APPENDIX 5.3 – INFORMATION TO INFORM HABITAT REGULATIONS ASSESSMENT (HRA) - RIVER SPEY SAC

1. INTRODUCTION

1.1 Overview

1.1.1 As noted within **Chapter 5: Ecology**, under the Conservation (Natural Habitats, &c.) Regulations 1994, as amended (the Habitats Regulations) any development that may have a 'Likely Significant Effect' (LSE) on a SAC, either alone or in combination with other plans or projects, requires an Appropriate Assessment (AA) to be carried out by the relevant competent authority, to determine whether the proposal will have an adverse effect on the integrity of the SAC. Before an AA is initiated, a screening process has to be undertaken to determine whether any of the predicted effects of the development will result in a LSE. Although no likely effects on the River Spey SAC are predicted in terms of EIA assessment methodology, a screening assessment has been provided here to provide information to the competent authority to allow them to reach a decision on whether or not there will be a LSE on the River Spey SAC. This Appendix should be accompanied by **Figure 5.5: Proposed Works within proximity to the River Spey SAC** of the Elchies (Rothes III) Wind Farm Grid Connection Works Environmental Appraisal.

1.1.2 During screening for the Proposed Development, the Energy Consents Unit (ECU) provided advice to state "*As the Proposed Development would cross the River Spey SAC, under the EU Habitats Directive, a Habitats Regulation Appraisal (HRA) is likely to be required to be carried out by the Competent Authority upon submission of a consent application. All relevant information to allow the competent authority to undertake this assessment will be provided*".

1.1.3 NatureScot also provided advice following the Consultation Report at the Alignment Options stage of the development stating *"In most cases it should be possible, with considerate planning and mitigation, to avoid impacting on the watercourses and wetlands linked to the Spey and therefore avoiding harm or damage to the qualifying features of the SAC/SSSI. It is likely that a suite of best practice and pollution prevention measures would be sufficient to offer enough protection but there may be locations along the route where the soil conditions of slope stability add an increased risk of erosion that may require specific measures to manage that risk"*.

1.1.4 This report addresses the advice received through consultation and assesses the potential for any LSE. The scope of the report is to:

- Describe the River Spey SAC;
- Describe potential effects upon the River Spey SAC from the Proposed Development;
- Make an assessment of these potential impacts in relation to the conservation objectives of the SAC; and
- Conclude whether the Proposed Development would adversely affect the integrity of the SAC qualifying interests.

1.2 Alternatives

1.2.1 Alternatives including the 'do nothing' scenario, alternative OHL route options and alignments have been investigated and are discussed in **Chapter 2** of the main EA report.

2. DESIGNATED SITE DESCRIPTION AND CONSERVATION OBJECTIVES

2.1 River Spey SAC

2.1.1 In line with current guidance any designated sites that form part of the National Site Network (formerly Natura 2000 sites) were screened based on proximity to the Proposed Development and potential for connectivity. The Proposed Development will oversail the River Spey SAC and SSSI at Boat o' Brig and runs parallel to the designated site for a section of the route at the Spey's prominent northern meander, west of Dundurcas Farm, for approximately 400 m. The location of the Proposed Development in relation to the SAC is shown on **Figure 5.1**.

2.1.2 The River Spey along with some of its main tributaries are designated as a SAC and SSSI, with Atlantic salmon (*Salmo salar*), freshwater pearl mussel (*Margaritifera margaritifera*), otter (*Lutra lutra*) and sea lamprey (*Petromyzon marinus*) as qualifying features. Tributaries partially included within the boundary of the SAC include the Burn of Rothes, Back Burn, Broad Burn and the Burn of Mulben. All four qualifying species rely on good water quality.

2.2 Conservation Objectives

2.2.1 The conservation objectives for each individual qualifying feature are taken from the Conservation Advice Package 8365 available online from NatureScot Site Link website[1].

Freshwater pearl mussel (FWPM)

Objective 2a: Restore the population of freshwater pearl mussel as a viable component of the site

2.2.2 Restore the population of FWPM as a viable component of the site can be considered met if the conditions for the species' long-term existence are in place. These conditions include:

- Avoiding effects that could lead to an inability of the population to successfully reproduce and recruit sufficient juveniles into the population (e.g. >20 % of the population should be juvenile). Very young juveniles (<30mm long) should also be present;
- Avoiding effects that could lead to a permanent reduction in the density and number of FWPM in the population, or that prevent a recovery in density and numbers, through mortality, injury or impacts caused by disturbance. These effects could be caused by development, water pollution, river engineering, land-use change, abstractions, and wildlife crime. For a healthy mussel population, the aim is to have at least 5 mussels per m^2 in appropriate habitat;
- Ensuring high quality habitat in areas which support freshwater pearl mussels (see conservation objective 2c);
- Allowing the species distribution within the site to be maintained or expanded (see conservation objective 2b); and
- Restore the distribution and viability of the host species – mostly salmon in the Spey - and their supporting habitat (see conservation objective 2d).

2.2.3 FWPM are in unfavourable declining condition at this site. The focus of this objective will therefore be to stop the decline in population and subsequently promote its increase. Recovery of pearl mussel populations is notoriously difficult. This is partly due to their unusually long lifecycle and their requirement for high quality freshwater conditions and riverine habitats, including low levels of nutrients and fine sediments. These conditions generally need to be provided all the time.

Objective 2b: Restore the Distribution of freshwater pearl mussel throughout the site

[1] NatureScot Site Link website https://sitelink.nature.scot/home

2.2.4 Conditions within the River Spey SAC should allow for the distribution of FWPM to be expanded or at least restored to their previous known extent.

2.2.5 In the River Spey, FWPM are present in the tributaries as well as the main river stem, but the populations in the tributaries are very small, and probably currently not viable in the long term. The upstream populations of mussels is thought to be lower than would naturally be the case due to over-exploitation in the past. The distribution of mussel in the upper river should be restored to suitable habitat in their natural range.

2.2.6 Distribution of FWPM within the site can be affected by disturbance originating both within and outwith the site. Factors such as abstraction, water pollution, illegal pearl fishing, river engineering, development and intensification of land use can risk directly affecting FWPM.

Objective 2c: Restore the habitats supporting freshwater pearl mussel within the site and availability of food

2.2.7 The distribution and extent of the FWPM's habitat within the River Spey SAC, together with the structure, function and supporting processes of the habitat should be restored. Sufficiently high water quality and flow conditions should be in place to provide the necessary conditions for FWPM.

2.2.8 Freshwater pearl mussels are typically found in rivers with 'soft' high water quality conditions, combined with abundant gravel river beds. They feed by filtering fine organic particles from the water. In order to maintain the supporting freshwater pearl mussels' habitat it is important that the species' high quality habitat requirements are met.

2.2.9 High water quality and natural flow conditions should be in place to provide the necessary conditions for freshwater pearl mussel. The restoration of peatlands (e.g. drain-blocking) and creation of native riparian woodlands will also lead to more sustainable river flow regimes. These land management practices will help to reduce the potential for damaging flood impacts and also create more sustainable steady flows during droughts. It is recognised that not all flow conditions in the River Spey SAC can be wholly natural due to existing dams, reservoirs and water abstractions.

2.2.10 Freshwater pearl mussel populations are particularly vulnerable to nutrient enrichment and fine sediment increases, both of which can affect the juvenile mussels that predominantly live buried in river gravels. River engineering can also directly damage populations, as well as interrupt the supply of sediment that maintains habitat. Changes in land use have the potential to increase nutrient and fine sediment concentrations in the river however, land use changes, such as the establishment of native riparian woodlands, have the potential to improve habitat by providing shade that can mitigate damaging peaks in summer temperature, stabilise riverbanks and reduce erosion.

2.2.11 Specific targets for some water quality parameters include:

- Nutrient concentrations should be near-natural. Soluble reactive phosphorus is particularly important (the annual mean should be <0.005mg/l);
- Mean Biochemical Oxygen Demand should be <1 mg/L. BOD measures the oxygen consumed by bacteria from the decomposition of organic matter (such as sewage or run-off from eroding land) in water. Unpolluted water has a low BOD (i.e., well oxygenated water with a low level of organic matter). Freshwater pearl mussels need river water to have some organic particles, as this is what they feed on. However pearl mussels can be harmed by excessive levels of organic particles, and associated low levels of oxygen in water;
- Filamentous algae should have <5% coverage of the riverbed during the summer months (indicating that the river does not have excess nutrients); and
- Excess fine sediment should be avoided in the river as this can smother FWPM or interfere with filter feeding.

2.2.12 The quality of the riverbed habitat is particularly important for FWPM, and is best assessed by measuring the 'redox potential' (a measure of how much oxygen there is in the water):

- There should be no pronounced difference in the redox potential between open water and interstitial (within sediment) water at 5 cm depth (a typical depth for juvenile freshwater pearl mussels which are normally buried within the gravels); and
- River flow rates should be as natural as possible throughout the site, avoiding human induced high and low extremes. Long standing altered flows occur in many places due to hydro-electric schemes such as in the main stem of the River Spey especially below Spey Dam, River Tromie, Loch an t-Seilich, River Truim, Allt Cuaich, and Allt an t-Sliuc, and these are regulated by SEPA under the Controlled Activities Regulations (CAR).

Objective 2d: Restore the distribution and viability of freshwater pearl mussel host species' and their supporting habitats

2.2.13 Sufficient salmonid fish hosts should be present within the River Spey SAC to support juvenile mussel recruitment.

2.2.14 Salmonid fish (native salmon and trout) are an integral part of the FWPMs' lifecycle and should be available in sufficient numbers to ensure continued recruitment of juvenile mussels to the population. It is important that juvenile host salmonids, including any range of genetic types, are present in all areas of the catchment to which they, and adult fish, have natural access where freshwater pearl mussels have historically been present. It is important to note that this can include naturally impassable waterfalls.

2.2.15 The host species can vary in different sites. At this site Atlantic salmon are the primary salmonid host known to be used by the local freshwater pearl mussel population. An abundance of > 0.1 native juvenile host salmonid per m^2 should ensure sufficient host species are available. More generally, the density of host juvenile salmonids should not differ significantly from those expected for the river type / reach under conditions of high physical and chemical quality.

2.2.16 FWPM population viability is dependent upon host salmonid population viability, so any threats to host species stocks should be avoided. Factors that can affect the viability of host species include those that affect FWPM, but potential barriers to fish migration, inappropriate fish stocking and biosecurity are also further increased risk factors. Factors that also affect the marine survival, and therefore viability, of Atlantic salmon and sea trout populations should also be considered. This is an international issue and research and agreements are ongoing.

2.2.17 Host species should be able to continue to use and access all areas of importance within the site. Plans and projects that cause disturbance, displacement and barrier effects to host species can affect their distribution and in turn the distribution of FWPM however, many existing barriers are high in the catchment and FWPM are not present in these locations. Work is ongoing to improve access to salmon where man-made barriers to migration exist by removing the barriers or creating / improving fish passes.

2.2.18 To ensure a viable population of host species is present supporting salmonid habitat should be maintained throughout the area. Atlantic salmon and trout, both require the presence of clean gravels for spawning. For Atlantic salmon and large trout, these typically occur at the tail-end of pools, although spawning may take place if suitable gravels and flows are present. On emergence, usually between March and early May, the young fry disperse and set up territories which they defend aggressively. Atlantic salmon fry prefer fast flows (>30 cm/s) in addition to a rough bed of pebble, cobble and gravel; favouring these areas which provide a surface turbulence (riffle habitat). Trout fry prefer areas of relatively low water velocity near the streambed. Cover from stones, plants and debris is essential for maintaining high fry densities.

2.2.19 Atlantic salmon that have survived their first winter (parr) prefer deeper water than fry (typically 15-40 cm) and a coarser substrate of pebbles, cobbles and boulders. Trout parr generally favour currents of relatively low speed, where cover is available. Juvenile trout are often to be found under bankside cover, within undercuts, among tree roots or in marginal vegetation. Cover remains important for adult trout and Atlantic salmon particularly in smaller streams. The shade from bushes next to the river or overhanging trees is likely to help to prevent fish from becoming stressed due to high water temperature combined with low water levels.

Sea lamprey

2a Maintain the population of sea lamprey as a viable component of the site

2.2.20 The conditions for the long-term existence of the sea lamprey at the River Spey SAC should be maintained.

2.2.21 An estimate of the number of sea lamprey occupying the site is not available and, due to the difficulties of surveying the species, is unlikely to become so. The actual number may vary both inter-annually and intra-annually according to a variety of environmental factors including changes in the amount of larval habitat as it is altered, removed, or created by variations in flow and the availability of sediment.

2.2.22 This conservation objective is considered to be met if the conditions for the species' long-term existence are in place. These conditions include:

- Avoiding direct or indirect effects that could lead to a permanent reduction in the number of sea lamprey through mortality, injury, disturbance, or displacement. The effects may be caused by the direct or indirect physical alteration of habitat as a result of development or river engineering, or by pollution associated with these activities or from point or diffuse catchment sources - see conservation objective 2c;
- Ensuring that the sea lamprey are able to gain access to and use all parts of the site in which they would be expected to occur naturally - see conservation objective 2b; and
- Ensuring that sea lamprey are able to migrate unhindered to the sea.

2.2.23 When assessing the effects of any plan or project consideration should be given to whether impacts outwith the SAC could affect achievement of this conservation objective. The appraisal should also consider the life cycle and life history of sea lamprey and the scale and duration of the impact being assessed. For example, an activity that prevented access to or altered spawning habitat during the period when sea lamprey spawn could lead to a reduction in the number of larvae produced and so eventually a reduction in the number of adults associated within the affected cohort.

2b Maintain the distribution of sea lamprey throughout the site

2.2.24 The spatial extent of sea lamprey within the River Spey SAC boundary should be maintained.

2.2.25 Distribution of the sea lamprey within the River Spey SAC should not be restricted by pollution, artificial structures or human activities.

2.2.26 Sea lamprey have been reported anecdotally as spawning as far upstream as Kingussie although they are more often found closer to the sea. They have not been recorded in any of the tributary rivers, although there is no reason why they should not be present. Otherwise, relatively little is known about the distribution and density of sea lamprey within the SAC due to limitations in current survey methods.

2.2.27 To date, conventional electrofishing surveys have recorded relatively few sea lamprey larvae in the Spey and the total has frequently been two orders of magnitude less than that for river and brook lamprey *Lampetra*. It is thought that sea lamprey larvae may occupy similar habitat to that used by *Lampetra* but in deeper water that is ordinarily out of reach during electrofishing surveys.

2.2.28 When considering the impacts of a plan or project any accessible suitable habitat should be considered to have the potential to contain sea lamprey larvae, although in practice some may be naturally unoccupied. The population of sea lamprey in the River Spey appears to be low and this may be due to under recording due to survey difficulties, or it may reflect a genuine low population because this site is on the edge of the species' range in Scotland.

2.2.29 The distribution of sea lamprey across the site may be affected by disturbance originating from within or outside it (including at sea, coastal plus deep off-shore waters). Plans or projects that lead to the displacement of sea lamprey or which impede or prevent the species' movement may also affect its distribution. Examples of activities that may affect the distribution of sea lamprey include: the construction of engineered structures (e.g. bridge abutments or piers) or the removal of accumulations of sediment to maintain the conveyance capacity of culverts, both of which may lead to the

direct loss of juvenile habitat; poor land use that leads to fine organic matter or sediment being washed into a river and smothering spawning habitat.

2c Maintain the habitats supporting sea lamprey within the site and availability of food

2.2.30 The distribution and extent of sea lamprey habitat within the River Spey SAC, together with the structure, function and supporting processes of the habitat, should be maintained.

2.2.31 Sufficiently high water quality and flow conditions should be in place to provide the necessary conditions for sea lamprey. Sea lamprey larvae feed by filtering fine organic particles, especially diatoms and other algae, as well as protozoans and detritus, from the surface of the silt around the mouths of their burrows. A naturally functioning river system in a well-managed catchment should provide adequate food. Adult sea lamprey feed on a variety of fish in estuaries and the sea.

2.2.32 Both the larval and adult phase of sea lamprey require clean, well oxygenated water. The larvae commonly burrow into soft sediment in the margins of streams and rivers. They may also be found in detritus overlying coarse substrate, amongst submerged tree roots, emergent vegetation rooted in silt, shallow patches of fine sediment among coarser substratum, or submerged branches or twigs that have trapped fine sediment. The unconsolidated nature of their habitat means that it may be readily altered by sufficiently powerful flows. The distribution and abundance of habitat may therefore undergo significant intra-annual or inter-annual change in a naturally functioning river system. Adult sea lamprey spawn in nests in well oxygenated gravel and some sand, in flowing water. Suitable conditions are often found at the tail-end of pools.

2.2.33 Low flow conditions may leave sea lamprey habitats unusable, influencing both:

- juvenile habitat, particularly that in the margins as the wetted width of a watercourse is reduced; and
- adult spawning habitat.

2.2.34 The natural flow regime of the river should be protected. Low and high flow conditions may occur artificially e.g. through hydroelectric power scheme flow management however, daily flows should be close to those expected in the absence of abstractions and discharges, with no obvious problems with water availability. Water flow and quality standards for Good Ecological Status (GES) under the Water Framework Directive should be met. These targets are intended to support a healthy, naturally functioning riverine ecosystem which protects the whole biological community and individual species to a degree characteristic of the river.

2.2.35 The geomorphology and so the physical sea lamprey habitat available in a river may change in response to natural changes in flow, but also as a direct or indirect result of human intervention. River engineering may, for example, result in hydraulic conditions that cause the erosion of larval habitat.

2.2.36 The morphology of a naturally functioning river system will provide the range of habitats needed by sea lamprey. For this the river should follow its natural course, with little modification and a natural riparian zone with emergent vegetation and native trees. There should also be no unnaturally high levels of siltation. Artificial in-channel structures, e.g. weirs, dams and fords, should not bar or impede the movement of sea lamprey and the movement of sediment which may limit the availability of material needed to replenish spawning habitat.

2.2.37 Man-made (and natural) changes to the water quality of the site may have direct or indirect effects on sea lamprey habitat. Examples of manmade effects include: silt laden runoff from poorly managed tilled land smothering redds; and pollution caused by inadequately treated discharges, e.g. from sewage treatment works.

Atlantic salmon

2a Restore the population of Atlantic salmon, including range of genetic types, as a viable component of the site

2.2.38 The conditions for Atlantic salmons' long-term existence at the River Spey SAC should be restored. This includes encouraging the number of Atlantic Salmon to increase, especially the spring fish component of the population.

2.2.39 This conservation objective is considered to be met if the conditions for the species' long-term existence are in place. These conditions include:

- Effects should be avoided that could lead to a permanent reduction in the Atlantic salmon population or that prevent the population recovering, through mortality, injury, or impacts caused by disturbance or displacement. This includes for example the effects caused by the construction of in-stream barriers to migration, changes in water flow rates or water quality. Observed densities therefore need to be assessed in relation to the expectation for the River Spey overall and for each river reach, based on productivity and natural habitat character of the system. However, these should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality; and
- The numbers of returning Atlantic salmon should be sufficient to maintain the long-term viability of each life history type. All returning adults and emigrating smolts must have unhindered access between freshwater and marine habitats (see conservation objective 2b). All supporting freshwater habitats must be of sufficient quality and quantity to support both adult and juvenile fish (see conservation objective 2c). Different rivers have different seasonal patterns of adult migration associated with the environmental characteristics of the catchment and river system. Multi-sea winter fish are an important component of a natural Atlantic salmon run and the spring run component has declined considerably in recent years. The seasonal pattern of migration characteristic of the river and, in particular, the multi-sea-winter stock component, should be restored.

2.2.40 Atlantic salmon are in unfavourable condition at this site. The focus of this objective is therefore, to increase the number of salmon parr in the river, through increasing the number of adult salmon able to spawn in the river and maintaining access to spawning grounds. The river should not be stocked with young salmon, as they could compete with wild fish for food and be less adapted to life in the river, resulting in an overall reduction in the number of smolts able to go to sea.

2.2.41 When assessing the effects of any plan or project consideration should be given to whether impacts outwith the SAC could affect achievement of this conservation objective. The appraisal should also consider the life history traits of the species, including maintaining all genetic types of Atlantic salmon, and the scale and duration of the impact being assessed. Impacts resulting in the loss of genetically distinct populations of Atlantic salmon would not be considered temporary in nature as these adaptive traits may have evolved over generations and could not be recovered if lost.

<u>2b Restore the distribution of Atlantic salmon throughout the site</u>

2.2.42 Conditions within the River Spey SAC should allow for the distribution of Atlantic salmon to be expanded or at least restored to their previous known extent.

2.2.43 Atlantic salmon distribution within the River Spey SAC should not be restricted by pollution or human activities.

2.2.44 Access to spawning sites, juvenile rearing sites and areas where adult Atlantic salmon may rest prior to spawning (some may be present within the river for a year prior to spawning), should all be restored throughout the majority of the site. There are numerous dams and other man-made barriers in the Spey catchment and work is on-going to remove them, or create / improve fish passes where necessary. Juvenile Atlantic salmon should be present in all areas of the catchment to which they, and adult fish, have natural access. This does not include areas above naturally impassable barriers, but areas where access has been limited by man-made obstructions.

2.2.45 The distribution of Atlantic salmon within the site may be affected by disturbance originating both within and outwith the site (including estuarine and coastal areas). Plans and projects that cause displacement and barrier effects to the species, for example by impeding access to spawning areas or downstream passage of smolts to the sea, can also affect species distribution. Examples may include: the provision of compensation flows which are inadequate to allow adult Atlantic salmon to reach known spawning areas; the presence of physical in-stream structures such as flow deflectors, coffer

dams etc. which may increase flow velocity to that which is beyond the swimming capacity of migrating fish or sustained noise generation (such as that caused by piling) in places that cannot be avoided by migrating Atlantic salmon.

2c Restore the habitats supporting Atlantic salmon within the site and availability of food

2.2.46 The distribution and extent of Atlantic salmon habitat within the River Spey SAC should be restored, together with the structure, function and supporting processes of the habitat.

2.2.47 Sufficiently high water quality and flow conditions should be in place to provide the necessary conditions for Atlantic salmon. Atlantic salmon spawn in late autumn and early winter, depositing their eggs in redds which they excavate in gravel and pebble beds. Eggs are often deposited in areas of accelerating flow, such as the tail end of pools and glides, upstream from riffles. In upland streams, eggs may be deposited in any areas of gravel that can be physically moved by the fish. A good supply of oxygen is essential for eggs to develop and this is facilitated by a flow of water through the gravel. Therefore, clogging these fine sediments with silt and fine sand can reduce the water and oxygen flow resulting in egg mortality. Egg survival is also affected by redd 'washout' during winter spates, resulting in the physical scouring out of eggs from the gravel. Substrate stability, the dynamics of water flow and the weather all influence the extent of siltation and scale of washouts.

2.2.48 After hatching the young fry remain in the gravel until March to early May, when they disperse and set up territories. Atlantic salmon fry prefer fast flows (>30 cm/s) and favour areas with surface turbulence (riffle habitat). They require a rough bed of pebble, cobble and gravel and water <20 cm deep. Good cover is essential for maintaining high fry densities, such as cover from stones, plants or debris.

2.2.49 Atlantic salmon that have survived their first winter (parr) prefer deeper water than fry (typically 20-40 cm) and a coarser substrate of pebbles, cobbles and boulders. Cover remains important for adult Atlantic salmon particularly in smaller streams and rivers. In larger rivers and lochs this type of cover may be less important.

2.2.50 Favoured habitat used by adult fish include pools of at least 1.5 m depth, with cover from features such as undercut banks, instream vegetation, submerged objects and even surface turbulence. Spawning habitat is defined as stable coarse substrate without an armoured layer, in the pebble to cobble size range (16-256 mm) but with the majority being <150 mm. Water depth during the spawning and incubation periods should be 15-75 cm. Coarse woody debris should be retained where appropriate as it plays a significant role in the formation of new gravel beds.

2.2.51 Juvenile Atlantic salmon (fry and parr) maintain feeding stations within rivers and defend these aggressively. The invertebrates which they feed upon are intercepted by juvenile fish as they drift downstream, and may be of aquatic or terrestrial origin.

2.2.52 At sea, adult Atlantic salmon feed on range of prey items, including marine amphipods, shrimps and squid and fish, such as sand eels, capelin and herring. Adults do not feed once they return to freshwater.

2.2.53 As a result of their life history Atlantic salmon stocks can be impacted in both freshwater and marine habitats. In freshwater, both water quality and water quantity are key issues. Salmonids require access to rivers with unpolluted and well-oxygenated water with a habitat mosaic which comprises suitable spawning gravels, cobbles and boulders. In terms of water quality, these fish also require enough water to ensure access to and from spawning areas, as well as enough water to maintain an adequate level of juvenile habitat.

2.2.54 Over-exploitation, inappropriate stocking activities, riparian land management operations (such as those related to forestry and agriculture), in-stream engineering and alterations to natural water flow regimes (including those relating to hydropower development), invasive non-native species, physical barriers to migration (such as historic caulds and lades), pollution (direct and diffuse) and direct damage to spawning habitat (e.g. through mineral or gravel extraction) can all impact the quality of freshwater environments and their value to Atlantic salmon. Climate change, and the rises in water temperatures during summer, may also be a factor in determining the suitability of some waterbodies for Atlantic

salmon. Cover is therefore important for Atlantic salmon, particularly in smaller streams. The shade from bushes next to the river or overhanging trees is likely to help to prevent fish from becoming stressed due to high water temperatures which often occur in combination with low water levels.

2.2.55 Water quality, hydrology, and habitat standards for Good Ecological Status (GES) under the Water Framework Directive should be met. These targets are intended to support a healthy, naturally functioning riverine ecosystem which protects the whole biological community and individual species to a degree characteristic of the river.

Otter

2a Maintain the population of otter as a viable component of the site

2.2.56 The conditions for the long-term existence of the otter at the River Spey SAC should be maintained.

2.2.57 An estimate of the number of otters occupying the River Spey SAC is not available and therefore there is no numerical baseline that can be given for the SAC. However, otter appear to be present in all suitable habitat.

2.2.58 This conservation objective is considered to be met if the conditions for the species' long-term existence are in place. This includes:

- Avoiding effects that could lead to a permanent reduction in the otter population through mortality, injury, or impacts caused by disturbance or displacement. This includes for example the effects caused by development, river engineering, water pollution, roads without adequate crossing provision for otters or suitable culverts, or entanglement in fishing gear. Otters can drown in unprotected or disused fishing gear such as eel traps or fyke nets, so these should be removed, or if active, an otter guard fitted;
- Maintaining the species' ability to use all areas of importance within the site (to be considered under conservation objective 2b);
- Maintaining access to, and availability of, undisturbed resting places; and
- Maintaining access to, and availability of, supporting habitats and prey (to be considered under conservation objective 2c).

2.2.59 Otter is a wide-ranging and highly mobile species. The population at the River Spey SAC is reliant on suitable habitat in the surrounding countryside including the adjoining Insh Marshes SAC, Cairngorms SAC and the overlapping Lower River Spey – Spey Bay SAC, it is unlikely to be viable (capable of being self-sustaining) in isolation. The home range of an otter will vary depending on their sex, habitat quality and food availability. It will also vary between freshwater and coastal environments. At this SAC some otters that have parts of their territories within the study area may also feed in coastal waters that lie outwith the boundary of the study area (for example in the Lower River Spey – Spey Bay SAC and Spey Bay). In coastal areas otter densities may be as high as 0.5 - 0.7 animals/km. Males living in rivers and streams can have a mean linear range size of around 40km and females living in the same habitat can have a linear home range of 20km. Males have been known to range as far as 80km.

2.2.60 When assessing the effects of any plan or project consideration should be given to whether impacts outwith the SAC could affect achievement of this conservation objective.

2.2.61 Otters are a European protected species (EPS) and it is an offence to deliberately or recklessly capture, injure, kill, harass or disturb them in certain circumstances, or to damage or destroy their breeding or resting places anywhere in Scotland unless a licence has been issued to do so. A licence can only be issued for particular purposes which the law allows. Further, there must be no satisfactory alternative and no detrimental impact on the contribution to the maintenance of otter at a favourable conservation status for a licence to be issued. This assessment considers impacts on the otter population at a local and regional level. The licensing requirement is in addition to considering whether a plan or project will result in any impacts (including incidental impacts) to the otter population within the SAC.

2b Maintain the distribution of otter throughout the site

2.2.62 The spatial extent of otter within the River Spey SAC should be maintained.

2.2.63 The ability for otter to use and access all areas of importance within the River Spey SAC should be maintained. Otter appear to be present in all suitable habitats within the River Spey SAC with higher population densities (smaller home ranges) expected in habitats with more abundant food and resting places.

2.2.64 Distribution of otters within the site can be affected by disturbance originating both within and outwith the site. Plans and projects that cause displacement and barrier effects to the species can also affect species distribution. Examples include use of night-time floodlighting of watercourses, road and bridge construction works and general disturbance from human activity (and dogs) by watercourses especially at dusk / night-time.

2c Maintain the habitats supporting otter within the site and availability of food

2.2.65 The distribution and extent of otter habitat within the River Spey SAC should be maintained, together with the structure, function and supporting processes of the habitat.

2.2.66 Sufficiently high water quality and flow conditions should be maintained to provide the necessary conditions for otter and their prey. Otters require suitable habitat for foraging, breeding and resting. In freshwater environments abundant boulders, crevices and / or peat, or other cavity-forming features such as tree root systems are needed to provide secure holt sites above high water. Dense scrub is also valuable for providing lie-ups and couches. Also useful are riparian trees and shrubs, and areas with wetlands and tall vegetation which gives cover to otters and their prey.

2.2.67 Suitable areas supporting a healthy fish population within a nearby watercourse or still water body are required within each otter's home range, to enable foraging for key prey species such as salmonids and eels. Access to ponds, ditches, reedbeds and wetlands where amphibians breed is also important.

2.2.68 Changes to water flow and water quality can adversely affect otter habitat and prey on which they depend. Otters' food supply is normally associated with good water quality and therefore the water flow and quality standards for Good Ecological Status (GES) under the Water Framework Directive should be met. These targets are intended to support a healthy, naturally functioning riverine ecosystem which protects the whole biological community and individual species to a degree characteristic of the river.

3. POTENTIAL EFFECTS AND MITIGATION MEASURES

3.1 Potential Effects

3.1.1 The Proposed Development will oversail the River Spey SAC and SSSI at Boat o' Brig and will run parallel to the designated site for a section of the route at the Spey's prominent northern meander, west of Dundurcas Farm, for approximately 400 m. Two short sections of new access track are also proposed north of the B9015 in Sourden woods, which are located within 100 m of the designated site, see **Figure 5.4a-f**.

3.1.2 There would be no in-river works, no reductions to water flow, no barriers to fish passage and no disturbance of riverbanks which could have direct impacts on the qualifying features of the SAC.

3.1.3 Felling of approximately 0.12 ha of broadleaved woodland within the SAC, adjacent to the Spey's prominent northern meander and 0.33 ha of scrub and broadleaved tree clearance at the Boat o' Brig crossing point will be required to create an operational wayleave corridor for the OHL At the prominent northern meander, west of Dundurcas farm, felling will not be undertaken any closer than 10 m from the banks of the River Spey, avoiding any reduction in tree cover or disturbance to the riverbanks. At the OHL crossing point at Boat o' Brig, there will be removal of a small area of trees and scrub along the west bank of the River Spey which overhangs the riverbank.

3.1.4 Installation of poles does not involve substantial earthworks or earthworks of a long duration and therefore the potential for an adverse effect on the water environment is low. One pole is proposed to be located within the designated site, on the west bank of the Spey, approximately 20 m from the edge of the river bank. The proposed new access tracks north of the B9015, within Sourden woods, would be no closer than 40 m from the edge of the designated site.

3.1.5 Felling and new track construction have potential to have direct effects on otter through disturbance and indirect effects on all qualifying features of the SAC through run-off affecting water quality.

3.1.6 Felling and access track construction associated with the Proposed Development could potentially adversely affect the SAC through indirect effects from construction works run-off impacting water quality or directly through disturbance to otter which may be present within the works area.

3.1.7 Non-native invasive species (NNIS) are present within the Study Area and without appropriate mitigation construction has the potential to spread these plant species, causing detrimental effects to biodiversity within and outwith the Study Area.

3.2 Embedded Mitigation

3.2.1 Mitigation has been built into both the project design and proposed construction methods to prevent any potential effects to the River Spey SAC.

3.2.2 Baseline protected species surveys undertaken in 2021 identified the presence of otter shelters within 200 m of the Proposed Development within proximity to the River Spey SAC, see confidential Appendix 5.2A and confidential Figure 5.3a for further details. The proposed alignment has been designed to avoid these features with appropriate buffers to avoid disturbance.

3.2.3 The Applicant has developed General Environmental Management Plans (GEMPs) and Species Protection Plans (SPPs) for construction works that may negatively impact upon habitats and protected species. The Plans detail the procedures that must be followed where there is a potential for sensitive habitats and protected species to be present, these are included in **Appendix 3.1** and **Appendix 3.2**. Each SPP outlines the responsibilities of the Applicant and their Contractors, legislative protection for protected species, best practice measures to follow and an approved methodology for carrying out certain mitigation activities. This suite of SPPs has been approved by NatureScot and would be adopted where relevant to the project.

3.2.4 A site-specific Construction Environmental Management Plan (CEMP) will be developed by the successful Contractor detailing measures to manage, control and monitor the potential effects of noise, dust, litter, pollution and personnel / vehicular movements. Best practice pollution control measures, with reference to the Scottish Environmental Protection Agency (SEPA) and Control of Substances Hazardous to Health (COSHH) guidelines, will be included in the CEMP. Particular reference will be made to managing handling, storage and use of hazardous chemicals and fuels used during the construction process. A detailed spill response plan will be developed and fully-briefed to all site operatives and forms part of the CEMP.

3.2.5 An Ecological Clerk of Works (ECoW) would be appointed to provide monitoring of construction activities relating to the installation of infrastructure. The ECoW would also identify and monitor sensitive ecological receptors immediately prior to, during and immediately after the construction phase. This would include a detailed pre-construction protected species survey to identify any possible constraints to construction by the presence of protected species. The ECoW will be responsible for ensuring specific mitigation measures where necessary are adopted to protect any potential breeding and foraging otters, water quality and sensitive habitats during construction.

3.3 Measures Specific to Water Quality Management

It is expected that the following will be included within the CEMP and would ensure the works are undertaken in accordance with good practice guidance:

- In accordance with SEPAs Guidance for Pollution Prevention GPP02 any fuel and chemical storage would be bunded and will not be stored within 50 m of watercourses or waterbodies;
- Fuel deliveries and refuelling would be undertaken by trained staff in a designated area with an impermeable base. All fuel related activities would take place more than 50 m away from any watercourse;
- Emergency spill response kits will be available and maintained during construction works;
- Mechanical plant would be well maintained and inspected regularly for leaks;
- Drip trays would be placed under stationary vehicles which could potentially leak fuel / oils;
- Suitable access routes would be chosen which minimise the potential requirement for either new temporary access tracks or for tracking across open land which could contribute to the generation of suspended solids;
- Any temporary construction / storage compounds required would be located remote from any sensitive surface water receptors and will be constructed to manage surface water run-off in accordance with best practice;
- A buffer of 20 m between construction works and watercourses will be implemented and maintained wherever practicable;
- Any water contaminated with silt or chemicals would not be discharged directly or indirectly to a watercourse without prior treatment;
- Silt fences, cut-off drains, silt traps and drainage will be used where appropriate to ensure that silt-laden run-off from construction activities does not enter watercourses, groundwater or aquatic waterways that have hydrological connectivity with either SAC;
- Water for temporary site welfare facilities would be brought to site, and foul water would be collected in a tank and collected for offsite disposal at an appropriately licensed facility;
- Felling works will adhere to good practice measures including Forestry Commission (Scottish Forestry) guidelines[2], management of forestry waste (SEPA)[3] and implementation of tree harvesting and extraction methods to ensure minimisation of soil disturbance and compaction to ensure protection of the water environment;
- Any vegetation clearance works and felling works within 30 m of the banks of the River Spey will be undertaken by means of chainsaw and chipper machine to reduce the potential for run-off created from tracking of forest harvesting machinery;
- The ECoW will have authority to stop any works that are or have potential to impair the water environment;

[2] Forestry Commission (2017) The UK Forestry Standard.

[3] SEPA (2017) Management of Forestry Waste. Guidance WST-G-027.

- A wet weather protocol would be developed detailing the procedures to be adopted by all site staff during periods of heavy rainfall (e.g. inspection and maintenance regimes of sediment and runoff control measures), in extreme cases works may be temporarily suspended until weather / ground conditions allow.

3.4 Measures Specific to Otters

3.4.1 Otters are a mobile species and may have several shelters and holts within their home range, therefore the shelters identified during the baseline in 2021 may no longer be in use and / or additional shelters may now be found within proximity to the Proposed Development. Prior to construction commencing a detailed pre-construction protected species survey will be carried out by suitably qualified ecologists to identify any signs of otter within 250 m of proposed works (including temporary laydown areas and access tracks). Should any evidence of otter be identified, the SPP will be followed to ensure there is no disturbance, either to a shelter used by otter or to individuals foraging / commuting through or close to the works area. Monitoring by the ECoW will be ongoing throughout the construction phase to update pre-construction surveys.

3.4.2 A Limit of Deviation (LoD) defines the maximum extent within which a development can be built, which is defined as 50 m either side of the Proposed Development. The 100 m LoD is sought to allow for micro-siting during construction, allowing poles to be relocated up to 50 m either side of the centreline of the proposed alignment as shown on **Figure 3.1**. This micro-siting allowance enables the ECoW to apply suitable buffers to protect otter shelters from disturbance during construction works if required.

3.4.3 In line with the Applicant's otter SPP, in order to avoid disturbance to and risk of injury to otters, the following measures will be adopted during construction:

- no works will be undertaken within 50 m of waterbodies and watercourses showing signs of regular use of otters during the house of darkness or within 2 hours of sunset / sunrise;
- where works close to watercourses are required in darkness, lighting should be directed away from riparian areas by using fittings such as hoods or shields to avoid any unnecessary light spill;
- any temporary exposed pipe system should be capped when staff are off site to prevent otters from gaining access and becoming trapped;
- all exposed trenches or holes should be provided with mammal exit ramps e.g. wooden planks or earth ramps;
- to limit the risk of collision, the speed limit along access tracks will be limited to 15 mph, which can be reduced further on ECoW advice if a key commuting route is identified during the course of ongoing monitoring; and
- an emergency procedure should be implemented by site workers if otter / otter shelters are unexpectedly encountered.

3.5 Measures Specific to Non-Native Invasive Species (NNIS)

3.5.1 As part of the CEMP, an invasive species management plan will be developed prior to works commencing to prevent the spread of NNIS within and out with the Site. This should be developed in consultation with the Spey Fishery Board and the Scottish Invasive Species Initiative, which may hold information of existing treatment regimes along the affected areas of the River Spey.

4. CONCLUSIONS

4.1.1 The construction of the Proposed Development has the potential to indirectly impact the River Spey SAC qualifying features through pollution and sedimentation or directly through disturbance to otter.

4.1.2 Best practice construction methods and pollution prevention measures detailed in a site-specific CEMP would avoid pollution or sedimentation of the SAC. Mitigation measures would manage both the source of the potential effect (trapping any fuel spills to prevent them from leaving the work site etc.) and the impact pathway (avoiding construction works close to watercourses, ensuring access tracks do not act as channels for polluted water etc.).

4.1.3 Avoidance is the preferred option for active otter holts and couches identified within 30 m of works or 200 m for confirmed breeding holts. The LoD allows for a micrositing allowance of up to 50 m. The preferred alignment has already taken into account the presence of the two potential holts and couch along the River Spey and has sought to ensure that buffer distances of 30 m from couches and 100 m from holts is achieved. With the implementation of embedded mitigation including the Applicant's GEMPs and SPPs which the Contractor will be contractually obliged to adhere to and implement, there are no likely predicted effects on otter.

4.1.4 No activities associated with the construction of the Proposed Development are considered likely to have a significant effect on qualifying species of the SAC. Furthermore, no construction related activities related to the Proposed Development are considered contrary to the conservation objectives set out for each SAC qualifying feature.