Proposed Scheme. Additionally, areas which are not hydrologically connected to the scheme, are predominantly fed by artificial drainage or where deep peat is present (151 areas), were also screened out from the assessment. A total of 316 locations were screened in for baseline review of groundwater dependency.

12.3.28 A qualitative baseline assessment of the groundwater dependency of each vegetation community is provided in ES Appendix 10.4 - Groundwater Assessment.

Protected and Other Notable Terrestrial Species

12.3.29 A summary of key desk and field study results and nature conservation evaluation of protected and notable terrestrial species, found to be present within the Study Area, is provided in Table 12.5. This table cross references relevant ES Appendices and Figures for further details.

12.3.30 Species or species groups that are legally protected and subject to survey, evaluation and assessment in the ES Appendices are:

- badger - the majority of the Study Area is evaluated as being of Local importance with the remainder being of Less than Local importance;
- bats - 20 roosts are evaluated as either of Authority Area or Local importance;

- birds – breeding; 75 species are evaluated as having populations of from Less than Local to National importance;
- birds – wintering; 51 species are evaluated as having populations of from Local to Authority Area importance;
- birds – capercaillie; the population is evaluated as being of International importance;
- great crested newt - seven ponds that are known or assumed to support this species are evaluated as being of Local importance. The remaining 43 ponds in the great crested newt Study Area are evaluated as being of Less than Local importance;
- reptiles - suitable areas are evaluated as ranging from Less than Local to Authority Area importance based on habitat suitability;
- red squirrel - suitable areas are evaluated as ranging from Local to Regional importance based on habitat suitability;
- pine marten - suitable areas are evaluated as ranging from Less than Local to Authority Area importance based on habitat suitability;
- wildcat - suitable areas are evaluated as ranging from Regional to National importance based on habitat suitability;
- otter - 43 watercourses and 22 waterbodies are evaluated as ranging from Local to International importance;
- water vole - five watercourses and one pond are evaluated as being of Local importance and the remaining areas as being of Less than Local importance;
- invertebrates - sites that support CNPA priority species are evaluated as ranging from Local to Authority Area importance; and
- fungi - sites that support CNPA priority species are evaluated as ranging from Local to Authority Area importance.

12.3.31 Other notable species also assessed include brown and mountain hare and hedgehog (ES Appendix 12.9). Areas of habitat suitable for these species are evaluated as Local importance.

Table 12.4: Summary of Baseline Assessment and Evaluation of Designated Sites and Habitats Within the Study Area

Feature	Summary of Baseline Assessment	Rationale for Valuation	Valuation
Designated sites			
Abernethy Forest SPA, SSSI, RSPB Reserve, located 3.83km to the east of Proposed Scheme	SPA qualifying features: breeding populations of capercaillie and Scottish crossbill. The SSSI is notified for its native pinewood, basin fen, raised bog, subalpine dry heath and its vascular plant assemblage. It is also notified for its assemblages of fungi, lichen, invertebrates, beetles, dragonflies and birds, particularly capercaillie, Scottish crossbill, crested tit, and osprey.	Valuation of designated sites is derived from designation.	International
Anagach Wood SPA[8] , located 14.02km to the east of Proposed Scheme	SPA qualifying feature: breeding populations of capercaillie.	Valuation of designated sites is derived from designation.	International
Cairngorms SAC and SPA, located 999m to the southeast of Proposed Scheme	A range of Annex I habitats are listed as the primary reason, or qualifying feature, for selection of this site including European dry heaths, blanket bogs, juniper formations and Caledonian forest. Annex II species listed as the primary reason, or qualifying feature, for selection of this site include otter, breeding capercaillie, dotterel, golden eagle, merlin, osprey, peregrine and Scottish crossbill.	Valuation of designated sites is derived from designation.	International
Cairngorms Massif SPA, located 4.71km to the south of Proposed Scheme	SPA qualifying feature: breeding populations of golden eagle.	Valuation of designated sites is derived from designation.	International
Carn nan Tri-tighearnan SAC and SSSI, located 8.1km to the north of Proposed Scheme	SAC qualifying feature: blanket bog. The SSSI is notified for blanket bog and sub-alpine dry heath.	Valuation of designated sites is derived from designation.	International
Craigmore Woods SPA, located 9.95km to the east of Proposed Scheme	SPA qualifying feature: breeding populations of capercaillie.	Valuation of designated sites is derived from designation.	International
Insh Marshes SAC, located 2.11km to the south of Proposed Scheme	Several Annex I habitats are listed as the primary reason and qualifying feature for selection of this site including transition mires and quaking bogs. Annex I habitat present as a qualifying feature, but not a primary reason for selection of this site: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) The otter is listed as an Annex II species that is a primary reason for selection of this site. The site overlaps with River Spey – Insh Marshes SPA.	Valuation of designated sites is derived from designation.	International
Kinveachy Forest SAC, SPA and SSSI, located 444m to the west of Proposed Scheme	SAC qualifying features: Annex I habitat that is a primary reason for selection of this site: Caledonian forest. Annex I habitat present as a qualifying feature, but not a primary reason for selection of this site: bog woodland SPA qualifying features: capercaillie and breeding Scottish crossbill. The SSSI notified natural features include breeding bird assemblage and native pinewood.	Valuation of designated sites is derived from designation.	International
Loch Vaa SPA and SSSI, located 55m to the east of Proposed Scheme	SPA qualifying species: Slavonian grebe. The SSSI is notified for goldeneye, Slavonian grebe and beetles.	Valuation of designated sites is derived from designation.	International
River Spey SAC and SSSI, Proposed Scheme crosses SAC at three locations which are tributaries of the SSSI.	SAC qualifying features: freshwater pearl mussel, sea lamprey, Atlantic salmon and otter.	Valuation of designated sites is derived from designation.	International
River Spey – Insh Marshes SPA and Ramsar site, located 2.11km to the south of	SPA qualifying features: osprey, spotted crake, and wood sandpiper during the breeding season and hen harrier and whooper swan over winter. The features associated with the Ramsar designation are its breeding bird assemblage and non-	Valuation of designated sites is derived from designation.	International

[8] The Study Area was expanded outwith the 10km buffer to include this site, as it forms an important part of the habitat network for Capercaillie, along with the other SPAs designated for the species within the Study Area.

Feature	Summary of Baseline Assessment	Rationale for Valuation	Valuation
Proposed Scheme	breeding whooper swans. The site is also notified for its flood plain fen, mesotrophic loch and its river.		
Slochd SAC, located 141m to the north of Proposed Scheme	SAC qualifying feature: European dry heath.	Valuation of designated sites is derived from designation.	International
Alvie SSSI, within the Proposed Scheme	SSSI notified for its upland oak woodland, hydromorphological mire range, invertebrate assemblage and breeding goldeneye	Valuation of designated sites is derived from designation.	National
Craigellachie SSSI and National Nature Reserve, within the Proposed Scheme	SSSI notified for its upland birch woodland and moth assemblage.	Valuation of designated sites is derived from designation.	National
North Rothiemurchus Pinewood SSSI, located 999m to the south-east of Proposed Scheme	SSSI notified for its native pinewood, breeding bird assemblage, capercaillie, crested tit, osprey, Scottish crossbill, fungi assemblage, lichen assemblage, invertebrate assemblage and vascular plant assemblage.	Valuation of designated sites is derived from designation.	National
Aquatic habitats			
Allt nan Ceatharnach, River Dulnain, and Allt na Criche (Lynwilg) and Pond 21 complex (part of Loch Vaa SPA)	Three watercourses within the Study Area form part of the River Spey SAC: Allt nan Ceatharnach, the River Dulnain, and Allt na Criche (at Lynwilg). These watercourses provide a range of habitats important in supporting SAC qualifying species. They also support species-rich macroinvertebrate communities indicative of high quality aquatic habitat. The Pond 21 complex (forming part of Loch Vaa SPA) is important in supporting the SPA qualifying species (Slavonian grebe *Podiceps auritus*) and supports over 50 aquatic macroinvertebrate taxa. During field survey the following SBL species were recorded across these receptors: • southern iron blue mayfly (*Nigrobaetis niger*) within Allt nan Ceatharnach; • northern damselfly (*Coenagrion hastulatum*) (Endangered[9]) within Pond 21 complex. CNPA also provided a record of the species at this location; and • water beetle (*Hydrochus brevis*) (Near Threatened[10]) within Pond 21 complex. Fish data received from the Spey Foundation confirmed the following records: • Allt nan Ceatharnach - Atlantic salmon (*Salmo salar*) fry and parr, trout (*Salmo trutta*) fry and parr, European eel (*Anguilla anguilla*); • River Dulnain - Atlantic salmon fry and parr; • Aviemore Burn - Atlantic salmon fry and parr, trout fry and parr, European eel; and • Allt na Criche (Lynwilg) - trout fry and parr.	These watercourses are designated as part of the River Spey SAC and provide a range of habitats that are important in supporting the SAC qualifying species. The watercourses also support species-rich macroinvertebrate communities indicative of high quality habitat. Three ponds (21a, 21b and 21c) are also evaluated as International importance on the basis that they are components of Loch Vaa SPA.	International
Caochan Ruadh, Allt Chriochaidh, Allt an Fhearna	The Caochan Ruadh, Allt Chriochaidh and Allt an Fhearna fall within the Alvie SSSI. Field survey recorded variable fish habitat throughout these watercourses, with higher quality fish habitat recorded within Allt an Fhearna, including areas of salmonid spawning habitat. All are considered likely to support resident populations of brown trout and fish species such as common minnow (*Phoxinus phoxinus*), European eel, lamprey species, and potentially migratory salmonids. The watercourses also provide a range of aquatic habitats that support species-rich macroinvertebrate communities indicative of high quality habitat conditions.	The Caochan Ruadh, Allt Chriochaidh and Allt an Fhearna fall within the Alvie SSSI, serving an important function in terms of flow and sediment delivery to the wetland features for which Alvie SSSI is designated.	National
Seven ponds (Ponds 8, 18, 19, 30, 31, 37, 44)	Each of these ponds have moderate to good water quality and a macroinvertebrate assemblage assessed as 'Moderate' to 'Very High' conservation value under the CCI scoring system. All are either confirmed as supporting, or considered likely to support, the SBL species northern damselfly. Uncertainty exists due to the early larval development stage of specimens recorded at survey and a precautionary approach to evaluation has therefore been adopted. A confirmed record of northern damselfly was provided by CNPA for Pond 30.	Seven ponds (8, 18, 19, 30, 31, 37, 44) included each recorded 'Moderate' to 'Very High' conservation value and qualify as SBL Priority Habitat on the basis that they are assumed (or have been confirmed) to support the SBL species northern damselfly.	National
Bogbain Burn and Aviemore	The Bogbain Burn and Aviemore Burn provide a range of habitats that are important in	The Bogbain Burn and Aviemore Burn provide a range of habitats that are important in	Regional

[9] Endangered under Red listing based on 2001 IUCN guidelines.
[10] Near Threatened under Red listing based on 2001 IUCN guidelines

Feature	Summary of Baseline Assessment	Rationale for Valuation	Valuation
Burn watercourses	supporting fish assemblages, and wider ecological communities. They also support species-rich macroinvertebrate communities indicative of high quality habitat, and 'Fairly High' conservation value under the CCI scoring system. As well as having intrinsic conservation value, both serve important functions in terms of flow and sediment delivery to the River Spey SAC.	supporting fish assemblages and wider ecological communities. The watercourses also support a species-rich macroinvertebrate community indicative of high quality habitat and 'Fairly High' conservation value.	
Pond 14, 28 and 43	Pond 14 has a macroinvertebrate assemblage assessed as 'High' conservation value under the CCI scoring system and potentially including a Nationally Scarce[11] water boatman (*Sigara striata*) and water beetle (*Hydraena rufipes*). Pond 28 has good water quality and a macroinvertebrate assemblage assessed as 'Moderate' conservation value under the CCI scoring system and including the Nationally Scarce water boatman (*Arctocorisa carinata*). Although Pond 43 (Loch Puladdern) recorded a 'Low' conservation value it sits within Craigellachie SSSI. The SSSI is notified for upland birch woodland and its moth assemblage, rather than open water habitat, meaning the loch is not considered to be of National importance by virtue of occurring within the SSSI. It does however have good water quality, a relatively species-rich macrophyte community, and potentially supports the Nationally Scarce water boatman (*Sigara striata*).	Ponds 14 and 28 support macroinvertebrate communities assessed as 'Moderate' to 'High' conservation value under the CCI scoring system and including Nationally Scarce species. Pond 43 (Loch Puladdern) was assessed as 'Low' under CCI; however being set within Craigellachie SSSI (though not supporting species for which it is notified) and on the basis of its ecological, has been assessed as Authority importance.	Authority Area
Allt Cnapach watercourse and Pond 16	Allt Cnapach is a headwater as defined under SBL Priority Habitat definitions. However, it has been 'significantly altered from its natural state', as evidenced by the River Habitat Survey and is therefore not considered to be Priority Habitat under the definition. Field survey recorded a highly species-rich macroinvertebrate assemblage with 62 taxa recorded over two sample points and included the Regionally Notable[12] stonefly (*Protonemura meyeri*). Poor quality fish habitat was recorded throughout due to high gradients recorded and cascade type habitat. Pond 16 is permanent with good water quality and a macroinvertebrate assemblage assessed as 'Moderate' conservation value under the CCI scoring system. The macrophyte community is species-poor.	Allt Cnapach is unlikely to provide an important habitat resource for fish, but provides dynamic cascade stream habitat and supports a species-rich macroinvertebrate community indicative of high quality habitat, and 'Fairly High' conservation value under the CCI scoring system, including the Regionally Notable stonefly (*Protonemura meyeri*). Pond 16 is important for the maintenance of biodiversity at a Local level.	Local
Ancient woodland			
Fifteen locations covering about 33% of the total ancient woodland area on the Proposed Scheme	The majority of these areas support semi-natural mature/ancient trees, no or little plantation woodland, a well-developed, usually relatively diverse ground flora and with multiple ancient woodland indicator species. Generally extensive in area, with good connectivity to other areas within the wider ancient woodland inventory.	Several ancient woodland characteristics.	National
Three locations covering about 1% of the total ancient woodland area on the Proposed Scheme	Some semi-natural woodland with mature or ancient trees and a well-developed ground flora, but much of the area does not contain woodland with these features, i.e. much of the ancient woodland is plantation with a generally poorer ground flora and fewer ancient woodland indicator species; or small fragmented and isolated patches of better quality woodland.	Intermediate number of ancient woodland characteristics between, or a mosaic of, National and Authority Area importance levels.	Regional
Ten locations covering about 66% of the ancient woodland area on the Proposed Scheme	Predominately plantation or immature semi-natural woodland with trees that are not of a notable age (i.e. younger plantation lacking mature or veteran trees) and a generally more impoverished ground flora with few or no ancient woodland indicator species.	Few or no ancient woodland characteristics.	Authority Area
Other Terrestrial Habitats			
Dry heath zone by Slochd (end of Study Area to *c*. Ch21750)	This is a substantial area to the east of the A9 at the northern end of the scheme around Slochd. Dry heath here is extensive, good quality, and is part of a much larger unit of European dry heath.	Given the size of this area and its connectivity to the Cairngorms National Park and Slochd SAC it has been assigned as Authority Area importance. It has not been classed of any higher importance due the fact that the extent within the Study Area still represents a small percentage area of this type of habitat locally, regionally, and nationally.	Authority Area
Blanket bog/heath zone (*c*. Ch19300 - Ch21000)	This is an area of blanket bog and dwarf shrub heath which equates to communities listed as Annex I and SBL priority habitat.	This area of habitat has been assigned Local importance. This is a sizable and contiguous area of this habitat.	Local
All other Annex I habitat areas	Includes European dry heath, juniper scrub, Caledonian forest, blanket bog, transition mires and quaking bogs, Northern Atlantic wet heath, species-rich *Nardus* grassland and alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior.*	All other areas of Annex I habitat have been assessed as of no greater than Local importance due to their extent, distribution, fragmentation, widespread nature and in some cases, quality.	Local
SBL - woodlands	This includes wet woodland, upland birchwoods and upland oakwoods, and aspen dominated woodlands. The quality of these woodlands varies from young scrubby stands to more mature stands that are similar to some of the *Betula* dominated ancient woodland areas described above, and to	Given the relative abundance of these types of woodlands locally and regionally, and thus the relatively small proportion which sits within the Proposed Scheme and Study Area, and in the absence of any designation or overlap with the AWI, these areas are assigned Local importance.	Local

[11] Nationally Scarce in Great Britain and estimated to occur within the range of 16 to 100 10km squares of the National Grid.
[12] Species thought to occur in fewer than five localities (regions) across Great Britain

Feature	Summary of Baseline Assessment	Rationale for Valuation	Valuation
	some areas which are ecologically connected. Stands of these woodland types that are not covered by any designated site, are not part of the AWI, or are not already covered by an Annex I classifications, have been classed as Local importance.		
SBL – other flushes, fens and swamps.	Including upland flushes, fens and swamps; lowland fens; and reedbeds, which are not covered by Annex I classifications.	Within these SBL types, given their widespread and common distribution, extent, and quality within the Study Area, none are deemed to be of more than Local importance (assigned Local importance due to intrinsic value of being a SBL habitat type).	Local
All other habitat types not covered by the above.	This encompasses common habitats and features of negligible ecological importance, or low nature conservation importance and includes improved, acid or neutral grasslands, marshy *Juncus* spp. mires, dense or scattered scrub, fern dominated vegetation, tall herb and weedy vegetation, bare ground, soil, rock, shingle, roads, bare peat, buildings and gardens.	The parts of the Study Area that have not been identified as of Local or greater nature conservation importance through the process above are all considered to be of Less than Local importance. This encompasses common habitats and features of negligible ecological importance, or low nature conservation importance.	Less than Local

Table 12.5: Protected and Notable Terrestrial Species; Key Desk Study and Field Survey Results and Valuation

Species or Species Group	Key Desk Study[13] and Field Survey Results (Study Area)	Rationale for Valuation	Valuation[14]	Relevant ES Appendix and Figures
Badger	**Desk study** Forty-four road traffic accident records of badger dating from 2007 for the Study Area were received. In addition, thirteen sett records were received, although all are located outside the Study Area. **Field survey** Badger activity evidence was largely confined to areas south of Slochd Mor where there is generally good connectivity to extensive areas of woodland, grassland and farmland. No evidence of badger was recorded north of Black Mount. The field survey identified 6 badger setts within the Study Area including: • one main sett; • three outlier setts; and • two disused setts. In addition, one main, one outlier and two annex setts were identified in areas outwith but potentially ecologically connected to the Study Area.	Areas within the Study Area from Dalraddy to Black Mount were assessed to generally provide suitable habitat for badgers and evidence of the species was found during the field surveys.	Local	ES Appendix 12.4 Figure 12.13 – survey results (confidential figure)
Bats	**Desk study** A single record of a pipistrelle bat species from 2008 was provided by HBRG. Only a four-digit grid reference was detailed so an accurate location of this record is not known. All other desk study records received were judged too old (over ten years) to provide any indication of the current bat population in the vicinity of the Proposed Scheme. Trees, buildings, structures and culverts were identified during the 2014 Phase 1 habitat survey as having bat roost potential, further detailed surveys were undertaken through 2015-2018. **Field survey** The Habitat Suitability Assessment identified features and habitat with the potential to support across the Study Area foraging, commuting and roosting bats. The main species recorded during detailed surveys included brown long-eared bat (*Plecotus auritus*), common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*). A total of 25 bat roosts were identified across the Study Area within buildings, trees and rock faces. **Structures** Six bridges, three culverts and two underpasses were subject to subject to emergence/re-entry or targeted endoscope surveys.	Maternity roosts (within two buildings, ST01, ST09), based on their significance for bat populations in the local area.	Authority Area	ES Appendix 12.5 Figure 12.14 - bat survey points and transects and bat crossing points
		The presence of a Natterers bat (*Myotis nattereri*) roost (RF10) represents a roost in an area towards the northernmost range of the species. The rock face is a prominent feature of the area with similar rock face roosting opportunities, both rock face profile and extent, limited in the wider area.	Authority Area	
		Eleven roosts (ST03, ST05, ST08, ST11, ST12 (four roosts within MacDonald Hotel affiliated buildings) ST21, ST23 and ST25) are assessed as individual, non-breeding roosts of common bat species, unlikely to support hibernating, maternity or breeding roosts. In addition, non-breeding roosts were also identified within ST01 and ST09.	Local	
		Roosts identified at three rock faces (RF01, RF04, RF15) are assessed to support low numbers of	Local	

[13] Only records from the last 10 years are listed, with the exception of badger.
[14] Species or groups that are valued as Less than Local importance not included

Species or Species Group	Key Desk Study[13] and Field Survey Results (Study Area)	Rationale for Valuation	Valuation[14]	Relevant ES Appendix and Figures
	No roosts were recorded in any structure.	common bat species.		
	Buildings A total of 21 buildings were surveyed with confirmed non-breeding roosts recorded within 13 buildings (ST01, ST03, ST05, ST08, ST09, ST11, ST12 (four buildings), ST21, ST23 and ST25). Two maternity roosts were also identified, located at Avielochan (ST09) (common pipistrelle roost), and Lynwilg Farmhouse (ST01) (brown long-eared bat roost).	Three tree roosts (TR75, TR78, TR95) are assessed as transient summer roosts and not considered to be viable hibernating, maternity or breeding roosts.	Local	
		The mosaic of habitats at proposed Granish and Aviemore Junctions includes woodland edge habitat suitable for foraging and commuting bats.	Local	
	Rock faces Thirteen rock faces were initially surveyed from the ground with a subsequent more detailed rope, ladder or endoscope inspection of the ten that were assessed as having potential for roosts. RF10, located at the northern end of the Proposed Scheme, presented with numerous features with potential to support roosting bats. A single roost was confirmed during aerial surveys with subsequent DNA analysis of a dropping, recovered from a cave in the central region of the rock face, indicating roosting by a Natterer's bat. Bat roosts were also identified at three other rock faces RF01, RF04, and RF15. These rock faces all presented with fissures, apertures and features suitable for roosting bats. Roosts were identified through the presence of bats during the survey or from DNA analysis of recovered droppings. Roosts were assessed as non-breeding transitional roosts; however, at RF01 the roosts were assessed as hibernation roosts owing to the presence of three common pipistrelle bats during surveys over two consecutive months outwith the standard bat activity season.	The crossing point near Aviemore South Junction (CP02) returned the highest numbers of bat crossings of the A9 over consecutive years. It is considered likely there is a roost in the wider area (although not discovered as part of the suite of surveys completed in relation to the Proposed Scheme). While the number of bats crossing is more compared to other crossing points surveyed, the peak of 51 bats during a single survey was not consistent over surveys undertaken here. The majority of crossings were by common pipistrelle bats.	Local	
	Tree surveys A total of 175 trees were assessed for bat suitability by ground inspection, with 90 trees with highest bat potential subject to more detailed ground, aerial or emergence/re-entry survey. Confirmed roosts were identified in three trees, TR71, TR95 and TR678, with a single *Myotis* sp., pipistrelle sp. or unidentified species recorded respectively.			
	Crossing points Twenty-four crossing point locations identified as having moderate to high suitability for bats to cross either over or under the existing A9, were subject to monthly surveys during the 2016 season. An additional 3 sites were surveyed as control points. The reduced crossing activity found at the control points compared to non-control crossing point locations, suggests that bats are targeting locations with suitable features and habitat either side of the road as crossing locations. Only six crossing point survey locations recorded numbers greater than five bats crossing per survey with peak bat numbers per night at each location ranging from 12-51. Crossing point CP02 recorded the highest number of bats crossing the A9 with a peak of 51 bat crossings in a single survey, with further notable peaks recorded during a dusk survey in May 2016 (28 passes); a dawn survey in July 2016 (37 passes); a dawn survey in May 2017 (21 passes) and a dusk in June 2017(48 passes). Crossing points CP03, 06 and 08 were moderately more active than the majority of crossing locations, registering between 12-32 crossings during a single survey.			
	Transects Land in proximity to three proposed junction locations at Aviemore, Granish and Black Mount were subject to six monthly or bi-monthly transect surveys across the three areas between May and September 2017. The following activity levels were recorded (maximum peak counts recorded): • Aviemore Junction – foraging and community bats (possibly roosting nearby) with generally 7-33 passes per transect per survey. • Granish Junction - foraging and commuting bats (possibly roosting nearby) with peaks of 8 and 13 passes recorded on the north and southbound transects respectively. • Black Mount Junction - foraging and commuting bats generally low numbers of bats were recorded with a peak of five passes in July. Unlikely to be roosts in the immediate vicinity due to low number recorded.			
Birds - Breeding	**Desk study** Thirteen records of notable bird species were received, including black grouse, capercaillie (see below), red kite and peregrine.	Three species were valued as National importance. Osprey (a migrant species) has its UK breeding	National	ES Appendix 12.6

Species or Species Group	Key Desk Study[13] and Field Survey Results (Study Area)	Rationale for Valuation	Valuation[14]	Relevant ES Appendix and Figures
	Two osprey nesting sites were identified through consultation with RSPB, located 460m and 990m from the Proposed Scheme. SNH identified Slochd Summit as a location where ring ouzel are regularly seen between April and May. **Field survey** A total of 70 species of bird were recorded in the 2016 surveys during the breeding season (April to July). Crossbill (unidentified species) are the only species recorded listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). One active osprey nest (located 460m from the Proposed Scheme) was recorded during the 2016 breeding season. A total of 60 species of bird were recorded in the 2018 surveys. Of this 35 were Target Species and 25 were Secondary Species. Taking the 2016 and 2018 surveys in combination, 20 of the species recorded are SBL species, 18 species are Birds of Conservation Concern (BoCC) Red listed, 19 species BoCC Amber listed, and three listed as Schedule 1 species.	stronghold in the Cairngorms and the nearby Abernethy Forest is one of the key breeding sites for this raptor species. Several statutory sites of national importance near the Study Area are designated for osprey. Osprey are known to forage in waterbodies within and adjacent to the Study Area. Redwing has its very small UK breeding population almost exclusively in the Scottish Highlands. Redwing is a SBL species and BoCC Red listed. Crossbill species. It is considered likely that crossbill species recorded in 2018 were either Scottish or parrot crossbill. Scottish crossbill is endemic to the region and parrot crossbill has its only regular breeding areas in the UK in the Scottish Highlands. Crossbills are SBL species, BoCC amber listed and protected under Schedule 1 of the Wildlife and Countryside Act (1981, as amended).		Figure 12.21 – desk study records Figure 12.15a – survey results
		Three breeding species, lapwing, curlew and ring ouzel, are SBL species and listed on the Highland BAP[xxv]/CNAP[xxvi].	Regional	
		Sixteen breeding species are SBL species and/or listed on the Highland BAP/CNAP. They represent breeding birds which remain fairly common in suitable habitat throughout the UK.	Authority Area	
		Forty-nine species of breeding birds recorded are common and widespread UK breeding bird species. This list includes those resident birds which remain in the area throughout winter, but also common migrants which are not listed on the SBL, Highland BAP or CNAP. Although many of the residents are primarily associated with man-made habitats these migrants mainly use woodland and scrub, both within areas of development and more natural habitats beyond. They represent species which are more generalist in their habitat requirements and which are not considered to be under particular threat and are found in many different parts of the UK during the breeding season.	Local	
Birds - Wintering	**Desk study** No desk study data specific to wintering birds was available. **Field survey** Fifty-one species of bird were recorded during the wintering bird surveys. This includes 23 important bird species, including 10 which are listed on the SBL (some of these are also listed as Red or Amber Birds on Conservation Concern (BoCC)) and 13 listed only as Red or Amber BoCC. Wetland Bird Survey (WeBS) counts on Loch Alvie and Loch Vaa were conducted monthly between September 2015 and March 2016. 13 species were identified using Loch Alvie. Three of these species are listed on the SBL: lapwing (BoCC Red listed); dunlin and whooper swan (both BoCC Amber listed). 10 species were identified using Loch Vaa. None of these species are SBL listed, with five BoCC Amber listed and one BoCC Red listed.	Thirteen wintering species are SBL species and/or listed on the Highland BAP/CNAP. However, few of these species are found in the area throughout winter, and many use the area on migration to shelter or feed, or vacate the area during the coldest months; waders such as lapwing and oystercatcher fall into this category, as well as finches and waterfowl.	Authority Area	ES Appendix 12.6 Figure 12.15b – survey results
		Twenty-eight wintering species are common and widespread UK species with no listing on the SBL, Highland BAP or CNAP. They can be found in most parts of the UK, and many benefit from the human influence on the landscape, including	Local	

Species or Species Group	Key Desk Study[13] and Field Survey Results (Study Area)	Rationale for Valuation	Valuation[14]	Relevant ES Appendix and Figures
		farming and residential development; many are typical garden birds and/or birds that thrive in modified habitats such as plantation woodland. Many are found in the Cairngorms throughout winter, but some vacate the area during the coldest months.		
Birds - Capercaillie	**Desk study** A total of 679 records of capercaillie were received within the 1km of the Proposed Scheme, including known lek sites. RSPB and SNH provided details of the locations and distribution of woodland that could support capercaillie within 1km of the Proposed Scheme. The closest lekking site identified is ~530m away to the east of the Proposed Scheme. **Field survey** The Habitat Suitability Assessment of the Study Area mapped 172ha as potential brood habitat, 157ha as adult/wintering habitat, 98ha as poor habitat and the remaining 1105ha as unsuitable. Individual capercaillie were observed at Black Mount (one bird) and north of Loch Vaa near Kinveachy (one bird). Evidence was recorded in the woodland surrounding Carn Bad nan Luibhean in the north of the Proposed Scheme (including evidence of breeding), Black Mount, Baddengorm Woods, and to the north of Loch Vaa.	The population supported within the Study Area is part of the Scottish stronghold of this species which is rare in other parts of the Highlands, and absent from all other areas of the UK. It is a key species of conservation value, and a qualifying feature of SPAs within the Study Area. It is a core species in the Highland BAP and the CNAP.	International	ES Appendix 12.6 Figure 12.15c – desk study records (confidential figure) Figure 12.15d - survey results (confidential figure)
Amphibians	**Desk study** Three records of great crested newt were received from Pond 21, located north-west of Loch Vaa (one from 2007 and two from 2014). CNPA has provided details of areas considered likely to support amphibians. Eleven locations have been identified within the Proposed Scheme, as shown on Figure 12.9. **Field survey** Fifty ponds fall within the 250m Study Area. Habitat Suitability Index (HSI) evaluation carried out for the ponds in the Study Area found suitable habitat at 37 locations. eDNA surveys of 37 ponds recorded great crested newt presence in three ponds. A single juvenile great crested newt was located on the bank Pond 21 in April 2017. Although the eDNA result for this pond was negative the species was assumed to be present. No great crested newts were recorded in the presence/likely absence surveys carried out at the three ponds where positive eDNA results were recorded or the three ponds within 50m of these locations. It is concluded that great crested newts are likely to be breeding in low densities in the three positive eDNA ponds. Three ponds were not subject to eDNA sampling or presence/ likely absence surveys. Therefore, following a precautionary approach, great crested newts are assumed to be present in these ponds. Therefore, in total, seven ponds are considered to support great crested newts.	Although great crested newt is not listed in the CNAP, the areas may contribute to the plan by potentially improving wetland connectivity and quality of biodiversity. Therefore, the seven ponds where great crested newt were identified or assumed to be present were assessed to be of Local importance.	Local	ES Appendix 12.7 Figure 12.16 – desk study, survey results and pond locations
Reptiles	**Desk study** Twelve records of reptiles (adder, common lizard and slow-worm) were received within the Study Area. Common lizard and slow worm were also recorded during the Preliminary Ecological Appraisal[xiii]. **Field survey** No detailed surveys for reptiles have been undertaken as part of the assessment. Incidental sightings recorded during other ecological surveys conducted between 2015 and 2017 included six records of slow worm and 13 records of common lizard. A habitat suitability assessment, based on the importance of mapped habitats for reptiles, assessed during field survey and from available records identified the following: • 512ha of high suitability to support reptiles, including large extents of heath and bog habitats, and mosaics of grassland, heath, bracken and scrub which offer suitable foraging, basking and sheltering opportunities for reptiles, with a known presence of common lizard, slow worm and adder.	The areas of high habitat suitability for reptiles are highly suited to support reptiles. All three species of reptile that may be present in these areas are identified on the list of priority species in the Highland BAP.	Authority Area	ES Appendix 12.8 Figure 12.17 – desk study records, incidental sightings and habitat suitability
		Areas of moderate habitat suitability include suitable and varied habitat with connectivity to the wider area and are likely to support populations of reptiles that are important in a local context.	Local	

Species or Species Group	Key Desk Study[13] and Field Survey Results (Study Area)	Rationale for Valuation	Valuation[14]	Relevant ES Appendix and Figures
	• 419ha of moderate suitability including woodland interspersed with heath and grassland habitats, with limited incidental records of reptiles and no desk study records; and • 307ha of low suitability, including homogenous extents of coniferous plantation and built-up areas.			
Red squirrel	**Desk study** 366 records red squirrel were received within the Study Area. **Field survey** Evidence of red squirrels has been recorded throughout the Study Area: surveys in 2017 recorded 32 dreys, two feeding platforms, 96 feeding signs and 14 sightings. Dreys were recorded throughout the Study Area, with high concentrations in woodland in the south, between Granish and Avielochan on the southbound side of the existing A9 road and in the north near Slochd. These woodlands are characterised by Scot's pine and birch spp. of more than 25 years old, with a ground flora of heather and bilberry, and with good connectivity via both the canopy and the scrub layers. The Habitat Suitability Assessment for red squirrel mapped the area into the following categories across the Study Area: • 157ha of high suitability. High suitability areas consisted of a greater number of mature conifer woodlands (>25 years old), were well connected, with little disturbance and were dominated by Scots pine. Trees were mature enough to provide both feeding resources and suitable drey sites for red squirrels, with evidence of the species recorded frequently. • 78ha of moderate suitability. Moderate suitability areas consisted of a greater number of immature conifer woodlands (<25 years old), largely well connected and largely dominated by Scots pine with little disturbance, with evidence recorded occasionally. • 200ha of poor suitability. Poor suitability areas consisted of immature conifer woodlands (<25 years old), sometimes isolated and largely dominated by birch spp., with some disturbance. Poor suitability areas rarely had evidence of red squirrel activity.	Areas of high habitat suitability are most likely to support red squirrels. The Cairngorms are an important stronghold for red squirrel in a UK context and the species is both a priority species for the Highland BAP/CNAP as well as an SBL species.	Regional	ES Appendix 12.9 Figure 12.18 – desk study records and habitat suitability
		Areas of moderate habitat suitability were poorer quality than the high suitably areas but allow connectivity to higher quality areas.	Authority Area	
		Areas of low suitability are unlikely to provide important habitat but may allow connectivity to higher quality areas.	Local	
Pine marten	**Desk study** Three records of pine marten were received within the Study Area. **Field survey** Evidence of pine marten (scat) was recorded at three locations of which only one could be confirmed by DNA analysis. Suitable den sites were found throughout the Study Area, although no evidence of the species was observed at any site. The species is likely to occur at low densities across the Proposed Scheme. The habitat suitability assessment mapped the area into the following categories across the Study Area: • 124ha of high habitat suitability for pine marten within the Study Area. These areas were generally well connected, very mature conifer woodlands (>100 years old) dominated by Scots pine; containing trees of an age and size to provide suitable den sites, as well as rocky outcrops (frequent at Kinveachy) and with little disturbance. • 127ha of moderate habitat. These areas consisted of a greater number of immature conifer and broadleaved woodlands (<25 years old), largely well connected with little disturbance and some records for suitable den sites areas had some records for suitable den sites. • 184ha of low habitat. These areas consisted of a greater number of immature broadleaved woodlands (<25 years old), sometimes isolated and largely dominated by birch, with some disturbance. No records of suitable den sites were made within these areas. The habitat suitability of the Study Area is generally high to moderate in the south of the Study Area and generally moderate to poor in the north.	Areas of high habitat suitability are most likely to support pine marten. The pine marten is a UK BAP/SBL species, and is legally protected.	Authority Area	ES Appendix 12.9 Figure 12.19 – desk study records and habitat suitability
		Areas of moderate habitat suitability are lower suitability than above but potentially provided connectivity to higher quality areas.	Local	
Wildcat	**Desk study** A total of 36 records received within the Study Area (many with unspecified dates). The desk study identified the Proposed Scheme as being located within the SNH Northern Strathspey priority area for the conservation of wildcat. **Field survey** No detailed surveys for wildcat have been undertaken as part of the assessment. However, field survey of habitat suitability, identified the following: • 227ha of high suitability, including a mix of habitats, including grassland, woodland, heath and riparian margins.	Area of high and moderate habitat suitability are most likely to support wildcat. The wildcat is nationally rare and this habitat is located within an area designated for targeted conservation action by SNH. Although the species is likely to occur at low densities across the Proposed Scheme these areas are either highly suited to the species or allow connectivity to higher quality areas.	National	ES Appendix 12.9 Figure 12.22 – desk study records (confidential figure) Figure 12.25 – habitat suitability
		Area of low habitat suitability may allow	Regional	

Species or Species Group	Key Desk Study[13] and Field Survey Results (Study Area)	Rationale for Valuation	Valuation[14]	Relevant ES Appendix and Figures
	• 665ha of moderate suitability including areas tending not to be as diverse as high habitat suitability areas; lacking in woodland edge and with larger expanses of homogenous habitats and greater level of disturbance than habitats of high suitability. • 525ha of low suitability, tended to include large expanses of homogenous habitat and included large areas of bog and heath. These habitats offer little cover to allow wildcat to shelter from the elements and reduce the ability for wildcat to conceal themselves from prey species.	connectivity to higher quality areas.		
Otter	**Desk study** Six records of otter were received within the Study Area. One record of otter was also provided in the Preliminary Ecology Appraisal[xiii]. **Field survey** Evidence of otter has been recorded along 10 named watercourses and several unnamed tributaries within the Survey Area. A total of three holts and six hovers (valued between low and moderate status) were recorded along five watercourses (Caochan Ruadh, Bogbain Burn, Allt na Criche (Lynwilg), and unnamed tributaries of Allt Slochd Mhuic and the River Spey). Other evidence of otter, including spraints, footprints, feeding remains and slides, has been recorded sporadically on watercourses within the Survey Area, with the exception of the Caochan Ruadh where 85 spraints were recorded at one location, indicating that otters are using these watercourses to commute and forage. In addition to the running water habitats, lochs and ponds are also likely to provide foraging resources and resting opportunities for otter. Toad feeding remains, spraints, footprints and an otter hover were recorded at Pond 02, whilst spraints and feeding remains were recorded at Avie Lochan, Loch Puladdern, and Ponds 25, 42 and 44. The small drainage channels and ditches within the Study Area provide suitable connecting routes for otter, providing links to high quality habitats for foraging and resting, although evidence of their use by otter was limited. Terrestrial habitats, such as the woodland present throughout the Study Area, are likely to offer important sheltering opportunities and potential breeding habitat for this species. The majority of the watercourses described above are well connected to extensive areas of woodland and thus are likely to be used by otter.	Three watercourses (Allt nan Ceatharnach, River Dulnain, Allt na Criche (Lynwilg)) form part of the River Spey SAC, for which otter is a qualifying feature. These watercourses feed into the River Spey and provide high quality habitat for otter to commute, forage and shelter, which is part of the habitat needed to maintain the SAC population of otters. Sporadic evidence of otter, including one resting site (TN 7), was recorded along these watercourses during field surveys in 2017.	International	ES Appendix 12.10 Figure 12.20 – desk study records and field survey results
		Two watercourses (Bogbain Burn & Caochan Ruadh) and one waterbody (Loch Alvie). The evidence of otters on the water courses confirms their habitat value to the species. Loch Alvie provides abundant foraging resources for otter in the form of fish and amphibians. Areas of woodland surrounding the loch also provide suitable habitat for this species to rest and shelter. The Allt Cosach was not surveyed in 2017 (see Limitations section of ES Appendix 12.10), therefore a precautionary approach has been taken to the valuation of this watercourse valuing it as up to Authority Area.	Authority Area	
		A total of 37 watercourses and 21 waterbodies which include small burns and drainage channels offer suitable connecting routes for otter, providing links to high quality habitats for foraging and resting. A number of watercourses are located within areas of woodland and therefore provide suitable habitat for otters to rest and shelter. Waterbodies offer suitable foraging resources in the form of amphibians and fish. However, the sporadic nature of otter evidence suggests that these areas do not form a mainstay of otter territory and are not regularly patrolled.	Local	
Water vole	**Desk study** No records were received. **Field survey** Although some suitable habitat for foraging and shelter were identified within the Study Area, no evidence of water vole was recorded during the field surveys undertaken in 2017. One incidental sighting was recorded along the Feith Mhor watercourse outwith the Study Area (dead water vole recorded during the otter survey).	Five watercourses (Allt Slochd Mhuic, Allt na Criche (Granish), unnamed ditch D011, two unnamed tributaries of Loch Alvie and one waterbody (Pond 2) offer suitable habitat for water voles to forage and shelter. No evidence of water vole was recorded during field surveys in 2017. However as only one survey was undertaken, and in-line with current guidance[xxvii], a precautionary approach to valuation has been taken, accounting for the potential future use of these locations by water vole. All remaining habitat within the Study Area has low suitability for the species and is evaluated as	Local	ES Appendix 12.10 Figure 12.20 – desk study and field survey results

Species or Species Group	Key Desk Study[13] and Field Survey Results (Study Area)	Rationale for Valuation	Valuation[14]	Relevant ES Appendix and Figures
		being of Less than Local importance.		
Invertebrates (Terrestrial)	**Desk study** A total of 119 records of notable invertebrates were received, including mountain bumblebee (*Bombus monticola*), hairy wood-ant (*Formica lugubris*) and narrow-headed ant (*Formica exsecta*). CNPA provided details of 125 locations known or likely to support notable invertebrates from within the Study Area. This includes 91 red locations where there are records of species and habitats which are particularly vulnerable and high priority for conservation; and 34 amber locations where there are no confirmed records but an indication of habitat suitability for priority species. Habitats at the locations identified included conifer woodland, semi-improved grassland, flowery verges, dry heath, aspen woodland; and woodland edges and glades. These habitats possess the greatest potential for a range of CNPA priority listed species especially butterflies and aculeate hymenoptera (bees, wasps and ants). The woodland edge sites and open areas within woodland are the preferred habitat for narrow headed ants and wood ants. **Field survey** No detailed surveys for terrestrial invertebrates have been undertaken as part of the assessment. Incidental records of over 220 wood ant nest locations (exact species not identified) were collected during other ecological surveys between 2015 and 2017, in the Study Area. These occur within and on the edge of woodlands to the north of Granish.	Locations where wood ant nests or other species identified by CNPA as a priority in the region and/or on the SBL list (CNPA red locations) are known to occur.	Authority Area	ES Appendix 12.11 Figure 12.9 – CNPA priority species locations Figure 12.10 – desk study records and incidental wood ant next locations
		Locations that provide habitat suitable for species identified by CNPA as a priority in the region and/or on the SBL list, although the presence of priority species has not been confirmed (CNPA amber locations).	Local	
Fungi	**Desk study** No records received from within the last 10 years. CNPA has provided details of 63 locations known (red locations) or likely (amber locations) to support notable fungi from within the Study Area. This includes 36 red locations where there are records of species and habitats which are particularly vulnerable and high priority for conservation; and 27 amber locations where there are no confirmed records but an indication of habitat suitability for priority species. Habitats at the locations identified included a range of grasslands, semi-natural and coniferous semi-natural woodland and coniferous plantation where target notes indicated the presence of mature *Vaccinium* understory. Most of the locations are associated with broad fungal diversity with no individual species identified. Some locations are associated with fungal taxa such as waxcaps, northern bilberry redleaf, Milcap and other CNPA priority and non-priority taxa. **Field survey** No detailed fungi surveys have been undertaken as part of the assessment.	Locations where species identified by CNPA as a priority in the region and/or on the SBL list are known to occur (CNPA red locations).	Authority Area	ES Appendix 12.11 Figure 12.9 – CNPA priority species locations
		Locations that provide habitat suitable for species identified by CNPA as a priority in the region and/or on the SBL list, although the presence of priority species has not been confirmed (CNPA amber locations).	Local	
Other notable species				
Mountain and brown hare	**Desk study** Mountain hare: two records received, the closest 571m from the Proposed Scheme. Brown hare: two records received, the closest 816m from the Proposed Scheme. The desk study assessments have concluded that suitable habitat for these species is present within the Proposed Scheme although large areas are considered to be unsuitable for mountain hare, with suitable habitat limited to upland heath habitat at Slochd Mor and Slochd Summit. **Field survey** No detailed surveys for these species have been undertaken as part of the assessment.	Brown hare Area of suitable habitat for brown hare. This is habitat which is a species of principal importance for biodiversity conservation in Scotland.	Local	ES Appendix 12.9 Figure 12.21 - desk study records Figure 12.9 - CNPA priority species locations
		Mountain hare Although not a key species for targeted conservation action in this region, suitable habitat was limited and therefore of Local importance.	Local	
Hedgehog	**Desk study** No records of hedgehog received. **Field survey** No detailed surveys for this species have been undertaken as part of the assessment. Suitable habitat for hedgehogs was identified across the Study Area although limited to habitat in urban areas, farmland and woodland fringes.	Although this species is not a key species for targeted conservation action in this region, suitable habitat was limited and therefore of Local importance.	Local	ES Appendix 12.9 Figure 12.21 - desk study records Figure 12.9 - CNPA priority species

Species or Species Group	Key Desk Study[13] and Field Survey Results (Study Area)	Rationale for Valuation	Valuation[14]	Relevant ES Appendix and Figures
				locations

12.4 Potential Impacts

12.4.1 A detailed impact assessment is provided for each ecological feature in ES Appendices 12.2 to 12.11. Potential impacts identified include:

Construction Impacts

- permanent habitat loss (e.g. loss of hibernacula, basking sites, or foraging habitat);
- temporary habitat loss (e.g. land used during construction that is subsequently to be restored);
- habitat degradation (e.g. sediment release, pollution events and dust);
- habitat fragmentation affecting movements of protected and notable species;
- injury or mortality of protected and notable species; and
- disturbance including noise and vibration to protected and notable species.

Operational Impacts

- fragmentation (primarily as a result of habitat loss at junction locations) and severance (primarily in relation to watercourses);
- injury and mortality of protected and notable species from vehicle collisions;
- disturbance including noise and vibration to protected and notable species;
- pollution events; and
- changes to hydrological conditions.

12.5 Mitigation

12.5.1 A list of standard mitigation measures has been developed for the A9 Dualling programme; those related to ecology are detailed in Table 12.6 (standard mitigation commitments).

12.5.2 Additional mitigation measures have been developed that are specific to the potential impacts of the Proposed Scheme; those related to ecology are detailed in Table 12.7 (project mitigation commitments).

12.5.3 Each ES Appendix for ecology (12.2-12.11) identifies both standard and project mitigation measures (from those listed below) required for the management of the Proposed Scheme in relation to each habitat and/or species.

12.5.4 Specific mitigation measures are also presented on the Landscape and Ecological Mitigation plan, Figure 13.4 (for example, areas of habitat creation).

12.5.5 The Proposed Scheme also includes embedded mitigation as part of the design such as mammal ledges through culverts (detailed crossing locations are specified within relevant species appendices and Figure 12.24) and design of culverts with open bottoms to maintain natural beds.

Table 12.6: A9 Standard Mitigation Commitments

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required
SMC-E1	Throughout Proposed Scheme	Pre-Construction	Pre-construction surveys will be undertaken to verify and, where required, update the baseline ecological conditions set out in the ES. The scope of the pre-construction surveys will be confirmed with SNH prior to them being undertaken.	To update the baseline ecological conditions set out in the ES.	SNH
SMC-E2	Throughout Proposed Scheme	Pre-Construction	Prior to construction a suitably qualified (or team of suitably qualified) ECoWs will be appointed and will be responsible for implementation of the Ecological Management Plan. The ECoW will: • provide ecological advice over the entire construction programme, at all times as required; • undertake or oversee pre-construction surveys for protected species in the areas affected by the Proposed Scheme; and ensure mitigation measures are implemented to avoid and reduce impacts on ecological features; and • monitor the implementation of the mitigation measures during the construction phase to ensure compliance with protected species legislation and commitments within the ES. The ECoW will be a member of CIEEM and will have previous experience in similar ECoW roles. All ECoWs will be approved by Transport Scotland to be appropriately qualified for the role. The ECoW will be appointed in advance of the main construction programme commencing to ensure pre-construction surveys are undertaken and any advance mitigation measures required are implemented.	To ensure the implementation of the Ecological Management Plan.	None required
SMC-E3	At watercourses throughout Proposed Scheme	Construction	Noise and vibration will be reduced by working back from the river bank where possible or working within a dry area to avoid implications to fish, such as behavioural changes e.g. avoidance of areas or physical damage to hearing. In addition, soft-start techniques will be applied to piling work procedures to enable sensitive species to evacuate the area.	To protect fish species from noise, vibration and light spill.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required
SMC-E4	At watercourses throughout Proposed Scheme	Construction	Where areas are required to be temporarily dewatered to permit construction activities, fish will be removed by means of electrofishing and relocated prior to dewatering.	To protect fish species during de-watering of watercourse sections and in-stream works.	CAR Licence approved by SEPA
SMC-E5	At watercourses throughout Proposed Scheme	Construction	Water flow/passage will be sufficiently maintained to permit movement of Atlantic salmon, brook lamprey and brown/sea trout past areas of dewatering and/or significant alteration of water movement during any construction works within the watercourses. Suitable temporary channels may be implemented so that movement between areas of habitat can be maintained.	To protect fish species during de-watering of watercourse sections and in-stream works.	CAR Licence approved by SEPA
SMC-E6	Throughout Proposed Scheme	Pre-Construction	The Contractor will obtain and comply with the requirements of any protected species derogation licences in respect of works that have the potential to breach applicable conservation legislation necessary to construct the project. Licensing may be for the UK and/or protected species.	To comply with conservation legislation.	SNH
SMC-E7	Throughout Proposed Scheme	Pre-Construction & Construction	Tree felling and vegetation clearance to be minimised as far as practicable and undertaken outside the core bird nesting season (01 March to 31 August) to avoid damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require an inspection of vegetation to be cleared for nesting birds by a suitably qualified ecologist no more than 24 hours prior to any works being undertaken. If any nesting birds are identified during the survey, they will be left in situ for their entire nesting period until the young birds have fledged. Alternative approaches to the work will need to be proposed e.g. leaving an exclusion zone around the nest to avoid disturbance. All cleared vegetation will be rendered unsuitable for nesting birds, for example, by covering or chipping depending on the end purpose of the vegetation, or will be removed from the	To protect habitat and fauna during bird nesting season.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required
			works area.		
SMC-E8	Throughout Proposed Scheme	Pre-Construction & Construction	Any tree felling will be carried out by experienced contractors to reduce direct mortality of protected species according to agreed felling methods between contractors and the ECoW.	To protect fauna during removal of habitat.	None required
SMC-E9	Throughout Proposed Scheme	Pre-Construction, Construction & Post-Construction	Plant and personnel will be constrained to a prescribed working corridor through the use of, where practicable, temporary barriers to minimise the damage to habitats and potential direct mortality and disturbance to animals located within and adjacent to the Proposed Scheme working corridor.	To protect habitats and fauna.	None required
SMC-E10	Throughout Proposed Scheme	Construction	The use of construction lighting will be in accordance with BS5489 Code of Practice for the Design of Road Lighting[xxviii] and follow best available guidance on lighting with regards to protected species (e.g. Bat Conservation Trust (2009)[xxix] and Institute of Lighting Engineers (2007)[xxx]). The construction lighting design will take into account the need to avoid illuminating sensitive mammal habitats (e.g. for bats and badgers) in locations such as: adjacent to watercourses; along woodland edges; and, where there is known activity identified through pre-construction ecological surveys (refer to Mitigation Item SMC-E1). Where this is not possible the Contractor will agree any exceptions with SNH.	To protect sensitive mammal habitats from illumination.	Exceptions to be agreed with SNH
SMC-E11	Throughout Proposed Scheme	Construction	During construction trees will be protected in line with guidelines provided in BS 5837 Trees in relation to Construction[xxxi].This includes the following: • establishment of Root Protection Areas (RPA); • protective fencing will be erected around the RPA to reduce risks associated with vehicles trafficking over roots system or beneath canopies; • selective removal of lower branches of trees to reduce risk of damage by construction plant and vehicles; • prevent soil compaction measures; and	To comply with guidelines provided in 'BS 5837 Trees in relation to Construction' (British Standards Institute, 2012).	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required
			• maintain vegetation buffer strips (where practicable).		
SMC-E12	Throughout Proposed Scheme	Construction & Post-Construction	Planting will be undertaken to replace any trees that were intended to be retained which are felled or die as a result of construction works. The size, species and location of replacement trees will be approved by Transport Scotland and other relevant stakeholders.	Replacement of trees lost that are to be retained.	Transport Scotland and other relevant stakeholders
SMC-E13	Throughout Proposed Scheme	Construction	Trenches, holes and pits will be kept covered at night or provide a means of escape for mammals, reptiles and amphibians that may become entrapped. Gates to compound areas will be designed sensitively to prevent mammals from gaining access and will be closed at night.	To avoid mammals becoming entrapped in and around compound areas during construction.	None required
SMC-E14	Throughout Proposed Scheme	Construction	Temporary mammal-resistant fencing will be provided around construction compounds following a specification agreed through consultation with Transport Scotland.	To avoid mammals becoming entrapped in and around compound areas during construction.	Transport Scotland
SMC-E15	Throughout Proposed Scheme	Construction	The Contractor will describe within the CEMP (Mitigation Item SMC-S1) the strategy to be implemented for the appropriate treatment of invasive, non-native species (INNS). The strategy will set out appropriate construction, handling, treatment and disposal procedures to prevent the spread of INNS in line with recognised best practice.	To prevent the spread of INNS.	None required
n/a (note)	Throughout Proposed Scheme	Construction	Best practicable means will be employed to avoid the disturbance of sensitive species and habitats with noise, dust and air pollution. The Standard Mitigation Measures as detailed in ES Chapter 11 (Road Drainage and the Water Environment), ES Chapter 13 (Landscape and Visual), ES Chapter 16 (Air Quality) and ES Chapter 17 (Noise and Vibration) will be implemented to protect aquatic and terrestrial habitats and species.	To protect aquatic and terrestrial habitats and species.	n/a

Table 12.7: Project Mitigation Commitments

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P11-E16	Throughout Proposed Scheme	Pre-Construction & Construction	The working area will be kept to the minimum necessary for construction of the project to reduce habitat loss. A Habitat Management Plan will be produced pre-construction and agreed with SNH. This will include specific plans and measures for working on the border of the Craigellachie SSSI/NNR and Alvie SSSI, as well as other sensitive habitats (such as aspen woodland), detailing avoidance, mitigation and rehabilitation measures to further reduce residual impacts.	To protect all habitats, including those located on the boundary of Craigellachie SSSI/NNR and Alvie SSSI.	SNH
P11-E17	Throughout Proposed Scheme	Pre-Construction & Construction	The removal of any trees identified for retention within the ES will be avoided and, if unavoidable, shall be undertaken in consultation with CNPA. Assessment of the trees at such locations will be undertaken and where any trees that were intended to be retained are identified as requiring felling or die as a result of construction works these will be replaced. Any changes to the extent of tree removal from that assessed within the ES, will be subject to assessment using the same methods as detailed within the ES to determine the appropriate mitigation requirements. Where required, any additional impacts identified will be appropriately mitigated for using the same methods as detailed within the ES. The size and species of replacement trees will be agreed in consultation with SNH, CNPA and relevant stakeholders, and will take account of management plans of immediately adjacent woodland.	To protect retained trees.	SNH and CNPA
P11-E18	Throughout Proposed Scheme	Construction	Aspen woodland will be avoided where possible. If felling is required, this shall be undertaken in consultation with CNPA and deadwood over 75cm circumference will be retained where practicable.	To protect aspen and species associated with it (including fungi and invertebrates).	CNPA
P11-E19	Throughout Proposed Scheme	Construction	Areas of temporary habitat loss during construction will be reinstated as soon as practicable. The reinstatement and restoration of habitats will generally be done on a like for	To maintain/enhance biodiversity.	None

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			like basis or where possible will aim to provide an enhancement where degraded or ecologically poor habitats are present (e.g. improved grassland). This may involve the use of appropriate seed mixes to provide a suitable tie-in with local habitats.		
P11-E20	Throughout Proposed Scheme	Construction	Mitigation and compensation for the loss of ecologically important habitats will occur through habitat creation. This will include roadside planting, where appropriate, as shown on Landscape and Ecological Mitigation plan (Figure 13.4). Where feasible important habitats will be replaced on a like for like basis, with habitats of a similar type and character to be created within the vicinity of the area where the loss has occurred. Where this is not possible, habitat creation will occur within other suitable areas identified within the Proposed Scheme. In respect of red squirrel, 43ha or greater of created woodland habitat should comprise a mixed species composition favourable to the species as detailed in guidance[xxxii] within Table 3 of Managing forests as red squirrel strongholds. Landscape planting and newly created habitat will be comprised of locally obtained native species of local provenance, and will comprise a mixture of species. Sowing/planting should be undertaken in the appropriate planting season but as soon as possible following completion of the works to reduce the likelihood of the areas being colonised by invasive, non-native species which are of lower value to wildlife. Replacement habitats will be monitored and managed during the aftercare and operation phase of the Proposed Scheme. Where practicable habitat creation will fill in existing gaps in linear vegetation features, adjoin or connect existing blocks of woodland or act as stepping stones between habitat	To compensate for the loss of ecologically important habitats (including woodland, dry heath, and blanket bog).	None

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			areas.		
P11-E21	Throughout Proposed Scheme	Construction	Planting of new woodland will be undertaken at a variety of locations to mitigate for the loss of ancient woodland which includes a proposed woodland compensation site (see Landscape and Ecological Mitigation plan Figure 13.4). Soil will be retained from locations of ancient woodland and reused in areas of woodland planting. These soils will be reused in areas of new woodland planting in order to utilise the existing seedbank as much as possible and transfer soil organisms and specialist bacteria that may be adapted to these environments to new areas of woodland. This will include areas that are no longer wooded where appropriate (e.g. areas with a species rich ground layer and associated seed bank). A method statement will be produced detailing the approach to soil translocation and woodland creation. The methodology will be agreed with SNH and CNPA. Planting activities will adopt good practice measures from the UK Forestry Standard[xxxiii] as appropriate to the nature conservation objectives of the planned woodland creation.	To compensate for the loss of ancient woodland.	SNH and CNPA
P11-E22	Throughout Proposed Scheme	Construction	Where practicable, top soil from cleared woodland not on the ancient woodland inventory but still considered important (e.g. aspen woodland or SBL birchwoods) will be stored appropriately for re-use in areas where similar habitat is to be created. See Landscape and Ecological Mitigation plan, Figure 13.4.	To retain the seedbank of cleared woodland (including aspen and SBL birchwoods).	None
P11-E23	Throughout Proposed Scheme	Construction	Where practicable top soils or substrates from areas of Annex I or SBL priority habitat loss, including heath and species rich grassland, will be stored appropriately for re-use in areas where similar habitat is to be created. See Landscape and Ecological Mitigation plan, Figure 13.4. This includes species rich grasslands and areas of fungi habitat (such as grasslands that have been highlighted as	To retain the seedbank of lost Annex I/SBL priority habitats.	None

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			potential waxcap habitat: CNPA priority locations 12, 15, 16, 34 and 55 shown on Figure 12.9) where turves will be re-used to retain seed sources and botanical value.		
P11-E24	Throughout Proposed Scheme	Construction	Bird's-foot trefoil (*Lotus corniculatus*) will be added to species mix for heath mitigation planting where practical and appropriate (e.g. not already locally abundant).	To maintain/enhance invertebrate habitat and provide additional foraging resources for wild pollinators.	None
P11-E25	Throughout Proposed Scheme	Construction	Where retained, deadwood will be placed in a variety of locations and conditions to benefit a number of species. Deadwood should be stored in a location away from the working area to prevent risk of damage and then placed within areas of retained woodland or woodland planting at an appropriate time. Similarly, where possible, selected, blasted rock material will be incorporated into retained woodland and woodland planting for the benefit of a range of species including pine marten under the direction of an ECoW. Tree stumps will be retained in situ where felled on the edge of working areas where this does not pose a constraint to the works. Edges of woodland will be scalloped where practicable increasing variety of conditions to reduce the risk of windthrow. Existing stone dykes shall be retained where possible.	To maintain/enhance habitat for species including reptiles, invertebrates, and pine marten.	None
P11-E26	Throughout Proposed Scheme	Construction	If deadwood exists in wooded areas to be lost that are listed within the ancient woodland inventory, this deadwood will be transferred to nearby areas of ancient woodland to be retained or to areas of new woodland creation, to allow the retention and transfer of specialist ancient woodland invertebrates, fungi and bacteria. Ancient or veteran trees to be felled in these areas will also be moved to new woodland creation areas for the same purposes and to act	To maintain populations of specialist ancient woodland species, including invertebrates, fungi and bacteria.	None

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			as an input of new deadwood.		
P11-E27	Throughout Proposed Scheme	Construction	During construction permanent and temporary drainage designs will aim to maintain existing and natural flows and pathways for surface and sub-surface water, in order to maintain links and hydrological connectivity with existing habitats dependant on wet conditions.	To maintain hydrological connectivity between habitats.	None
P11-E28	Throughout Proposed Scheme	Construction	Culverts placed at Allt Cnapach, Aviemore Burn and Caochan Ruadh will be designed as open structures which act to: • retain natural bed substrate within the culvert; • ensure no deterioration (and aim to improve) existing water depth and flow provision within the culvert for migratory fish; and • improve river continuity by replacing existing A9 structures with artificial inverts. The watercourse outlet will be designed to provide appropriate resting pools immediately downstream of the culvert entrance. Marginal/riparian planting will also be implemented to provide cover and mitigate the transition from light to dark at the culvert inlet and outlet. This will ensure fish are not discouraged or prevented from entering or exiting the culvert. • All culverts, including channel inlet and outlets, will be constructed with reference to SEPA's Good Practice Guides, namely: • Engineering in the Water Environment Good Practice Guide: Bank Protection Rivers and Lochs[xxxiv]; • Engineering in the Water Environment: Good Practice Guide - River Crossing[xxxv]; and • Position Statement WAT-PS-06-02 - Culverting of Watercourses – Position Statement and Supporting Guidance[xxxvi].	To maintain aquatic habitats at culverts placed at Allt Cnapach, Aviemore Burn and Caochan Ruadh.	SNH and SEPA

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P11-E29	Throughout Proposed Scheme	Construction	Ponds of Local ecological importance or greater and lost to construction will be replaced as near to their original location as practically possible, or within the nearest suitable habitat, whichever is more ecologically advantageous. This will be undertaken at a ratio of 1 pond loss: 1 pond replacement. SuDS and drainage features shall not act to compensate for the loss of any pond; however, SuDS shall be designed to maximise their biodiversity value, in line with the CIRIA SuDS Manual[xxxvii]. Replacement ponds will be designed following good practice principles as described by SEPA Guidance on good practice in the management and creation of small waterbodies in Scotland[xxxviii]. An ecological watching brief and fish rescue plan will be instigated in consultation with SNH and SEPA during pond dewatering activities.	To compensate for loss of ponds and maintain/enhance habitats for associated species (including fish and invertebrates).	SNH, CNPA and SEPA
P11-E30	Throughout Proposed Scheme	Construction	A pond at Granish Junction (Pond 18) will be lost as a result of the Proposed Scheme. The new pond will be constructed in an area immediately adjacent to the existing pond (as shown in Landscape and Ecological Mitigation plan, Figure 13.4). A suitability qualified ecologist shall be oversee all stages of pond design/creation. The new pond will be designed to occupy a surface area similar in extent to the existing pond being lost, but will include sloping marginal shelves of gradient no greater than 1:8. This will ensure the establishment of an extensive marginal 'drawdown' area. The new pond may be lined to ensure water retention, subject to ground and soil conditions. In the event pond lining is required, a natural bentonite clay product will be used to ensure the sustained hydrological viability of the replacement ponds. The new pond will be 'seeded' with translocated material from their respective pond lost to the Proposed Scheme. This will include the existing marginal seed bank/marginal vegetated turf and bare-root plant stock (where available), as well as pond sediment. This will	To compensate for the loss of Pond 18 and maintain/enhance habitat for northern damselfly.	SNH, CNPA, and SEPA

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			encourage rapid establishment of similar successional characteristics as the pond being lost, and maximise the establishment of northern damselfly (*Coenagrion hastulatum*) aquatic larvae, as part of the wider aquatic macroinvertebrate community. The replacement pond shall be constructed no later than March prior to the loss of their adjacent pond to be lost to the Proposed Scheme. Limited translocation of material (as defined above) will be undertaken in March at the time of construction, to include no more than 10% of the pond perimeter. This will reduce disturbance of the existing pond and the macroinvertebrate community. The pond to be lost shall remain in situ until at least August of the same year, allowing for emergence and breeding of adult northern damselfly from the existing pond, maximising the likelihood of oviposition (egg-laying) in the replacement pond. Prior to loss of the existing pond, additional material (as defined above) shall be translocated to the replacement pond, maximising the establishment of the macroinvertebrate community. The replacement pond will otherwise be designed following good practice principles as described by SEPA Guidance on good practice in the management and creation of small waterbodies in Scotland[xxxviii]. CNPA shall be consulted during the detailed design of the replacement pond. An ecological watching brief and fish rescue plan will be instigated in consultation with SNH and SEPA during pond dewatering activities.		
P11-E31	Throughout Proposed Scheme	Construction	Construction works (for example, temporary watercourse diversions and in-channel working) to be undertaken taking into account sensitive ecological seasons (e.g. breeding, hibernation or migration seasons) and the potential impact that the type of construction work could have on protected species within that season. Prior to construction, consultation will be undertaken with SNH to confirm the	To protect aquatic species (including salmonids) and bats during construction works affecting watercourses.	SNH, SEPA, and Spey Fishery Board.

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			programme of construction works. The key sensitive period for salmonids is mid-October to June, inclusive. However, the most acceptable timing will depend on which sensitive species are present and will be agreed with SEPA, SNH and the Spey Fishery Board. Percussive (hammer) piling will be avoided adjacent to the watercourse in favour of softer alternatives (e.g. silent sheet piling, vibratory sheet piling) where ground conditions allow. Where not possible, soft start piling procedures should be utilised. The soft-start duration should be a period of not less than 20 minutes, and should piling cease for a period greater than 20 minutes, the soft start procedure must be repeated. During any river dewatering and/or in-channel working, an ecological watching brief and fish rescue plan will be instigated in consultation with SNH and SEPA. The key sensitive periods for bats are between May-August (inclusive) when bats form maternity roosts; and between November-February (sometimes extending into October and March dependent on weather conditions) when bats occupy hibernation roosts[xxxix].		
P11-E32	Throughout Proposed Scheme	Construction	Mitigation measures to avoid or reduce potential impacts on surface waters will be employed, including adherence to Guidance for Pollution Prevention (GPP)[xl] during construction, and appropriate road drainage and runoff treatment.	To protect fauna and habitats from pollution of surface waters during construction.	None
P11-E33	Throughout Proposed Scheme	Construction	Any permanent watercourse diversion works (including realignments at crossings) will incorporate design measures that enhance both in-channel and riparian habitat quality, e.g. provision of resting pools/spawning habitats for salmonids. Refer to ES Chapter 11 Road Drainage and Water Environment for key watercourse construction and design mitigation commitments.	To enhance in-channel and riparian habitat at diverted watercourses.	None

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P11-E34	Throughout Proposed Scheme	Pre-Construction & Construction	Species Protection Plans to be produced pre-construction and agreed with SNH. Plans will be produced for the following species: bats, otter, red squirrel, pine marten, great crested newts, reptiles, wildcat, water vole, badger and any other species as deemed necessary from the pre-construction surveys. Where appropriate, the Species Protection Plans will include monitoring plans. As an extension to the standardised mitigation listed in SMC E7 consideration will be given to specialised habitat use and untypical breeding strategy employed by crossbill species. In consideration of crossbill species that can potentially nest outside of the main breeding season as (defined as March-August inclusive), felling and vegetation clearance within optimal habitat for these species i.e. pine woodland, will require a nest check at all times of the year.	To comply with conservation legislation and to protect fauna.	SNH
P11-E35	Throughout Proposed Scheme	Construction	Appropriate exclusion zones in line with best practice and as agreed with SNH should be maintained. Where exclusion zones of the required size are not possible and if a licence is not needed the amended buffer zone should be agreed with the relevant statutory body.	To comply with conservation legislation and to protect fauna.	SNH
P11-E36	Badger setts	Pre-Construction & Construction	Until a licence from SNH has been granted no working within 30m of an active badger sett. This distance will be increased for operations such as piling, rock coring or blasting works to 100m or more (distance will be confirmed with the ECoW and SNH). The Contractor will obtain and comply with the requirements of the protected species derogation licence in respect of works that will require the exclusion of a badger sett or potential disturbance of a badger sett. Conditions may include the following. Badgers are to be excluded from setts outside of the breeding season 1st December to the 1st July inclusive. All works under licence must be carried out during daylight	To comply with conservation legislation and to protect badgers and badger setts.	Approval and licence required from SNH. Approval required from the ECoW.

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			hours, restricted to between two hours after sunrise and two hours before sunset from 1st March to 31st October, and restricted to between one hour after sunrise and one hour before sunset from 1st November to 28th February. Any lighting used to accommodate such works must be positioned to minimise light spill onto suitable commuting habitat and will be subject to ECoW approval. Any other licence conditions still to be specified will be adhered to. The ECoW may stop site activities at any time should they consider that the works are having an impact on badger activity or sett stability (not covered by the SNH badger licence).		
P11-E37	Throughout Proposed Scheme	Pre-Construction & Construction	The ECoW will monitor badger activity at setts within the Study Area (including a 100m radius) over the entire construction programme using the methodology outlined below. The methodology will include surveying for evidence of badger activity including setts, latrines, paw prints, snuffle holes (created when foraging), track-ways, hairs (caught on fencing) and scratching posts. Where new setts are identified, the location, number of entrances, and level of activity will be recorded, and an assessment of the likely status made based on the available evidence. Setts will be classified following the criteria given in ES Appendix 12.4 (Table 2.1, based on Harris, Cresswell and Jefferies, 1989[xli]). At the discretion of the ECoW other monitoring methods will include, camera-traps and sand pads. The sand pads and camera traps will be checked regularly.	To comply with conservation legislation and to protect badgers and badger setts.	Approval required from the ECoW. Approval maybe required from SNH (confirm with ECoW).
P11-E38	Throughout Proposed Scheme	Pre-Construction &	Permanent badger fencing and tunnels to be installed, where indicated on the Landscape and Ecological Mitigation plan (Figure 13.4), prior to scheme completion.	To protect badgers from road traffic accidents.	Deviations to be agreed with SNH

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
		Construction & Post Construction	Fencing design will follow SNH guidance and will be installed under direction of the ECoW. The recommended specification is as follows: at least 1.2m high galvanised welded mesh (of at least 2.5mm gauge) above ground level, with a maximum mesh size of 100 x 50mm attached to fence posts and topped with barbed wire. Below ground, the mesh should be dug in to a depth of 300mm, and 300mm horizontal lap. Where fencing ties into structures, culverts and mammal underpasses gaps will not exceed 5cm. Mammal proof fencing will be taken around the top of the structure where the height of the headwall/wingwalls do not exceed the required height of fencing, where access could be gained up a sloping wall or where an overhang on the fencing is required. Where fencing crosses access tracks mammal proof gates will be provided to prevent access onto the carriageway. Mammal underpass will follow DMRB specification using Class M 600mm diameter concrete pipes - widened at the entrances) The approach is to be 'softened' through the use of appropriate planting.		
P11-E39	Throughout Proposed Scheme	Pre-Construction & Construction & Post Construction	The badger fencing will be maintained for at least five years after completion. Following construction, the badger fencing will be maintained in an effective condition, with any repairs as a consequence of wear and tear or damage undertaken in a timeous manner.	To protect badgers from road traffic accidents.	Deviations to be agreed with design team and SNH
P11-E40	Throughout Proposed Scheme	Post Construction	In the event that badger road traffic accidents are identified along the Scheme over the five-year period following construction completion requirements for additional/alternative fencing will be discussed and agreed with a suitably experienced ecologist and SNH to prevent badger mortality.	To protect badgers from road traffic accidents.	To be agreed with SNH

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P11-E41	Throughout Proposed Scheme	Construction	At structures and crossing locations, planting will be designed with the aim of encouraging bats to fly over the A9 carriageway, above potential collision height with traffic, or to encourage bats to fly through structures beneath the carriageway. Locations of prescribed planting design are included within the Landscape and Ecological Mitigation Plan (Figure 13.4) with principles of planting also included. In line with P11-E34, a post-construction monitoring programme will be defined within the bat species protection plan. This will determine the use of bat 'hop over/fly-under' locations and new structures beneath the carriageway. Results from this monitoring will help demonstrate the effectiveness of implemented crossing location mitigation and inform future maintenance of roadside vegetation to ensure bat commuting to either side of the carriageway is maintained.	To maintain/enhance bat crossing locations.	None
P11-E42	Throughout Proposed Scheme	Construction	No working within 30m of known roost locations during the hours of darkness taken to be 30 minutes before sunset through to 30 minutes after sunrise. Where works are required, the nature of the works should be discussed with the ECoW to establish what mitigation measures are required. Works may only take place with the agreement of the ECoW.	To prevent disturbance to bats leaving/entering roosts.	None
P11-E43	Throughout Proposed Scheme	Construction	The confirmed roost at ST08 – Red Stag Lodge will necessitate the removal of the roof by hand and in the presence of a licensed bat worker. Any bats uncovered during roof removal works will be captured and translocated to the compensatory bat box (ref. P11-E46). Demolition of Red Stag Lodge should then be completed under a watching brief by a licenced bat worker.	To comply with conservation legislation and protect roosting bats.	None
P11-E44	Throughout Proposed Scheme	Construction	All trees assessed with bat roost potential that require to be pruned or felled to accommodate the Proposed Scheme will be subject to a pre-felling inspection no more than 24 hours prior in search of roosting bats. Where features	To comply with conservation legislation and protect roosting bats.	None

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			cannot be wholly assessed and ambiguity exists over the possible presence of bats, trees will be 'soft-felled' (i.e. felled in small sections) with care taken not to compromise the integrity of any potential roost feature in order to safeguard any potential bats present. Rock faces subject to blasting or reprofiling works, will be surveyed for the presence of bat roosts. Any bats present within roosts will be translocated to bat boxes erected to mitigate the loss of the roost and proportionate to the type of roost to be lost (see P11-E45). Location of bat box placement will be under direction and guidance of a bat licensed ecologist and be in accordance with P11-E45. Thereafter, the roost and any features with roost potential within a 10m circumference of the roost, will be filled with expanding foam (or equivalent).		
P11-E45	Throughout Proposed Scheme	Pre-Construction & Construction	European Protected Species licences will be in place for all bat roosts to be removed or disturbed. Any bat roosts to be lost will be replaced with bat boxes (or other suitable roosting feature), to be erected prior to the loss of the roost. The requirement for replacement roosts will be determined following pre-construction surveys. Where roosts have already been identified, locations for compensatory bat boxes have been identified and are presented within the Landscape and Ecological Mitigation plan (Figure 13.4). However, their ultimate placement within those predefined areas will be completed under guidance of a Suitably Qualified Ecologist/ECoW. The specification of mitigation bat box will be proportionate to that of the roost to be lost and selected by the suitably qualified ecologist/ECoW, with two bat boxes provided for each roost lost.	To comply with conservation legislation and protect roosting bats. To replace bat roosting habitat.	SNH
P11-E46	Three blasting locations: Slochd Beag CH21800-22000	Pre-Construction &	Birds nesting on rock faces at the three blasting locations present a potential constraint to works, and measures to prevent nesting will be put in place to avoid damage to or	To comply with legislation and protect nesting birds during blasting works.	SNH

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
	Slochd Mor CH23000-23400 Slochd Summit CH23900-24200	Construction	destruction of nests during blasting. Measures will comprise a combination of the following actions as determined to be appropriate through regular monitoring of the rock faces by ornithologists: • Attempts will be made during the winter prior to blasting to make nesting ledges used repeatedly by birds unsuitable to support nests. Wire mesh, netting, spikes or similar control measures will be used. • Bird deterrents will be deployed to prevent breeding birds, starting in late winter/early spring before nesting sites are occupied. Deterrent methods employed by farmers will be used, and may include visual distractions (kites, spinning reflectors, etc) and automated explosive bird scarers (gas guns or similar) aimed at the rock face. Falconry will also be considered to disperse birds prospecting for nest sites. • Blasting will be a controlled and targeted activity. In addition to consideration of ecological constraints, vibration limits will be in place to safeguard surrounding infrastructure. It is considered these limits will minimise the impact to ledges suitable for nesting birds outside of the blasting zone. These measures are, in-combination, expected to be successful in preventing the use of the three rock faces for nesting. However, monitoring throughout the late-winter, spring and summer of the pre-construction and construction periods by ornithologists will determine the success of the above measures. If nest sites are established, then blasting at that particular rock face will be suspended. Immediate consultation with SNH would take place to discuss possible mitigation/licensing options/agreements in order to allow blasting operations to recommence (given potential implications upon project programme, agreements with		

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			neighbouring landowners (e.g. Network Rail), and HRA mitigation.		
P11-E47	Three blasting locations: Slochd Beag CH21800-22000 Slochd Mor CH23000-23400 Slochd Summit CH23900-24200	Pre-Construction & Construction	Blasting is required at three locations to modify rock faces in preparation for construction. Mitigation to reduce this potential interruption of capercaillie lekking behaviour outside of the peak March to May period will be incorporated into the scheme blasting plan and in the Capercaillie Protection Plan. This will involve the following measures: • one blast per week only: to reduce frequency of blasts; • blasts timed to minimise disturbance during lekking periods i.e. scheduled for midday as far as is practical. It is noted that blast timing is subject to suitable intervals in Network Rail's schedule for the Highland Main Line which represents a significant constraint on the work. Of note, Network Rail has requested that consideration be given to blasting operations taking place at night. If this is necessary, blasts will not be conducted from one hour before dawn until 9am between 1st March to end of May, to reduce disturbance during peak lekking periods; • good practice measures during blasting, such as: – acoustic bunds to reflect the wave; – direction of firing away from sensitive locations; – not overcharging blast holes; – good use of stemming (material that backfills the drill holes for blasting); – avoiding venting of explosive gases along rock fractures; – correct burden thicknesses; – avoiding the use of detonation cords (or making sure that they are covered by sufficient burden); – avoiding the use of secondary blasting;	To avoid disturbance of lekking capercaillie during blasting works.	SNH

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			– minimise area of heave and total charge; and – avoid blasting in adverse weather condition (e.g. when wind direction is towards sensitive locations).		
P11-E48	Throughout Proposed Scheme	Pre-Construction & Construction	All protection measures for capercaillie during construction will be included with the Capercaillie Protection Plan/Bird Protection Plan. This will include a toolbox talk to explain all measures. Exclusion zones will be applied to reduce disturbance to capercaillie from both noise and visual disturbance sources. These zones will be defined as: • 1km exclusion zone from a known lek (all human activities); • 500m exclusion if a potential lek is observed (all human activities). If confirmed as a lek following a survey, this should be increased to 1km exclusion within 24 hours; • 100m exclusion if nesting site discovered during activities; • if indication of nesting discovered prior to start of human activities, work should cease or temporarily be moved away from suitable habitat until 15 June of that year; • 100m exclusion where a brood is accidentally disturbed during human activities, for several hours to allow re-grouping of the brood and facilitate their movement away from the disturbance source. Special measures will be put in place to protect leks: • construction within 1km of known lek sites will have a seasonal working window applied: no works will be conducted within this exclusion zone from 1st March to 31st August. Where this is not possible, sound barriers will be used to reduce noise to an acceptable level and the following activities will be prohibited between dusk through to 9am the following morning during this period:	To avoid disturbance of capercaillie whilst lekking and foraging.	SNH

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			– tipping, dumping, transfer and/or movement of aggregate; – drilling, hammering, piling, digging or rock breaking/crushing (including the use of vibratory machinery), and – mechanical means of vegetation clearance and tree felling (for example using a chainsaw). • sensitive lighting during construction phase around Black Mount Junction to reduce visual disturbance/light pollution to capercaillie; • personnel and vehicles/machinery will not enter areas of woodland out with the working area at any time of day, including along paths or tracks, in woodland where capercaillie are known to be present; • if a capercaillie is observed during works at any time, works must cease and the ECoW consulted. The ECoW will determine if there is evidence of nesting and enforce the appropriate exclusion buffer; • screening of construction areas during the lekking season (1st March to end May) that have direct line of sight to known leks. Screening in this area should be high enough to visually mask any machinery from the woodland to the south and be of a different colour to the surrounding vegetation so it is obvious to flying birds thus reducing potential for collision. Screening of other areas within 1km of leks is not deemed to be either necessary, due to existing woodland cover creating a natural visual barrier, or viable, due to local topography. The following measures will be incorporated into the Capercaillie Protection Plan:		

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			• Parking in designated areas only. Designated areas will not include land within Carn bad nan Luibhean or Baddengorm Woods woodland areas, and; • Screening of construction compounds from the surrounding area (all year).		
P11-E49	Ponds 15, 17, 24, 33, 45 and 72	Construction	eDNA testing should be undertaken on ponds 15, 17, 24, 33, 45 and 72 between 15th April to the 30th June in the year prior to construction commencing. If a positive eDNA result is recorded then the Species Protection Plan will be implemented.	To confirm presence/absence of great crested newts and, where present, protect individuals during construction.	None
P11-E50	Around ponds 17, 33, 45 and 72	Construction	All vegetation clearance within 250m of ponds 17, 33, 45 and 72 will be undertaken following a Precautionary Method of Working (PMW) for great crested newts. This PMW will be produced by a suitability qualified ecologist and will include details on approaches and timings for vegetation clearance and methods for hand searches of vegetation by an ecologist. The mitigation measures for Pond 45 include the provision of egg laying plants and timing restrictions for in situ pond works (between November and late January when great crested newts are less likely to be in the pond). An EPS licence application with a detailed mitigation plan will be produced for Pond 15 and Pond 24. This mitigation measure may not be required and will depend on the outcome of the pre-construction eDNA surveys.	To comply with conservation legislation and to protect great crested newts and their habitat.	SNH
P11-E51	Around Ponds 33 and 72	Pre-Construction & Construction	A Precautionary Method of Working document will be developed and adopted within areas suitable to support reptiles. This will detail requirements with respect to seasonal working and reptiles and approaches to vegetation and hibernacula clearance. This document should be agreed with SNH. This document will detail the approaches to follow to ensure that no reptiles are killed or	To protect reptiles within areas of suitable habitat during construction.	SNH

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			injured.		
P11-E52	Throughout Proposed Scheme	Pre-Construction & Construction	Tree felling in areas with red squirrel dreys will be timed outside of the red squirrel breeding season (February to September). Where these timescales cannot be achieved the ECoW will determine an appropriate course of action. All tree felling in locations where dreys are present (active or inactive) will be supervised by the ECoW. A SNH derogation licence must be in place for the removal of all active dreys (and dreys where activity levels cannot be confirmed).	To comply with conservation legislation and protect red squirrels and their dreys.	If licence required - SNH
P11-E53	At wildcat crossing points	Pre-Construction & Construction	Permanent wildcat fencing to be installed at identified crossings, the scope and design of which is to be agreed with SNH. Where fencing ties into structures, culverts and mammal underpasses gaps will not exceed 5cm. Mammal proof fencing will be taken around the top of the structure where the height of the headwall/wingwalls do not exceed the required height of fencing, where access could be gained up a sloping wall or where an overhang on the fencing is required. Where fencing crosses access tracks mammal proof gates will be provided to prevent access onto the carriageway. The installed fencing will be subject to checking and approval by the ECoW prior to works commencing. Where deviations to this are required for constructability purposes, these will be agreed with the ECoW and SNH. Temporary wildcat fencing will be installed prior commencement of the construction phase, terminating at the edge of construction works. The specification of the	To protect wildcats from road traffic accidents.	SNH

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			fencing will follow that of the permanent fencing.		
P11-E54	Throughout Proposed Scheme	Construction	Pre-construction surveys will include the identification of hedgehog nesting and hibernation sites. Prior to construction and outwith the hedgehog hibernation period (October to March inclusive) identified nesting and hibernation sites will be dismantled by hand and re-located outwith the construction area and within suitable, retained habitat for hedgehog, within the Proposed Scheme, under the supervision of the ECoW. This will allow nesting and hibernation sites to be used during construction.	To protect hedgehog nesting and hibernation habitat.	None
P11-E55	Throughout Proposed Scheme	Construction	Habitat manipulation will be undertaken for key areas for brown hare (Lynwilg Farm, Granish; Kinveachy, Carrbridge; southbound at Baddengorm; and northbound at An Slochd Beag). Habitat manipulation should consist of strimming vegetation early in the year (February) prior to works commencing and should include a buffer of 5m from working areas. Prior to strimming, a check should be made by the ECoW to ensure no hares or breeding birds are present. Where vegetation is more than 15cm high, a phased cut is recommended. The first cut should reduce the vegetation to 15cm. The second cut should then be taken to ground level. Habitat manipulation may be required to be maintained for the duration of works within the brown hare breeding period as directed by the ECoW. Where this is not possible, then 24 hours prior to works, the working area will be checked by the ECoW. Should a leveret be found an exclusion buffer of 30m will be applied by the ECoW and maintained for the duration of weaning period (30 days)[xlii]. Adult hares will be allowed to move out of the construction area of their own accord. Once moved, the ECoW will provide authorisation to proceed with works in that area.	To protect brown hare, mountain hare and breeding birds during construction.	None
P11-E56	Local value watercourses/waterbodies	Construction	No working or artificial lighting within 50m of watercourses/waterbodies during the hours of darkness,	To prevent disturbance to otters using Local value	Working times to be

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			taken to be 30 minutes before sunset to 30 minutes after sunrise, unless specifically agreed with SNH. Due to the geographical location of the Scheme and for reasons of practicality, works taking place between the months of November and February (inclusive) may be permitted up to 7pm and from 7am, with no works taking place between these hours, subject to the nature of the works and following discussion with the ECoW. Any lighting used to accommodate such works must be positioned to minimise light spill onto watercourses/waterbodies and will be subject to ECoW approval. The ECoW will monitor otter activity upstream and downstream of the works using camera traps and may stop site activities at any time should they consider that the works are having an impact on otter activity.	watercourses/waterbodies.	agreed with the ECoW
P11-E57	Authority Area value watercourses/waterbodies (Bogbain Burn, Caochan Ruadh, Loch Alvie)	Construction	No working or artificial lighting within 50m of watercourses/waterbodies during the hours of darkness, taken to be 30 minutes before sunset to 30 minutes after sunrise, unless specifically agreed with SNH. The ECoW will monitor otter activity upstream and downstream of the works using camera traps and may stop site activities at any time should they consider that the works are having an impact on otter activity.	To prevent disturbance to otters using Authority Area value watercourses/waterbodies.	Approval required from the ECoW
P11-E58	International value watercourses (River Dulnain, Allt nan Ceatharnach, Allt na Criche (Lynwilg))	Construction	No working or artificial lighting within 50m of watercourses during the hours of darkness, taken to be 30 minutes before sunset to 30 minutes after sunrise, unless specifically agreed with SNH. The ECoW will monitor otter activity upstream and downstream of the works using camera traps and may stop site activities at any time should they consider that the works are having an impact on otter activity. When site activities are taking place at more than one	To prevent disturbance to otters and fish using International value watercourses.	Approval required from the ECoW

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			International value watercourse at any one time, this will be subject to ECoW approval, to avoid any cumulative impact on otter activity. This includes any works taking place within 50m of the watercourse.		
P11-E59	Various locations shown on Figure 13.4	Pre-Construction & Construction	Permanent otter fencing to be installed 100m either side of watercourse crossings, where indicated on the Landscape and Ecological Mitigation plan (Figure 13.4), to be installed prior to scheme completion. Design will follow SNH guidance[xliii] and will be checked and approved by the ECoW. The recommended specification is as follows: at least 1.2m high galvanised welded mesh (of at least 2.5mm gauge) above ground level, with a maximum mesh size of 100 x 50mm attached to fence posts and topped with barbed wire. Below ground, the mesh should be dug in to a depth of 300mm, or 100mm with a horizontal lap on the otters' side of 300-450mm. Where fencing ties into structures, culverts and mammal underpasses gaps will not exceed 5cm. Mammal proof fencing will be taken around the top of the structure where the height of the headwall/wingwalls do not exceed the required height of fencing, where access could be gained up a sloping wall or where an overhang on the fencing is required. Where fencing crosses access tracks mammal proof gates will be provided to prevent access onto the carriageway. Temporary otter fencing must be installed prior to commencement of the construction phase, 100m either side of all watercourse crossings where indicated on the Landscape and Ecological Mitigation plan (Figure 13.4). Specification should follow that of the permanent fencing, where deviations to this are required for constructability purposes, these should be agreed with the ECoW and SNH.	To protect otters from road traffic accidents.	Deviations to be agreed with ECoW and SNH
P11-E60	River Dulnain, Allt nan	Pre-	No in-channel works or bank piling activity associated with	To avoid key spawning,	None

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
	Ceatharnach and Allt na Criche (Lynwilg)	Construction & Construction	crossing and outfall construction on the River Dulnain, Allt nan Ceatharnach and Allt na Criche (Lynwilg) shall be undertaken between October- June inclusive.	development and emergence periods for Atlantic salmon and sea lamprey, as well as the smolt run for Atlantic salmon.	
P11-E61	Allt nan Ceatharnach and Allt na Criche (Lynwilg)	Pre-Construction & Construction	With the exception of temporary dewatering, no working within wetted river channel shall be undertaken on the Allt nan Ceatharnach and Allt na Criche (Lynwilg). No working within the wetted channel shall be undertaken on the River Dulnain.	To avoid acoustic disturbance and water pollution/sedimentation.	None
P11-E62	Throughout Proposed Scheme to north of Granish Junction	Pre-Construction	Wood ant nests from across the impacted area, representing the genetic diversity of the impacted population, will be translocated to suitable receptor sites, before the commencement of construction. Potential receptor sites for translocation adjacent to the Proposed Scheme include Kinveachy Forest. However, this is not considered a fixed receptor site and further survey work is required before construction commences to confirm the site's suitability. Translocation will follow methods adopted during the A9 Kincraig to Dalraddy widening[xliv] (Project 10) and for receptor sites outside the road corridor will follow the Scottish Code for Conservation translocations[xlv]. Previous experience has shown that, depending on the timing, wood ant nests may recolonise sites after translocation but before construction. Where possible, nests will be moved to adjacent areas, immediately prior to construction, although the timing and receptor site selection will be dictated by construction operations. A Species Protection Plan, including a monitoring plan, will be produced for wood ants pre-construction and agreed with CNPA to allow sufficient time for land holder	To maintain diversity of impacted populations of wood ants.	CNPA

Mitigation Item	Approximate Chainage/ Location	Timing of measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			agreements, any site preparation required, and translocation of existing nests in the optimal time of year (spring), therefore avoiding delays to construction. The plan shall detail the following: • a detailed methodology, based on successes/failures of previous work on the A9; • all necessary data to be carefully recorded so that monitoring work can be undertaken and comparisons made (e.g. time of translocation, weather, type of supplementary food provided); • all translocation work to take place in spring unless absolutely necessary; • an estimate of how many nests require translocation (based on evidence from Project 10 that larger nests are more likely to survive); • the species of wood ant that require to be translocated; • location and details of receptor sites, both within the LMA and any off-line receptor sites; all receptor sites to be marked on a map; • all receptor sites to be marked on the ground throughout construction - these areas will be strictly off limits to all construction; • protection measures for nests that can be retained alongside the road during construction; • where possible, factor in the requirement for 'extra' space to be made available for additional nests discovered immediately prior to construction; and • a commitment to monitor the nests for at least 5 years post-construction, with detailed instructions as to the data collected during monitoring visits.		

12.6 Residual Impacts

12.6.1 Table 12.8 provides a summary of the impact assessment as detailed in ES Appendix 12.2-12.11. This impact assessment assumes the adoption of mitigation measures detailed above and as such detail is only provided for residual impacts after their adoption. However, for clarity, detail on pre-mitigation impact characterisation is also provided. Table 12.8 provides a summary of all the ecological receptors for which a residual impact has been identified and details which of these have been identified as significant, taking account of the prescribed mitigation measures.

12.6.2 Impacts during both construction and operation are described in this table, so that all impacts on a feature are considered together.

12.6.3 HRA has been carried out for 15[15] international sites, as documented in the HRA for the Proposed Scheme. Ten of these sites were carried forward to Appropriate Assessment. The result of the AA was a finding of no adverse effect on site integrity for any of the sites.

12.6.4 Mitigation to offset the potential impacts on capercaillie (as identified through the ES and HRA) are included in Table 12.6 and Table 12.7. It has been concluded (refer to ES Appendix 12.6) that, after implementation of mitigation measures, there will be no residual impacts on the capercaillie associated with the Proposed Scheme. This is consistent with the AA of sites designated for capercaillie which concluded no minor residual effects on this species, after implementation of mitigation measures.

[15] This is the number of individual designations ignoring overlapping areas.

Table 12.8: Summary of Specific Impacts, Mitigation and Residual Impacts

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
Designated Sites					
River Spey SAC and SSSI	International	Habitat loss – Medium Otters Disturbance – Low Severance – Low Direct mortality – Medium	The Proposed Scheme crosses the SAC at three locations: the Allt na Criche (Lynwilg), River Dulnain, and Allt nan Ceatharnach. These watercourses are also tributaries of the SSSI. Habitat Loss There will be a combined total loss of approximately 48m of open channel and bankside habitat across these watercourses, through portal frame culvert and bridge placement. This comprises a loss of approximately 22m on the Allt na Criche (Lynwilg), 13m on the Allt nan Ceatharnach, and 13m on the River Dulnain. Otter Disturbance: Construction works in the vicinity of the SAC watercourses may result in changes to existing otter activity levels due to increased levels of construction related disturbance, such as light, noise, vibration, and human activity. This may alter how otters use these watercourses and adjacent terrestrial habitat if individuals avoid areas due to disturbance. As a result, resting sites and foraging habitat may not be frequented during the construction period. Severance: Movement of otters along the SAC watercourses may be affected during the construction period through severance, restricting access to resting sites and foraging resources. For example, during construction of culverts and other water crossings, passage along watercourses may be temporarily severed. Direct mortality: Construction works within the vicinity of the SAC watercourses may cause changes to existing otter activity levels and alter how they use watercourses and terrestrial habitat in the area. This in turn may result in an increased risk of mortality caused by road traffic accidents.	Habitat Loss All practical measures have been included in embedded and standard mitigation to avoid impacts on watercourse habitats during construction, reducing the length of culverts required and using bridges and open portal-frame culverts which serve to remove existing artificial in-channel structures, (e.g. culvert inverts); restore natural bed substrates and improve water depth and flow provision at crossing locations, supporting unimpeded passage for migratory fish. In the case of Allt na Criche (Lynwilg), the artificial invert (channel reinforcement) associated with the existing bridge will be demolished and replaced by a clear-span structure. Residual habitat loss is therefore primarily riparian (as a result of abutments) and as a result of the increased extent of habitat physically beneath the road under the Proposed Scheme (with implications for shading and primary productivity). Otter Pre-construction surveys for otter will be undertaken (SMC-E1) and a Species Protection Plan produced and agreed with SNH (P11-E34). No working or artificial lighting will be permitted within 50m of the SAC watercourses during the hours of darkness, taken to be 30 minutes before sunset to 30 minutes after sunrise, unless specifically agreed with SNH (P11-E58). A suitably qualified ECoW (SMC-E2) will monitor otter activity upstream and downstream of the works using camera traps and may stop site activities at any time should they consider that the works are having an impact on otter activity. When site activities are taking place at more than one SAC watercourse at any one time, this will be subject to ECoW approval, to avoid any cumulative impact on otter activity. This includes any works taking place within 50m of the watercourse (P11-E58). Permanent otter fencing will be installed 100m either side of the SAC watercourse crossings, as indicated on the Landscape and Ecological Mitigation plan (Figure 13.4), prior to completion of the Proposed Scheme. Temporary otter fencing will be installed prior to construction, and will follow the specification of permanent fencing (P11-E59).	No
Insh Marshes SAC	International	Otters Disturbance – Low Severance – Low Direct mortality – Medium	Insh Marshes SAC is located approximately 2.1km from the Proposed Scheme. Due to the large home ranges of otters (which can extend over tens of kilometres), there is potential for otters present within the SAC to be utilising habitat within the vicinity of the Proposed Scheme. Disturbance: Construction works may result in changes to existing otter activity levels due to increased levels of construction related disturbance, such as light, noise, vibration, and human activity. This may alter how otters use watercourses	Pre-construction surveys for otter will be undertaken (SMC-E1) and a Species Protection Plan produced and agreed with SNH (P11-E34). No working or artificial lighting within 50m of watercourse or waterbodies during the hours of darkness, taken to be 30 minutes before sunset to 30 minutes after sunrise, unless specifically agreed with SNH (SMC-E2, P11-E56, P11-E57, P11-E58). All trenches, holes and pits will be kept covered overnight or provide a means of escape to prevent the entrapment of otters (SMC-E13).	No

[16] In some instances, different areas of the site may have been assigned different values, for this summary table only the highest value assigned to the receptor is detailed.
[17] Impacts are for the construction phase unless specifically noted as for the operation phase

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
			and terrestrial habitat if individuals avoid areas due to disturbance. As a result, resting sites and foraging habitat may not be frequented during the construction period. Severance: Movement of otters along watercourses may be affected during the construction period through severance, restricting access to resting sites and foraging resources. For example, during construction of culverts and other water crossings, passage along watercourses may be temporarily severed. Direct mortality: Construction works within the vicinity of watercourses may cause changes to existing otter activity levels and alter how they use watercourses and terrestrial habitat in the area. This in turn may result in an increased risk of mortality caused by road traffic accidents.	Permanent otter fencing will be installed 100m either side of the SAC watercourse crossings, as indicated on the Landscape and Ecological Mitigation plan (Figure 13.4), prior to completion of the Proposed Scheme. Temporary otter fencing will be installed prior to construction, and will follow the specification of permanent fencing (P11-E59). Permanent otter fencing will be installed 100m either side of the SAC watercourse crossings, as indicated on the Landscape and Ecological Mitigation plan (Figure 13.4), prior to completion of the Proposed Scheme. Temporary otter fencing will be installed prior to construction, and will follow the specification of permanent fencing (P11-E59).	
River Spey - Insh Marshes Ramsar	International	Otters Disturbance – Low Severance – Low Direct mortality – Medium	The River Spey – Insh Marshes Ramsar is located approximately 2.5km from the Proposed Scheme. Due to the large home ranges of otters (which can extend over tens of kilometres), there is potential for otters present within the SAC to be utilising habitat within the vicinity of the Proposed Scheme. Disturbance: Construction works may result in changes to existing otter activity levels due to increased levels of construction related disturbance, such as light, noise, vibration, and human activity. This may alter how otters use watercourses and terrestrial habitat if individuals avoid areas due to disturbance. As a result, resting sites and foraging habitat may not be frequented during the construction period. Severance: Movement of otters along watercourses may be affected during the construction period through severance, restricting access to resting sites and foraging resources. For example, during construction of culverts and other water crossings, passage along watercourses may be temporarily severed. Direct mortality: Construction works within the vicinity of watercourses may cause changes to existing otter activity levels and alter how they use watercourses and terrestrial habitat in the area. This in turn may result in an increased risk of mortality caused by road traffic accidents.	Pre-construction surveys for otter will be undertaken (SMC-E1) and a Species Protection Plan produced and agreed with SNH (P11-E34). No working or artificial lighting within 50m of watercourse or waterbodies during the hours of darkness, taken to be 30 minutes before sunset to 30 minutes after sunrise, unless specifically agreed with SNH (SMC-E2, P11-E56, P11-E57, P11-E58). All trenches, holes and pits will be kept covered overnight or provide a means of escape to prevent the entrapment of otters (SMC-E13). Permanent otter fencing will be installed 100m either side of the SAC watercourse crossings, as indicated on the Landscape and Ecological Mitigation plan (Figure 13.4), prior to completion of the Proposed Scheme. Temporary otter fencing will be installed prior to construction, and will follow the specification of permanent fencing (P11-E59). Permanent otter fencing will be installed 100m either side of the SAC watercourse crossings, as indicated on the Landscape and Ecological Mitigation plan (Figure 13.4), prior to completion of the Proposed Scheme. Temporary otter fencing will be installed prior to construction, and will follow the specification of permanent fencing (P11-E59).	No
Cairngorms SAC	International	Otters Disturbance – Low Severance – Low Direct mortality – Medium	The Cairngorms SAC is located approximately 1km from the Proposed Scheme. Due to the large home ranges of otters (which can extend over tens of kilometres), there is potential for otters present within the SAC to be utilising habitat within the vicinity of the Proposed Scheme. Disturbance: Construction works may result in changes to existing otter activity levels due to increased levels of construction related disturbance, such as light, noise, vibration, and human activity. This may alter how otters use watercourses and terrestrial habitat if individuals avoid areas due to disturbance. As a result, resting sites and foraging habitat may not be frequented during the construction period. Severance: Movement of otters along watercourses may be affected during the construction period through severance, restricting access to resting sites and foraging resources. For example, during construction of culverts and other water crossings, passage along watercourses may be temporarily	Pre-construction surveys for otter will be undertaken (SMC-E1) and a Species Protection Plan produced and agreed with SNH (P11-E34). No working or artificial lighting within 50m of watercourse or waterbodies during the hours of darkness, taken to be 30 minutes before sunset to 30 minutes after sunrise, unless specifically agreed with SNH (SMC-E2, P11-E56, P11-E57, P11-E58). All trenches, holes and pits will be kept covered overnight or provide a means of escape to prevent the entrapment of otters (SMC-E13). Permanent otter fencing will be installed 100m either side of the SAC watercourse crossings, as indicated on the Landscape and Ecological Mitigation plan (Figure 13.4), prior to completion of the Proposed Scheme. Temporary otter fencing will be installed prior to construction, and will follow the specification of permanent fencing (P11-E59).	No

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
			severed. Direct mortality: Construction works within the vicinity of watercourses may cause changes to existing otter activity levels and alter how they use watercourses and terrestrial habitat in the area. This in turn may result in an increased risk of mortality caused by road traffic accidents.	Permanent otter fencing will be installed 100m either side of the SAC watercourse crossings, as indicated on the Landscape and Ecological Mitigation plan (Figure 13.4), prior to completion of the Proposed Scheme. Temporary otter fencing will be installed prior to construction, and will follow the specification of permanent fencing (P11-E59).	
Alvie SSSI	National	Habitat loss – High Severance – Negligible	The Proposed Scheme will result in a potential direct permanent loss of 1.8ha of habitat. The proposed works are for the construction of access tracks and occur along the boundary of the site, mainly within woodland (1.4ha) and lesser areas of other habitats (0.4ha). The proposed works will not fragment or dissect the site. Apart from potential food sources for caddis fly larva, there will be no impacts on features for which the SSSI is designated.	Mitigation planting as shown on the Landscape and Ecological Mitigation plan (Figure 13.4) includes an area of 1.4ha, which will reduce the permanent residual loss of habitat within the SSSI to 0.4ha. A Habitat Management Plan will be developed which will include specific measures for working on the border of the Alvie SSSI detailing operational avoidance, mitigation and rehabilitation measures to further reduce temporary and residual impacts (P11-E16).	No
Craigellachie SSSI and NNR	National	Habitat loss – High Severance – Negligible Fragmentation – Negligible	The Proposed Scheme will result in a potential direct loss of 2.3ha of habitat. These losses border the A9 along the eastern edge of the SSSI/NNR and do not fragment or dissect the SSSI/NNR. The habitat loss represents a minor loss of habitat and food sources for moth species with is a qualifying feature for the site. The existing drainage flows directly into Loch Puladdern which has been included in the assessment of impacts on water quality. The proposed works are primarily three SuDS structures and associated upgrading of existing tracks. These were placed in this location because there was no alternative available[xlvi]. The proposed works are to occur mainly within areas of woodland (1.5ha), which includes upgrading of an existing infiltration basin. Other areas include grassland (0.4ha), heath (0.2ha) or existing tracks (0.1ha).	Mitigation planting as shown on the Landscape and Ecological Mitigation plan (Figure 13.4) includes an area of 1.9ha, which will reduce the permanent residual loss of habitat within the SSSI to 0.3ha. A Habitat Management Plan will be developed which will include specific measures for working on the border of the Craigellachie SSSI/NNR detailing operational avoidance, mitigation and rehabilitations measures to further reduce both temporary and residual impacts (P11-E16). The proposed scheme will continue to discharge into Loch Puladdern, but through two levels of SuDS in accordance with current standards/ SEPA guidance. Therefore, the quality of the run-off discharging into the Loch will be improved compared to baselines conditions.	No
Other terrestrial habitats					
Ancient Woodland	Authority Area to National	Habitat loss – High Fragmentation – Low Severance – Low	A total of 77.2ha from 25 areas listed on the AWI will be lost. Of this area 42.03ha is woodland and the remaining 35.17ha is a mix of open habitats, scrub and existing carriageways/tracks. Of this area 1.3ha of woodland (3.1ha of other habitats) has been assessment as not significant due to the very small nature (<0.5ha) of the woodland loss at individual ancient woodland areas.	Planting of woodland in a variety of locations (P11-E21). This includes planting of 48.16ha of woodland as shown on the Landscape and Ecological Mitigation plan (Figure 13.4). This includes 22.4ha of woodland planting on sites listed on the AWI. In addition to the above, a woodland compensation planting site has been selected (shown on Figure 12.23a). The receptor sites for this compensatory planting have been selected to enhance the ecological connectivity and functionality of the existing woodland network (see woodland compensation strategy Annex J, ES Appendix 12.2) which will reduce the impact on ancient woodlands. The combined areas of mitigation and compensatory woodland planting totals 88.97ha and once established will result in no let loss of woodland area from the Proposed Scheme as required by the Scottish Government's policy on control of woodland removal[xlvii]. Re-use of soil from lost ancient woodland sites (P11-E21), which includes areas that are no longer wooded where appropriate (e.g. areas with a species rich ground layer and associated seed bank). Transfer deadwood from ancient woodland to nearby existing ancient woodland (P11-E26).	Yes
Dry heath zone	Authority Area	Habitat loss – High Fragmentation – Low Severance – Low	A total of 20.9ha of habitat from the dry heath zone will be lost, of which 17.3ha is dry heath.	Mitigation of all important habitats will be undertaken (P11-E20). The Landscape and Ecological Mitigation plan (Figure 13.4) includes re-establishment of areas of dry heath (15.5ha) and other habitats (1.92ha) within the impact area that, if successful will	Yes

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
				reduce the extent of permanent habitat loss to 3.48ha including 1.8ha of dry heath. However, taking the precautionary approach, it is assumed that these habitats will be permanently lost. Minimise works area to reduce habitat loss (P11-E16). Re-use top soil from SBL and Annex 1 sites where appropriate (P11-E23).	
Blanket bog/heath zone	Local	Habitat loss – High Fragmentation – Low Severance – Low	A total of 11.24ha of habitat from the blanket bog/heath zone will be lost of which 2.13ha is dry heath, 2.07ha is acid grassland, 1.86ha is blanket bog, 1.34ha is basin mire/dry modified bog/marshy grassland and 2.17ha other habitats.	Mitigation of all important habitats will be undertaken (P11-E20) which will include 3.82ha dry heath, 0.89ha scrub and 1.9ha of other habitats. Re-use top soil from SBL and Annex 1 sites where appropriate (P11-E23).	No
Other habitat types	Local	Habitat loss – High Fragmentation – Low Severance – Low	A total of 29.72ha of Local valued habitat will be lost from areas of Local importance habitat not included above, which is mainly (19.45ha) semi-natural broadleaved and mixed woodland. These losses are made up of a large number of small woodland parcels throughout the length of the Proposed Scheme. The majority of the losses are in the southern half of the Proposed Scheme and in narrow or fragmented roadside bands along the A9 mainline route. The quality of these woodland stands can vary markedly from location to location. Other habitats included within this total lost include: Dry heath & dry heath/acid grassland mosaic – 8.69ha; Semi-natural coniferous woodland – 0.41ha; Blanket bog and wet modified bog – 0.21ha; Flushes - 0.08ha; and Swamp - 0.88ha.	Mitigation of all important habitats will be undertaken (P11-E20). Proposed woodland planting in the Landscape and Ecological Mitigation plan Figure 13.4 includes: 5.4ha aspen woodland; 3.69ha birch woodland; 16.65ha coniferous woodland; 19.8ha mixed woodland; 2.88ha scrub woodland; and 2.62ha wet woodland.	No
Aquatic receptors					
Watercourses (River Spey SAC and SSSI) Allt nan Ceatharnach River Dulnain Allt na Criche (Lynwilg)	International	Habitat loss – Medium	Loss of open channel and bankside habitat through culvert/bridge placement.	All practical measures have been included in embedded and standard mitigation to avoid impacts on watercourse habitats during construction, reducing the length of culverts required and using bridges and open portal-frame culverts which serve to remove existing artificial in-channel structures, (e.g. culvert inverts); restore natural bed substrates and improve water depth and flow provision at crossing locations, supporting unimpeded passage for migratory fish. Habitat loss is therefore primarily riparian (as a result of abutments) and as a result of the increased extent of habitat physically beneath the road under the Proposed Scheme (with implications for shading and primary productivity). Permanent water course diversions designed to specified standards to maintain habitat (P11-E33). Culverts placed on water courses built to appropriate standards (P11-E28). Mitigations for receptors associated with international designated sites includes restrictions on in channel works or wetted channel at specified locations (P11-E60, P11-E61).	No[18]
Watercourses - Allt Chriochaidh Caochan Ruadh Allt an Fhearna	National				
Watercourse- Aviemore Burn	Regional				
Watercourse- Allt Cnapach	Local				
Watercourse Allt na Criche (Lynwilg)	International	Improved fish passage - High	Removal of artificial bridge invert and naturalisation of river channel underneath replacement A9 1130 Criche Bridge, improving connectivity to upper catchment.	All practical measures have been included in embedded and standard mitigation to improve habitat connectivity and aquatic species permeability during operation, reducing the length of culverts required and restoring natural bed substrates through the	Yes (beneficial)
Watercourses	National	Improved fish passage -	Removal of artificial culvert inverts and naturalisation of river		Yes (beneficial)

[18] This does not include the significant beneficial operational residual impacts

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
Caochan Ruadh and Allt Chriochaidh		High	channel underneath replacement A9 1100 C70 Caochan Ruadh culvert and A9 1100 Allt Chriochaidh bridge, improving connectivity to upper catchment.	use of open portal-frame culverts. P11-E28 P11-E33	
Watercourse Aviemore Burn	Regional	Improved fish passage - High	Removal of artificial culvert invert and naturalisation of river channel underneath replacement A9 1150 C95 Steallan Dubh culvert, improving connectivity to upper catchment.		Yes (beneficial)
Watercourse Allt Cnapach	Local	Improved fish passage - High	Removal of artificial culvert invert and naturalisation of river channel underneath replacement A9 1170 C50 Allt Cnapach culvert, improving connectivity to upper catchment.		No (beneficial)
Pond 18	National	Habitat loss – High	Permanent loss of habitat during construction.	Detailed, specific mitigation has been developed for the loss of this pond based on its potential to support Northern damselfly (P11-E30), with the pond being replaced as near to its original location as practical, as shown on the landscape and Ecological Mitigation plan (Figure 13.4)	No
Badger					
Three badger setts	Local	Habitat loss – High Disturbance – Medium	Direct loss of three setts. Possible disturbance from construction works to the main sett located within the Study Area (within 100m of the Proposed Scheme).	Develop and implement species protection plan for badger (P11-E34). Maintain appropriate exclusion zones around badger setts (P11-E36). All works under licence must be carried out during daylight hours. Monitor badger setts across Study Area (P11-E37).	No
Suitable habitat within Study Area (south of Black Mount)	Local	Severance – Low	Movement of badgers may be affected during the construction period through severance, restricting access to badger setts and foraging resources.		
Badger population	Local	Operation Mortality – Medium	The Proposed Scheme may result in an increased risk of mortality by road traffic.	Permanent badger fencing installed as shown on Landscape and Ecological Mitigation plan (Figure 13.4) (P11-E38). Monitor and provide additional fencing for badger protection if required (P11-E40). The Proposed Scheme will result in, a minimum of 24 locations which will be suitable for passage (Figure 12.24), an increase of 14 passages compared to baseline conditions.	No
Bats					
Maternity roost at one building	Authority Area	Disturbance – Low	Disturbance to maternity brown long-eared bat roost, and non-breeding common pipistrelle and soprano pipistrelle roosts and potential hibernation during winter (Lynwilg ST01) located within 6m of the Proposed Scheme.	Construction works to take into account seasonal requirements for bats (P11-E31). Develop and implement species protection plan for bats (P11-E34). ECoW will be utilised during construction to ensure compliance with relevant wildlife legislation and any protected species licenses (P11-E42).	No
One non-breeding roost at a rock face	Authority Area	Disturbance - Low	Disturbance of non-breeding roost of Natterer's bat recorded within cave of rock face (RF10) located on the edge of the Proposed Scheme. On a precautionary basis and in the absence of further evidence of bats the cave has been assessed as a roost supporting non-breeding Natterer's bat. The roost is located towards the northern-most range of the species and will not be lost during construction of the Proposed Scheme and will remain suitable for use following completion.		No
Roosts located within eleven building locations and two rock faces	Local (one site Authority Area)	Disturbance - Low	Disturbance to eleven non-breeding roosts located 1-8m from the Proposed Scheme (one roost at ST03, ST05, ST08, ST11, ST21, ST23, ST25 and four roosts at ST12). Disturbance to one maternity and non-breeding roost located 3m from the Proposed Scheme (ST09). Disturbance of two roosts at Rock Face RF01 and a transition roost located on Rock Face RF04 located immediately adjacent to the Proposed Scheme.		No
Four non-breeding roosts	Local	Loss of roosts – Medium	Loss of four non-breeding roosts associated with common	As for disturbance impacts above and removal of bat roosts at	No

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
at a building, tree and (two roosts at) a rock face			pipistrelle or Myotis sp. at a building (ST08), tree (TR71) and at a rock face rock face (RF15).	ST08 as per P11-E43. Bat boxes will be installed to account for the loss of all roosts; detailed mitigation measures will be developed as part of SNH licence applications (P11-E45).	
Crossing Point	Local	Severance/fragmentation of commuting corridor – Medium	Partial loss of commuting route at crossing point (CP02) associated with felling of vegetation that is currently channelling bats into this corridor of passage and providing their flight line. Increase in width of the carriageway may deter bats from commuting over the carriageway and increase mortality.	As for disturbance impacts above. Retain vegetation associated with flight line for as long as possible. Utilise fencing/potted trees to maintain flight line corridor once vegetation is felled (P11-E44).	No
Foraging and commuting habitat around Granish and Aviemore Junctions	Local	Severance/fragmentation/ of commuting/foraging habitat – Low Loss of commuting/foraging habitat – Low	Severance, fragmentation and loss of commuting and foraging habitat due to the construction of junctions either side, and encompassing, the A9 carriageway. Likely displacement of bats to new areas for foraging due to loss of foraging and edge habitat. Loss of commuting habitat with the removal of linear roadside habitat to accommodate junctions. Ample habitat similar to that being lost will remain in the immediate area of the junctions continuing to offer commuting and foraging opportunities.	As for disturbance impacts above.	No
Birds – breeding					
Woodland Birds Scheme-wide	Local to National	Loss of woodland habitat – High	Removal of woodland within the Proposed Scheme will lead to potential loss of breeding habitat for two species of National importance (redwing and crossbill species), five woodland bird species of Authority Area importance (bullfinch, wood warbler, spotted flycatcher, siskin and tree pipit). Eight species of local importance (buzzard, coal tit, crested tit, goldcrest, mistle thrush, pied flycatcher, treecreeper, willow warbler) will be affected throughout the scheme. Buzzard roost and forage within woodland but also forage over adjacent open ground.	For all species woodland habitat is abundant in the wider areas so it is considered that alternative habitat is present for use over the construction period. Re-planting of woodland will be undertaken as indicated on the Landscape and Ecological Mitigation plan (Figure 13.4).	No
Buzzard	Local				
Birds - wintering					
Woodland Birds Scheme-wide	Local to National	Loss of woodland habitat – High	Removal of woodland will lead to loss of winter foraging and roosting habitat for woodland bird species. One species of national importance (crossbill species), two species of authority area importance (bullfinch and siskin) and five species of local importance (coal tit, crested tit, mistle thrush, treecreeper and buzzard) will be affected throughout the scheme. Buzzard roosts and forages within woodland but also forages over adjacent open ground.	For all species woodland habitat is abundant in the wider areas so it is considered that alternative habitat is present for use over the construction period. Re-planting of woodland will be undertaken as indicated on the Landscape and Ecological Mitigation plan (Figure 13.4).	No
Buzzard	Local				
Great crested newt					
Ponds where great-crested newts are assumed to be present and not separated from the Proposed Scheme by significant barriers to movement (Ponds 15, 33, 45 and 72)	Local	Habitat loss – High Mortality – High Disturbance – High	Habitat loss - Pond 15 and terrestrial habitat on the western side of the pond will be permanently lost. Terrestrial habitat will remain present on the eastern side of the pond. Ponds 33, 45 and 72 will not be lost but some terrestrial habitat within 250m of these ponds will be permanently lost. Mortality and disturbance - The movement of construction vehicles and machinery used to remove Pond 15 and terrestrial habitat at Ponds 15, 33, 45 and 72 may result in the death and/or disturbance of individual great crested newts.	Replace all ponds lost (P11-E29) including any adjacent important habitat (P11-E20) as shown on the Landscape and Ecological Mitigation plan (Figure 13.4)). Develop and implement species protection plan for fauna (P11-E34). Implement Guidance for Pollution Prevention (GPP) (P11-E32). eDNA testing prior to construction to confirm presence of species (P11-E49). Clearing around ponds where the species occurs undertaken following a Precautionary Method of Working (PMW) (P11-E50). Where required EPS Licences will be obtained.	No
Reptiles					

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
Areas of high suitability for reptiles within the Proposed Scheme Areas of moderate suitability for reptiles within the Proposed Scheme	Authority Area Local	Habitat loss – Medium Disturbance – Low Severance – Medium Mortality – Medium	Habitat loss - Direct loss of habitat highly suitable for reptiles (98.18ha) and moderately suitable (75.37ha). Disturbance - Noise, vibration and increased human activities associated with construction activities may result in disturbance. Severance - Fragmentation of high and moderate suitability reptile habitat at junctions and access roads. Mortality - Injury and/or mortality of common reptiles due to construction related activities, including earthworks and vehicle movements.	Precautionary Method of Working will be developed and adopted within areas suitable to support reptiles (P11-E51). Retained deadwood returned to benefit a number of species (including reptiles) (P11-E25). Develop and implement species protection plan for reptiles (P11-E34).	No
Red squirrel					
Woodland with suitable habitat at locations specified in ES Appendix 12.9	Authority Area to Regional	Loss of habitat including loss of dreys and direct mortality – Medium Disturbance, general construction activities – Medium	Tree removal in the identified locations is likely to result in the loss of dreys and foraging habitat. Proposed construction activities within 50m of the identified locations are likely to increase disturbance levels from noise, vibration and increased human activity. This may disturb red squirrel present in these locations for a temporary period.	Minimise works area to reduce habitat loss (P11-E16). Woodland planting shown in Landscape and Ecological Mitigation plan (Figure 13.4). Develop and implement species protection plan for red squirrel (P11-E34). Implement specifications for tree felling in areas with red squirrel dreys (P11-E52).	No
Woodland with suitable habitat within the vicinity of proposed piling construction, specified in ES Appendix 12.9	Regional	Disturbance, piling – Low	In addition to the disturbance and habitat loss impacts listed above, proposed construction activities are within 100m of suitable habitat at the specified locations and are likely to increase disturbance levels from high levels of noise, vibration and human activity. This may displace red squirrel from nesting, foraging and commuting within these areas for the duration of works.		
Woodland with suitable habitat within the vicinity of proposed blasting, specified in ES Appendix 12.9	Regional	Disturbance, blasting – Low	In addition to the disturbance and habitat loss impacts listed above, blasting at Slochd will affect nearby habitat at these locations as well as a drey located approximately 50m north-east of the Proposed Scheme. This may displace red squirrel from nesting, foraging and commuting within this area for the duration of works.		
Woodland with suitable habitat at Granish and Black Mount Junctions	Authority Area to Regional	Severance – Low	In addition to the disturbance and habitat loss impacts listed above, construction is likely to reduce connectivity at these locations. However, the habitat will not be completely severed at Granish as a corridor for movement across the woodland will remain. It is unlikely that red squirrel currently cross the road at Black Mount as high quality habitat exists on both sides of the carriageway.		
Woodland with suitable habitat throughout the Proposed Scheme	Authority Area to Regional	Severance – Low	The Proposed Scheme may result in an increased risk of mortality by road traffic.	In addition to above, the Proposed Scheme will result in, a minimum of 15 locations which will be suitable for passage (Figure 12.24), an increase of eight passages compared to baseline conditions.	No
Pine marten					
Woodland with suitable habitat at locations specified in ES Appendix 12.9	Local to Authority Area	Loss of quality habitat including loss of suitable den sites and direct mortality – Medium Disturbance, general construction activities – Medium	Suitable den sites were recorded within the Proposed Scheme at these locations. Works in these locations could result in the loss of suitable den sites and foraging habitat. The cumulative impact has been considered with regards to habitat of Local value. Construction activities are likely to increase disturbance levels from noise, vibration and increased human activity in these locations which include suitable den sites.	Develop and implement species protection plan for pine marten (P11-E34). Woodland planting shown in Landscape and Ecological Mitigation plan (Figure 13.4) will compensate for the loss of woodland (P11-E20). Minimise works area to reduce habitat loss (P11-E16).	No
Woodland with suitable habitat within the vicinity	Local	Disturbance, piling – Low	In addition to the disturbance and habitat loss impacts listed above, proposed piling within 100m of the specified locations is		

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
of proposed piling construction, specified in ES Appendix 12.9			likely to increase disturbance levels from high levels of noise, vibration and human activity. This may temporality displace pine marten from den excavation, foraging and commuting within these areas.		
Woodland with suitable habitat at locations specified in ES Appendix 12.9	Local to Authority Area	Operation Severance – Medium	Widening along the A9 and at Feith Mhor Junction and increased traffic may increase severance and mortality.	The Proposed Scheme will result in, a minimum of 16 locations which will be suitable for passage (Figure 12.24), an increase of 10 passages compared to baseline conditions.	No
Wildcat					
Habitat of high or moderate suitability at locations specified in ES Appendix 12.9	National	Habitat loss – Medium Disturbance – Low	Works in the specified locations will result in the loss of habitat that may be used by wildcat for foraging and shelter. Works in the specified locations are likely to increase disturbance levels from noise, vibration and increased human activity and disturb the species in these locations during the proposed works.	Minimise works area to reduce habitat loss (P11-E16). Develop and implement species protection plan for wildcat (P11-E34), which will include a monitoring plan.	No
Habitat of low-high suitability in locations specified in ES Appendix 12.9	Regional to National	Disturbance, piling – Low	In addition to the disturbance and habitat loss impacts listed above, proposed piling activities within 100m of these locations are likely to increase disturbance levels from high levels of noise, vibration and human activity. This may displace wildcat from denning, foraging and commuting within these areas.		
Suitable habitat at locations specified in ES Appendix 12.9	Regional to National	Operation Severance – Medium	Widening across the Proposed Scheme may decrease connectivity to suitable areas of habitat. This impact is considered to be greatest across habitat units determined as high or moderate suitability for wildcat and which are intersected by the proposed junctions of Aviemore South, Granish and Black Mount.	Install wildcat fencing at identified crossing points, the scope of which is to be agreed in consultation with SNH (P11-E53). The Proposed Scheme will result in, a minimum of 21 locations which will be suitable for passage (Figure 12.24), an increase of 12 passages compared to baseline conditions.	No
Otter					
River Spey SAC watercourses: River Dulnain Allt nan Ceatharnach Allt na Criche (Lynwilg)	International	Disturbance to individuals using commuting routes – Low Severance of habitat and important commuting routes – Low Direct mortality – Medium	Disturbance: Construction works may cause changes to existing otter activity levels due to increased levels of construction related disturbance, such as light, noise, vibration, and human activity. As a result, resting sites and foraging habitat may not be frequented during the construction period. Severance: Movement of otters along watercourses may be affected during the construction period through severance, restricting access to resting sites and foraging resources. For example, during construction of culverts and other water crossings, passage along watercourses may be temporarily severed. Mortality: Construction works within the vicinity of these watercourses/waterbodies may cause changes to existing otter activity levels and alter how they use watercourses/waterbodies and terrestrial habitat in the area. This in turn may result in an increased risk of mortality caused by road traffic accidents.	Species Protection Plans to be produced pre-construction and agreed with SNH (P11-E34). Exclude works within 50m of SAC International importance watercourses during the hours of darkness and limit potential cumulative impacts (P11-E58). Exclude works within 50m of Authority Area importance watercourses during the hours of darkness (P11-E57). Where practical exclude works within 50m of Local importance water courses during the hours of darkness (P11-E56). The above mitigation measures include direction on the control of lighting near otter habitats.	No
Bogbain Burn, Caochan Ruadh, Loch Alvie	Authority Area				
All other watercourses/waterbodies	Local				
Low status resting site located on the Caochan Ruadh	Authority Area	Direct damage - High	Construction works at this location will result in direct damage and loss of this resting site.		
Allt Cosach	Up to Authority Area	Disturbance - High	A precautionary approach has been taken to this assessment (see limitations section ES Appendix 12.10) Therefore construction works within the vicinity of this watercourse may result in disturbance to otters using natal/breeding holts due to increased levels of construction related disturbance, such as light, noise, vibration, and human activity. This may prevent individuals from using the watercourse as a location for potential		

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
			natal/breeding holts during the construction period.		
Low status resting site located on the Bogbain Burn	Authority Area	Disturbance – Medium	Construction works may result in disturbance to otters due to increased levels of construction related disturbance, such as light, noise, vibration, and human activity. This may prevent individuals from frequenting this resting site during the construction period.		
Suitable habitat throughout the Proposed Scheme	Local to International	Operation Direct mortality – Medium	The Proposed Scheme may result in an increased risk of mortality by road traffic.	Permanent otter fencing to be installed 100m either side of watercourse crossings, where indicated on the Landscape and Ecological Mitigation plan (Figure 13.4) (P11-E59). In addition to the above, the Proposed Scheme will result in, a minimum of 22 locations which will be suitable for passage (Figure 12.24), an increase of 2 passages compared to baseline conditions.	No
Water Vole					
Suitable habitat	Local	Loss of habitat – Negligible	Water vole are not considered within the impact assessment as no evidence of this species was recorded within the Study Area during field surveys in 2017. As such, they are not considered to be present within the EZoI.	Pre-construction surveys for the species will be undertaken, and in the event of a change in baseline conditions additional mitigation may be required. Any mitigation measures developed will require agreement from SNH (P11-E34).	No
Invertebrates					
Woodland edge/glade Woodland fringed banks and open areas Habitat for narrow-headed, Scottish and hairy wood ants	Authority Area	Habitat loss – Medium	Widening of the A9 to between Granish Junction and Slochd will result in the loss of woodland. These areas include edge habitat and potential habitat for narrow-headed and other species of wood ant. The incidental survey identified 46 wood ant nest locations within the Proposed Scheme footprint.	Mitigation includes replacement woodland planting as shown on the Landscape and Ecological Mitigation plan, Figure 13.4 (P11-E20). A species management plan will be prepared and translocation of wood ant nests to suitable receptor sites before the commencement of construction (P11-E62).	No
Aspen woodland, habitat for aspen hoverfly	Authority Area	Habitat loss – Medium	Widening of the A9 will result in the loss of aspen woodland at CNPA identified locations and across over 4.0ha[19] and 24 point localities[20] elsewhere within the Proposed Scheme.	Avoid removal of aspen trees where possible. If felled retain logs (P11-E18). Replanting along the new road verge will include 5.3ha of aspen woodland as shown on Landscape and Ecological Mitigation plan (Figure 13.4).	No
Neutral semi-improved grassland, potential habitat for *Andrena marginata* and other solitary bees; dry heath & birch, hotspot for moths; oak woodland supporting mountain flat-body moth; and conifer woodlands (various locations)	Authority Area	Habitat loss – Medium	Widening of the A9 will to the south of Aviemore, Granish Junction and in other locations will result in partial loss of habitats at these locations.	Replanting along the new road verge will include birch woodland and mixed pieces woodlands as shown on Landscape and Ecological Mitigation plan (Figure 13.4). Similar habitat remains adjacent to the Proposed Scheme, at both locations. The project mitigation commitments include items agreed with CNPA that address general invertebrate habitat requirements, which includes retention and reuse of soils from woodland (P11-E22) and other habitats (P11-E23), retention and reuse of dead wood from woodland sites (P11-E25, P11-E26) and use of bird's-foot trefoil in heath planting (P11-E24).	No
Dry heath, conifer woodlands and other habitats at specified locations that are potential habitat for priority species (various locations)	Local	Habitat loss - Medium	Widening of the A9 and associated access roads will result in partial loss of these habitats at the specified locations.	Standard and project mitigation commitments will be applied across the Proposed Scheme to minimise habitat disturbance and establish mitigation planting. The project mitigation commitments include items agreed with CNPA that address general invertebrate habitat requirements, which includes retention and reuse of soils from woodland (P11-E22) and other habitats (P11-E23), retention and reuse of deadwood from woodland sites (P11-E26, P11-E27) and use of bird's-foot trefoil in heath planting (P11-E24).	No

[19] Trees scattered or greater density throughout area.
[20] Isolated or small groups of trees.

Receptor	Valuation[16]	Potential Impact[17]	Impact Descriptor Summary	Mitigation Summary	Significant Residual Impact (yes/no)
Fungi					
Grassland, coniferous woodland and other habitats known or with potential to support a diverse range of fungi species (various locations)	Local to Authority Area	Habitat loss - Medium	Widening of the A9 and associated access roads will result in partial loss of these habitats at the specified locations.	Planting of new woodland will be undertaken at a variety of locations as part of the Landscape and Ecological Mitigation plan (Figure 13.4). Standard and project mitigation commitments will be applied across the Proposed Scheme to minimise habitat disturbance and establish mitigation planting. The project mitigation commitments include items agreed with CNPA that address general fungi habitat requirements, which includes retention reuse of soil substrates and deadwood impacted by the Proposed Scheme and their reuse in new locations (P11-E23, P11-E25).	No
Hedgehog					
Farmland, deciduous woodland, woodland edge, urban areas	Local	Loss of quality habitat including direct mortality - Medium	Works in relevant locations will result in the loss of habitat for foraging and shelter for hedgehog prior to mitigation.	Carry out pre-construction surveys and relocate nesting and hibernation sites outwith the hibernation period (October to March inclusive) and prior to construction (P11-E54).	No
Brown hare					
Mixed woodland, scrub, grassland, ruderal, heath and farmland habitats at Lynwilg Farm; Kinveachy, Carrbridge near Baddengorm; and at An Slochd Beag	Local	Direct mortality - Medium Disturbance - Low Fragmentation - Medium	Works in these locations could result in direct mortality during the brown hare breeding season prior to mitigation. Works in these locations will result in disturbance to brown hare from construction related noise, dust and night-time working. Widening across the Proposed Scheme near Granish may decrease connectivity to suitable areas of habitat, this impact is considered to be greatest across habitat intersected by the proposed Granish Junction.	Habitat manipulation will be undertaken of key areas for brown hare (P11-E55).	No

Construction

12.6.5 Significant residual impacts have been identified on ancient woodland and notable habitats during the construction phase (Table 12.8).

12.6.6 In respect to ancient woodland, during route development, design options have been selected to reduce the extent of ancient woodland habitat loss where practicable. ES Chapter 3, Alternatives Considered, provides a summary of the alternatives evaluated during the development of the preferred design and the environmental constraints evaluated, including the presence of ancient woodland.

12.6.7 Twenty-five areas listed on the AWI fall within the Proposed Scheme and will be subject to some permanent habitat loss. The nature conservation importance of these areas ranges from Authority Area to National. The total loss of areas that are listed on the AWI is 77.2ha, of which 42.03ha is woodland; the remaining 35.17ha of loss is a mix of open habitats, scrub and existing carriageways/tracks.

12.6.8 The majority (~65%) of the woodland listed on the AWI that will be lost is Authority Area importance and dominated by plantation or immature trees with no or few ancient woodland features (Table 12.4). It is possible that the ancient woodland seedbank is still present in these areas and the relatively floristically diverse ground flora suggests this. There are also substantial (~35%) areas with mature and ancient trees, diverse ground layer and ancient woodland indicator species. In all areas of ancient woodland loss, mitigation includes for the soil to be stripped and re-used within areas of woodland planting within the Proposed Scheme.

12.6.9 The project mitigation for loss of ancient woodland includes an undertaking for the establishment of 48.16ha of mitigation woodland planting as shown on the Landscape and Mitigation plan (Figure 13.4). This includes 22.4ha of woodland planting on sites listed on the AWI. In addition to this mitigation planting, a woodland compensation planting site has been selected and integrated into the Proposed Scheme (shown on Figure 13.4). The receptor sites for this compensatory planting have been selected to enhance the ecological connectivity and functionality of the existing woodland network. Further information on the compensation planting site selection is included in ES Appendix 12.2. The combined areas of mitigation and compensatory woodland planting of 88.97ha will result in no let loss of woodland from the Proposed Scheme.

12.6.10 It is acknowledged that ancient woodland cannot be replaced so all areas of ancient woodland that are affected by the Proposed Scheme are considered to be permanent losses. As these losses cannot be compensated for they have been identified as significant at an Authority Area or National level, depending on the value of the individual woodland.

12.6.11 With respect to notable habitat loss, areas of the dry heath zone by Slochd that are of Authority Area value will be lost. The area to be lost is 20.9ha, which is mainly dry heath (17.3ha) with smaller areas of associated communities.

12.6.12 Habitat creation within the dry heath zone at Slochd will be undertaken as part of the Proposed Scheme mitigation, which will include 15.5ha of dry heath and 1.92ha of other habitats. However, taking the precautionary approach, it is assumed that these habitats will be permanently lost. Taking account of this, the losses of these habitats are therefore considered to be significant at an Authority Area level.

12.6.13 No other significant residual impacts associated with the construction phase of the Proposed Scheme were identified (Table 12.8).

Operation

12.6.14 Significant beneficial residual impacts have been identified in relation to species permeability during operation of the Proposed Scheme for fish. This is because the Proposed Scheme includes the replacement of existing crossing structures with clear span bridges on Allt na Criche (Lynwilg) and Allt Chriochaidh, and the replacement of pipe culverts with portal-frame culverts which restore natural beds at Allt Cnapach, Aviemore Burn and Caochan Ruadh.

12.6.15 No other significant residual impacts associated with the operational phase of the Proposed Scheme were identified.

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