Department for Business, Energy & Industrial Strategy

Habitat Regulations Assessment for an Application Under the Planning Act 2008 Keadby 3 Carbon Capture Power Station Project

Regulation 63 of the Conservation of Habitats and Species Regulations 2017

December 2022

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1 Introduction

1.1 Background

This is a record of the Habitats Regulations Assessment ("HRA") that the Secretary of State for Business, Energy and Industrial Strategy has undertaken under the Conservation of Habitats and Species Regulations 2017 ("the Habitats Regulations") for Keadby 3 Carbon Capture Power Station Project and its associated infrastructure (the "Project"). For the purposes of these Regulations the Secretary of State is the competent authority (under the Habitats Regulations).

The Project will comprise construction, operation and maintenance of a new electricity generating station with a gross electrical output of up to 910 megawatts (MW), at International Organization for Standardisation (ISO) conditions. It will be equipped with carbon capture and compression plant and fuelled by natural gas. The Project application is described in more detail in Section 2.

The Project constitutes a nationally significant infrastructure project (NSIP) as defined by s.14(1)(a) of the Planning Act 2008 as it is for a generating station with a capacity over 50MW.

The Project was accepted by the Planning Inspectorate ("PINS") on 28 June 2021 and one Inspector was appointed as the Examining Authority ("ExA") for the application. The examination of the Project application began on 7 December 2021 and completed on 7 June 2022. The ExA submitted its report of the examination, including its recommendation ("the ExA's Report"), to the Secretary of State on 7 September 2022. Numbered references to the ExA's Report are presented in the format of "[ER***]"

The Secretary of State's conclusions on Habitats Regulations issues contained in this report have been informed by the ExA's Report, and further information and analysis, including the ExA's Report on the Implications for European Sites ("RIES") and written responses to it, including that of Natural England ("NE") as the appropriate Statutory Nature Conservation Body ("SNCB").

This report also contains analysis and assessment of the potential effects of the Project upon designated sites in European Economic Area States ("transboundary sites"). This is included under the transboundary assessment section of the report (Section 7).

1.2 Habitats Regulations Assessment (HRA)

The Conservation of Habitats and Species Regulations 2017 ("the Habitats Regulations") aim to ensure the long-term conservation of certain species and habitats by protecting them from possible adverse effects of plans and projects.

In the UK, the Habitats Regulations apply as far as the 12 nautical miles ("nm") limit of territorial waters. Beyond territorial waters. Following the UK's departure from the European Union, these domestic regulations continue to apply.

The Habitats Regulations provide for the designation of sites for the protection of habitats and species of international importance. These sites are called Special Areas of Conservation ("SACs"). The classification of sites for the protection of rare and vulnerable birds and for regularly occurring migratory

species within the UK and internationally are protected by sites called Special Protection Areas ("SPAs"). SACs and SPAs together from part of the UK's National Site Network (NSN).

The Convention on Wetlands of International Importance 1972 ("the Ramsar Convention") provides for the listing of wetlands of international importance. These sites are called Ramsar sites. Government policy is to afford Ramsar sites in the United Kingdom the same protection as sites within the NSN (collectively referred to in this HRA as "protected sites").

Candidate SACs (cSACs), SACs and SPAs are afforded protection as European sites. As a matter of policy[1] the Government affords potential SPAs (pSPAs) the same level of protection.

Regulation 63 of the Habitats Regulations provides that:

….before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which (a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in-combination with other plans or projects), and (b) is not directly connected with or necessary to the management of that site, [the competent authority] must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.

And that: *In the light of the conclusions of the assessment, and subject to regulation 64 [IROPI], the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).*

This application is not directly connected with, or necessary to, the management of a protected site. The Habitats Regulations require that, where the Project is likely to have a significant effect ("LSE") on any such site, alone or in-combination with other plans and projects, an appropriate assessment ("AA") is carried out to determine whether or not the Project will have an adverse effect on the integrity of the site in view of that site's Conservation Objectives. In this document, the assessments as to whether there are LSEs, and, where required, the AA, are collectively referred to as the HRA.

1.3 The Report on the Implications for European Sites (RIES) and Statutory Consultation

Under Regulation 63 (3) of the Habitats Regulations the competent authority must, for the purposes of an AA, consult the appropriate nature conservation body and have regard to any representation made by that body within such reasonable time as the authority specifies.

NE is the SNCB for England and for English waters within the 12 nm limit. The Joint Nature Conservation Committee ("JNCC") is the SNCB beyond 12 nm, but this duty has been discharged by NE following the 2013 Triennial Review of both organisations[2] [3]. However, JNCC retains responsibility

1 NPS EN-1 para 5.3.9

[2] https://www.gov.uk/government/publications/triennial-review-of-the-environment-agency-ea-and-natural-england-ne

[3] https://www.gov.uk/government/publications/triennial-review-of-the-joint-nature-conservation-committee-jncc

as the statutory advisor for protected sites that are located outside the territorial sea and UK internal waters (i.e., more than 12 nautical miles offshore) and as such continues to provide advice to NE on the significance of any potential effects on the interest features of such sites.

The ExA prepared a RIES, with support from the Planning Inspectorate's Environmental Services Team. The RIES was based on matrices provided by the Applicant and relevant information provided by Interested Parties (IPs). The RIES documented the information received during the examination (up until 26 April 2022) and presented the ExA's understanding of the main facts regarding the HRA to be carried out by the Secretary of State.

The RIES was published on the PINS planning portal website and the ExA notified IPs that it had been published. Consultation on the RIES was undertaken between 24 May 2022 and 7 June 2022. The RIES was issued to ensure that IPs, including the SNCBs, were consulted formally on habitat regulations matters, as required under regulation 63(3) of the Habitats Regulations.

The Secretary of State is content to accept the ExA's recommendation that the RIES, and consultation on it, represents an appropriate body of information to enable the Secretary of State to fulfil his duties in respect of protected sites.

In addition, this HRA has been compiled using evidence from the Application documents and consultation responses, which are available on the Planning Inspectorate's Nationally Significant Infrastructure Project web pages[4]. In particular:

- The ExA's Report
- The Applicant's ES [APP-042] – [APP-159]
- The Applicant's Habitats Regulations Assessment Appropriate Assessment Report [REP6a-055]

Plus, other information submitted during the Examination and during the Secretary of State's consideration of the Application.

Key information from these documents is summarised in this report.

[4] https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/keadby-3-carbon-capture-power-station/

2 Development description

The Project comprises the construction, operation and maintenance of a carbon capture equipped electricity generating station with the capacity to generate 910MW gross electrical output on land at and in the vicinity of the Keadby Power Station site, Trentside, Keadby, North Lincolnshire.

The ES Non-Technical Summary [APP-042], indicates that the Project would be designed to operate continuously 24 hours a day, seven days a week, with programmed offline periods for maintenance. Operation would be driven by demand, and regulated by the Environment Agency through an Environmental Permit.

The Project site comprises land within and adjacent to the boundary of the existing Keadby 1 Power Station (K1) and Keadby 2 Power Station (K2) (currently being commissioned) to the west of Scunthorpe. The site encompasses an area of approximately 69.7 hectares (ha) of generally flat low-lying land. This includes an area of approximately 18.7ha to the west of K2 in which the generating station and gas connection will be developed. The site lies within the boundary of the administrative area of North Lincolnshire Council (NCL), a unitary authority.

The site is located within and adjoining land to the west of the existing Keadby Power Station site, which lies to the west of the River Trent and village of Keadby, some 7 kilometres (km) west of Scunthorpe town centre.

Beyond the Keadby Power Station site, land uses are predominantly arable farming, although various types of power infrastructure have been developed near to the Project site in recent years, including overhead electricity transmission and distributional infrastructure and the Keadby Windfarm to the north which become operational in 2014. Additional wind turbines and electricity transmission and distribution infrastructure is present over the wider surrounding area. The former Keadby Ash Tip is located immediately west of the proposed Project site. Residential accommodation and canal river related uses are found in the nearby villages of Keadby and Gunness.

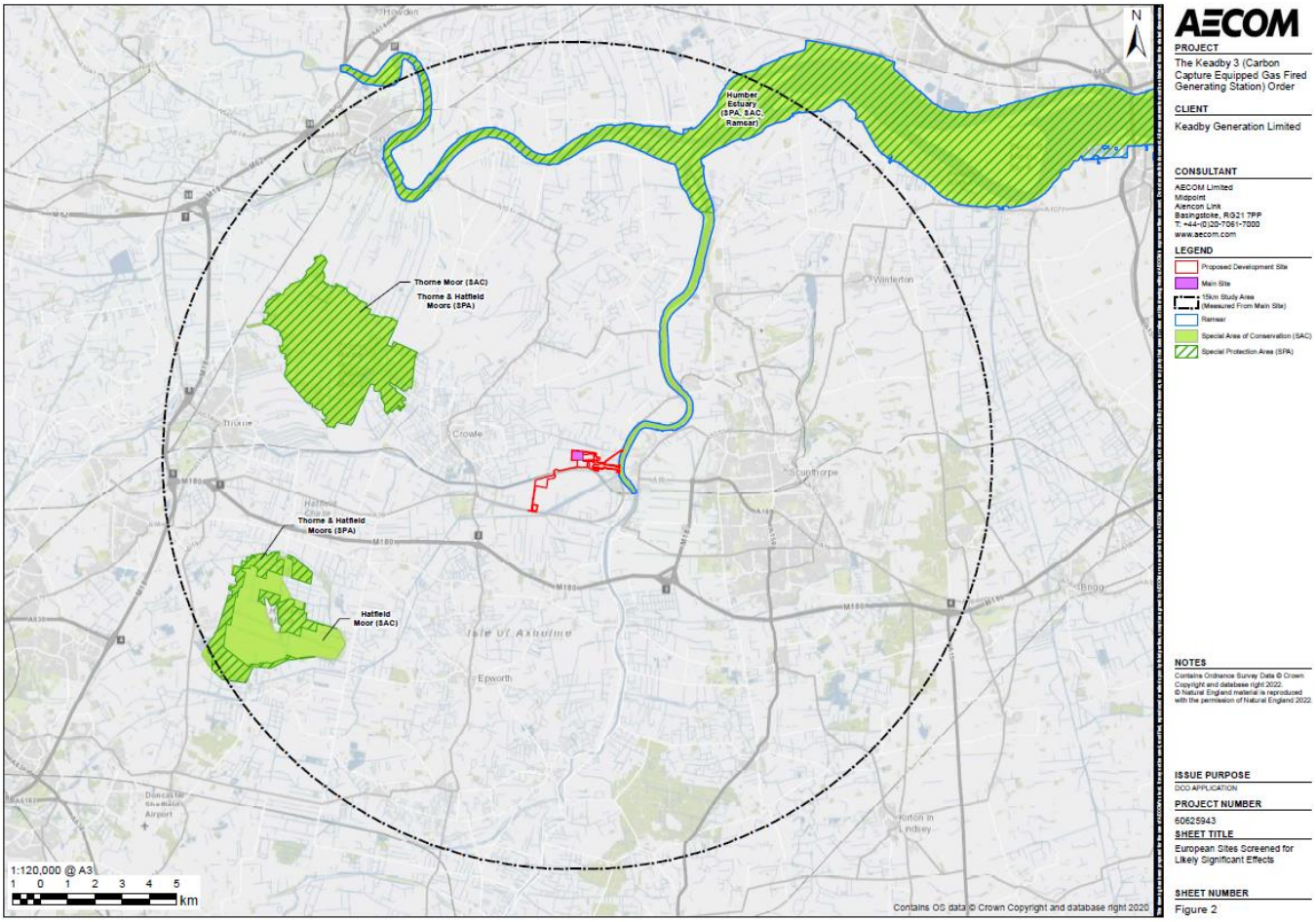

Figure 1: Protected sites screened in for likely significant effects

The Project design envelope sets out a series of design options for the Project and has a reasoned minimum and maximum extent for a number of key parameters. The final design would lie between the minimum and the maximum extent of the consent sought for all aspects of the Project. The final detailed design of the Project, which would occur post-consent, would fall within this 'envelope'. In addition, post-consent / pre-construction site investigation would further inform the detailed design.

3 Likely Significant Effects Test

Under regulation 63 of the Habitats Regulations, the Secretary of State must consider whether a development will have an LSE on a protected site, either alone or in-combination with other plans or projects.

The purpose of this section is to identify any LSEs on protected sites that may result from the project and to record the Secretary of State's conclusions on the need for an AA.

Of all the protected sites identified during Examination, the ExA concluded that LSEs could not be excluded for the following sites and their qualifying features, either alone or in-combination with other plans or projects:

- Humber Estuary SAC
- Humber Estuary SPA
- Humber Estuary Ramsar site

Table 1 (summarised from the RIES and ExA report) summarises the features for which significant effects, either alone or in combination, cannot be excluded for each site. The ExA report and the RIES provide further information on sites and features which were considered, but for which likely significant effects (LSEs) were screened out.

The Secretary of State agrees with the ExA, and the three protected sites listed in Table 1 are taken forward to the AA to consider whether an adverse effect on integrity (AEoI) from the Project alone and in combination with other plans or projects, can be excluded.

3.1 Humber Estuary SPA and Ramsar site

3.1.1 Noise and disturbance to bird species

NE [RR-010] disagreed with the Applicant's construction noise assessment methodology and proposed an alternative.

The Applicant [REP1-021] undertook sensitivity testing using the alternative thresholds proposed by NE and incorporated these findings into the revised HRA AA Report [REP6a-055], including accompanying noise contour plots. The Statement of Common Ground (SoCG) with NE states this matter is resolved [REP7-005].

The ExA was content with the applied methodology and agreed that the potential impact pathway from construction could be discounted, but installation of the cofferdam in the River Trent could give rise to LSE.

3.2 Humber Estuary SAC, SPA and Ramsar site

3.2.1 Water pollution

NE [RR-010] advised that measures outlined in the Habitats Regulations Assessment Screening Report [APP-041] to prevent water pollution impacts on the Humber Estuary SAC and SPA during the

construction phase of the Project would constitute mitigation and should therefore be screened into the AA. NE also sought these measures to be secured within the DCO.

The Applicant [REP2-006] considered the measures to be generic and applicable to all waterbodies regardless of destinations, as well as being necessary to meet general legislative, regulatory and good practice requirements. In response however, the Applicant revised the HRA Screening Report to consider water pollution effects at AA [REP6a-055]. Details of mitigation secured within the DCO are provided in Section 5.1.5.1 and Section 5.2.2.2.

3.2.2 Impacts to bird foraging resource

In response to NE's [RR-101] concerns that the original HRA Screening Report [APP-041] did not contain sufficient evidence regarding the impact of the Project on designated bird foraging resource, the Applicant submitted an updated HRA AA Report [REP1-006]. This considered temporary and permanent impacts on bird foraging resources for qualifying species and concluded no LSE.

The SoCG with NE [REP7-005] states that this matter is resolved.

The ExA considered the submitted information to be sufficient to demonstrate that there would be no LSE from the cofferdam installation works on foraging resources of qualifying species of the Humber Estuary SPA and Ramsar site.

3.3 Humber Estuary SAC and Ramsar site

3.3.1 Underwater noise / vibration on lamprey species

The Applicant's HRA Screening Report [APP-041] screened out LSEs from noise disturbance resulting from the installation of the cofferdam in the River Trent for the Humber Estuary SAC and Ramsar site river and sea lamprey qualifying features. This was on the basis that lamprey are low hearing sensitivity fish and therefore unlikely to be significantly affected by noise and vibration disturbance.

NE [RR-010] advised that noise and vibration could impact the lamprey migration as they would take shelter until the noise passes. The Applicant [APP-041] proposed soft-start procedures as standard mitigation for marine receptors.

The Applicant secured the mitigation and revised the HRA AA Report [REP6a-055] screening in this pathway for AA in response to NE's concerns, ensuring that it was consistent with case law (the People Over Wind judgement).

3.3.2 Entrapment of migrating lamprey species arising from cofferdam installation

NE [RR-010] queried the Applicant's assumption that the only migratory fish species likely to use the Stainforth and Keadby Canal is European eel. It advised that further information should be provided through surveys to demonstrate that lamprey do not use the canal, or that the same precautionary mitigation be applied to the cofferdam installation in the canal as for that applied to the river abstraction option.

The ExA [PD-021] also requested clarity on what mitigation was proposed to prevent entrapment of lamprey species through the dewatering of the cofferdam or both the River Trent and the Stainforth and Keadby Canal river abstraction options. It also asked the Applicant to justify how any mitigation proposed would be consistent with the People Over Wind judgement.

The Applicant [REP13-013] clarified that mitigation during cofferdam installation and dewatering involves fish rescue. This would be set out in the Fish Management Plan, secured via the Landscape and Biodiversity Management and Enhancement Plan [REP7-003] and the Construction Environment Management Plan (CEMP) [REP6-003]. The Applicant stated [REP7-013] that there is a legal duty to

meet the welfare requirements of fish, irrespective of protective site designations. Lamprey is therefore encompassed by this legislation and has no species-specific mitigation. NE raised no objection to this [REP7-005].

Due to the measures set out in the Fish Management Plan, the ExA considered potential entrapment effects on lamprey features of the Humber Estuary SAC and Ramsar site arising from installation of the cofferdam for consideration in the AA.

3.3.3 Saltmarsh habitat disturbance and modification

NE detailed concerns [RR-010] regarding transitional reedbed vegetation along the banks of the River Trent representing saltmarsh habitat in the context of the Humber Estuary SAC and Ramsar site. The Applicant [REP2-006] [REP6a-055] maintained its conclusion of no LSEs on saltmarsh habitat and clarified that perennial vegetation observed to be present along the margins of the River Trent is species-poor riparian vegetation which does not comprise the saltmarsh vegetation qualifying feature *"Salicornia and other annuals colonising mud"*.

NE confirmed [REP6-036] that the revised HRA AA Report provided evidence that the saltmarsh habitat (*Salicornia* qualifying feature) is not present in close proximity to the Project. On this basis, it is not necessary to secure the reinstatement of such habitat by a Requirement in the DCO. LSE on the *Salicornia* qualifying feature of the Humber Estuary SAC and Ramsar site arising from habitat disturbance during construction was therefore not taken through to the AA.

3.3.4 Dispersal of Invasive Non-native Species

The Applicant's HRA AA Report [REP6a-055] identified a pathway for the introduction of Invasive Non-Native Species (INNS), via construction vehicles, plant and materials brought into the construction site from other locations.

The Applicant stated [REP2-006] that biosecurity measures are required to ensure that during construction general legal requirements are met in relation to INNS, and to protect the water supply and discharge infrastructure from damage during operation. The measures are not proposed to address a specific potential impact on protected sites.

In light of the proposed biosecurity measures, the ExA decided to consider potential effects on the qualifying features of the Humber Estuary SAC and Ramsar site from the introduction of INNS in the AA.

3.4 In combination

The scope of the Applicant's in-combination assessment was not disputed by any IPs. The MMO [RR-006] recommended that the Applicant's HRA AA Report should be updated regularly to reflect any new plans or projects that may need consideration.

No in-combination LSEs were identified for the sites and qualifying features where LSEs were excluded from the Project alone, namely, in relation to saltmarsh habitat disturbance and modification on the Humber Estuary SAC and Ramsar site, and impacts to bird foraging resource on the Humber Estuary SPA and Ramsar site.

The air quality assessment intrinsically considered relevant consented schemes within the model, therefore the HRA AA Report screening of the Project alone already considered the potential in-combination effects with other relevant projects.

In-combination LSEs were excluded on the basis of:

- Most of the other plans or projects identified were of insufficient scale and / or are located at too great a distance from the relevant protected sites to be likely to interact with the Project; and
- In some cases, the plans or projects were insufficiently advanced or defined to be assessed.

Table 1: Protected sites for which significant effects cannot be excluded, when the Project is considered alone or in combination with plans or projects, on the listed qualifying features (summarised from the ExA's Report and the RIES).

Protected Site	Distance from the Project	Features for which likely significant effects have been identified	Likely significant effect(s) alone
Humber Estuary SAC	1.3km	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Coastal lagoons Dunes with *Hippophae rhamnoides* Embryonic shifting dunes Fixed coastal dunes with herbaceous vegetation ("grey dunes") *Salicornia* and other annuals colonizing mud and sand Sandbanks which are slightly covered by sea water all the time Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")	Introduction of INNS (construction / decommissioning) Atmospheric pollution (operation)
		Estuaries Mudflats and sandflats not covered by seawater at low tide	Habitat disturbance and modification (construction / decommissioning) Introduction of INNS (construction / decommissioning) Water quality (construction / decommissioning) Atmospheric pollution (operation)
		Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis*	Entrapment (construction / decommissioning) Introduction of INNS (construction / decommissioning) Visual and noise / vibration disturbance (construction / decommissioning) Water quality (construction / decommissioning) Atmospheric pollution (operation)

		Grey seal *Halichoerus grypus*	Introduction of INNS (construction / decommissioning)
Humber Estuary SPA	9.8km	Great bittern *Botaurus stellaris* (breeding and non-breeding) Eurasian marsh harrier *Circus aeruginosus* (breeding) Hen harrier *Circus cyaneus* (non-breeding) Pied avocet *Recurvirostra avosetta* (breeding and non-breeding) Little tern *Sterna albifrons* (breeding)	Introduction of INNS (construction / decommissioning) Atmospheric pollution (operation)
		Common shelduck *Tadorna tadorna* (non-breeding) European golden plover *Pluvialis apricaria* (non-breeding) Red knot *Calidris canutus* (non-breeding) Dunlin *Calidris alpina alpina* (non-breeding) Ruff *Philomachus pugnax* (non-breeding) Black-tailed godwit *Limosa limosa islandica* (non-breeding) Bar-tailed godwit *Limosa lapponica* (non-breeding) Common redshank *Tringa totanus* (non-breeding) Non-breeding waterbird assemblage	Introduction of INNS (construction / decommissioning) Visual and noise / vibration disturbance (construction / decommissioning) Water quality (construction / decommissioning) Atmospheric pollution (operation)
Humber Estuary Ramsar site	1.3km	Atlantic salt meadows Coastal lagoons Dunes with *Hippophae rhamnoides* Embryonic shifting dunes Fixed coastal dunes with herbaceous vegetation (“grey dunes”) *Salicornia* and other annuals colonising mud and sand Sandbanks which are slightly covered by seawater all the time Shifting dunes covered along the shoreline with *Ammophila arenaria* (“white dunes”) Pied avocet *Recurvirostra avosetta* (non-breeding)	Introduction of INNS (construction / decommissioning) Atmospheric pollution (operation)
		Estuaries Mudflats and sandflats not covered by seawater at low tide	Habitat disturbance and modification (construction / decommissioning)

			Introduction of INNS (construction / decommissioning) Water quality (construction / decommissioning) Atmospheric pollution (operation)
		Common shelduck (non-breeding) European golden plover (non-breeding) Red knot (non-breeding) Dunlin (non-breeding) Black-tailed (non-breeding) Bar-tailed godwit (non-breeding) Common redshank (non-breeding) Waterbird assemblage	Introduction of INNS (construction / decommissioning) Visual and noise / vibration disturbance (construction / decommissioning) Water quality (construction / decommissioning / operation) Atmospheric pollution (operation)
		Sea lamprey River lamprey	Visual and noise / vibration disturbance (construction / decommissioning) Water quality (construction / decommissioning / operation) Entrapment (construction) Introduction of INNS (construction / decommissioning) Atmospheric pollution (operation)
		Grey seal Natterjack toad *Epidalea calamita*	Introduction of INNS (construction / decommissioning)

The Secretary of State has considered the potential effects of the Project on all relevant protected sites, taking into account their conservation objectives, including the three protected sites listed above to determine whether there will be LSEs in the context of the Habitats Regulations. The Secretary of State considers that sufficient information has been provided to inform a robust assessment in line with his duties under the Habitats Regulations.

The Secretary of State recognises that powers are in place for decommissioning effects to be addressed fully by the relevant authorities prior to decommissioning, and in light of more detailed information on decommissioning processes and environmental conditions at that time. The Secretary of State therefore considers that it is reasonable not to include a detailed discussion on decommissioning effects in this report and notes that decommissioning is not a barrier to the application being granted.

3.5 Likely Significant Effects alone assessment

The Secretary of State agrees with the recommendations of the ExA and concludes that LSEs cannot be excluded at the three sites listed in Table 1, when the Project is considered alone. These sites are taken forward to the AA to consider whether the Project will result in an AEoI of these sites.

3.6 Likely Significant Effects in-combination assessment

Under the Habitats Regulations, the Secretary of State is obliged to consider whether other plans or projects in-combination with the Project might affect protected sites. In this case there are no other plans or projects which could potentially affect the three protected sites listed in Table 1.

The approach used by the Applicant to assess in combination effects was to select projects which may affect qualifying features of each protected site under consideration. The plans or projects included in the in-combination assessment include several planned and existing projects within the vicinity of the Project.

The Secretary of State agrees with the recommendations of the ExA and concludes that likely significant effects can be excluded at the three sites listed in Table 1 when the impacts of the Project are considered in-combination with other plans or projects.

4 Appropriate Assessment Methodology

The requirement to undertake an AA is triggered when a competent authority, in this case the Secretary of State, determines that a plan or project is likely to have a significant effect on a protected site either alone or in combination with other plans or projects. Guidance issued by Defra states that the purpose of an AA is to assess the implications of the plan or project in respect of the protected site's conservation objectives, either individually or in combination with other plans and projects, and that the conclusions should enable the competent authority to ascertain whether the plan or project will adversely affect the integrity of the site concerned. The focus is therefore specifically on the species and/or habitats for which the protected site is designated[5].

The purpose of this AA is to determine whether adverse effects on the integrity of the features of the three sites identified can be ruled out as a result of the Project alone or in combination with other plans or projects in view of the site's conservation objectives and using the best scientific evidence available.

If the competent authority cannot ascertain the absence of an AEoI beyond reasonable scientific doubt, then under the Habitats Regulations, alternative solutions should be sought. In the absence of an acceptable alternative, the Project can proceed only if there are imperative reasons of overriding public interest ("IROPI") and suitable compensation measures are identified.

4.1 Conservation Objectives

Defra Guidance indicates that disturbance to a species or deterioration of a protected site must be considered in relation to the integrity of that site and its conservation objectives[6]. It states that *"the integrity of a site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was designated"*.

The conservation objectives have been established by NE. When met, each site will contribute to the overall favourable conservation status of the species or habitat feature across its natural range. Conservation objectives outline the desired state for a protected site, in terms of the qualifying features for which it has been designated. If these qualifying features are being managed in a way which maintains their nature conservation value, they are assessed as being in a 'favourable condition'. An AEoI is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of its designation. There are no set thresholds at which impacts on site integrity are considered adverse. This is a matter for interpretation on a site-by-site basis, depending on the designated feature and nature, scale, and significance of the impact.

NE has issued generic conservation objectives, which should be applied to each interest feature of the site. Supplementary advice for each site underpins these generic objectives to provide site-specific information and give greater clarity to what might constitute an adverse effect on a site interest feature. Supplementary advice on conservation objectives is subject to availability and is currently being updated on a rolling basis.

[5] ttps://www.gov.uk/guidance/appropriate-assessment#what-must-an-appropriate-assessment-contain
[6] https://www.gov.uk/guidance/appropriate-assessment

Where supplementary advice is not yet available for a site, NE advises that HRAs should use the generic objectives and apply them to the site-specific situation. For SPAs, the overarching objective is to avoid the deterioration of the habitats of qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Habitats Regulations. This is achieved by, subject to natural change, maintaining and restoring:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of the qualifying features; and
- The distribution of the qualifying features within the site.

For SACs, the overarching objective is to avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving favourable conservation status of each of the qualifying features. This is achieved by, subject to natural change, maintaining and restoring:

- The extent and distribution of the qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats;
- The structure and function of the habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species; and
- The distribution of qualifying species within the site.

The conservation objectives and, where available, supplementary advice on conservation objectives have been used by the Secretary of State to consider whether the Project has the potential to have an AEoI of protected sites, either alone or in-combination with other plans or projects. The potential for the Project to have an AEoI is considered for each site in turn.

5 Appropriate Assessment

5.1 Appropriate Assessment: Humber Estuary SAC and Ramsar site

The Humber Estuary SAC is located approximately 1.3km from the Project.

The SAC covers an area of 36,657.15ha and is the second largest coastal plain estuary in the UK. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, vascular plants and invertebrates. Significant fish species include river lamprey and sea lamprey which breed in the River Derwent, a tributary of the River Ouse. Grey seals come ashore in autumn to form breeding colonies on the sandy shores of the south bank at Donna Nook[7].

The location of the Humber Estuary Ramsar site is broadly coincident with the Humber Estuary SAC.

The Criterion relating to habitats for which the Ramsar site is designated, and which have been carried forward for consideration of AEoI is:

- Criterion 1: The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons[8].

The Secretary of State has considered the potential for the Project to constitute an AEoI for each feature for which a significant effect is likely.

5.1.1 All features: Alone

5.1.1.1 Introduction of INNS

The Applicant concluded no LSE from the introduction of INNS, however, as it placed reliance on mitigation measures in the CEMP, the ExA considered it necessary to consider whether the spread of INNS would have AEoI of the Humber Estuary SAC.

The CEMP [REP6-003] sets out the mitigation, which comprises an Invasive Species Management Plan to specify the survey, control, eradication, biosecurity and supervision measures necessary. NE [RR-010] expressed satisfaction that the Project would not increase the risk of INNS impacts within the boundary of the Humber Estuary SAC.

The ExA was satisfied that, subject to the implementation of the mitigation measures as secured, there would be no AEoI on all qualifying features of the Humber Estuary SAC and Ramsar site from the unintentional introduction or spread of INNS as a result of the Project.

The Secretary of State is satisfied that, based upon the mitigation measures secured, an AEoI of all qualifying features of the Humber Estuary SAC and Ramsar site from the introduction of INNS from the Project alone can be excluded.

[7] http://publications.naturalengland.org.uk/publication/5009545743040512
[8] https://rsis.ramsar.org/ris/663

5.1.2 All features excluding grey seal: Alone

5.1.2.1 Atmospheric pollution

The Applicant identified LSEs from operational emissions to air, specifically emissions of nitrogen oxides (NO_x) and nitrogen deposition (with NH_3) on all features of the Humber Estuary SAC excluding grey seal.

The HRA AA Report [REP6a-055] concluded that there would be no AEoI on qualifying features of the Humber Estuary SAC and Ramsar site due to atmospheric emissions during operation of the Project. The basis for this conclusion was:

- The Predicted Environmental Concentration (PEC) for the Humber Estuary sites is predicted to remain below the critical level set for NO_x, so the potential impact from direct NO_x emissions is not significant; and
- After NH_3 abatement through acid wash, the process contribution to nitrogen deposition is not predicted to exceed 1% of the critical load at the Humber Estuary SAC and Ramsar site.

Baseline air quality data

NE [RR-010] recommended that the results of active diffusion tube monitoring, which were carried out for a year to satisfy the conditions of the Keadby 2 Power Station, of ambient NO_x, nitrogen dioxide and NH_3 should be incorporated into the air quality assessments.

The Applicant provided an update to the original HRA Screening Report [APP-041] with the HRA AA Report [REP1-006], which incorporated the diffusion tube monitoring results. The Applicant confirmed [REP2-006] that the new data did not affect the overall outcome of the air quality assessment or the HRA.

NE [REP7-005] agreed that the correct approach had been taken and the results of the monitoring had been incorporated correctly into the updated HRA AA Report. Both the Applicant and NE agreed that the updated air quality information within the HRA AA Report addresses the points raised by NE.

Mitigation

In response to NE, the Applicant confirmed that the Project includes Selective Catalytic Reduction (SCR) for the abatement of NO_x and the use of an acid wash to control NH_3 emissions. The SCR is required for regulatory purposes to meet the required Best Available Technique associated emission levels (BAT-AEL) limit values and to optimise the carbon dioxide efficiency. The NH_3 abatement is required to manage atmospheric pollutants so that they remain below the critical levels / loads set for the relevant protected sites. The SCR and flue gas washing will be required in order to ensure that the BAT-AELs are met in accordance with the Environmental Permit (EP).

NE confirmed that it was satisfied with the wording of the DCO with regard to the abatement measures to reduce the NO_x and NH_3 emissions.

The ExA acknowledged that further detail on atmospheric pollution would be provided in respect of the EP and that this would be subject to a separate HRA which would be issued by the Environment Agency, after the Secretary of State is due to reach a conclusion on the DCO. Focussing on the land use that would be authorised by the DCO, the ExA was satisfied that subject to the implementation of the mitigation measures as secured, there would be no AEoI on the qualifying features of the Humber Estuary SAC arising from the effects of operational emissions to air as a result of the Project.

The Secretary of State is satisfied that, based upon the mitigation measures secured, an AEoI of all qualifying features excluding grey seal of the Humber Estuary SAC and Ramsar site from atmospheric pollution from the Project alone can be excluded.

5.1.3 Estuaries; Mudflats and sandflats not covered by seawater at low tide: Alone

5.1.3.1 Habitat disturbance and modification

The HRA AA Report [REP6a-055] provided information in relation to the disturbance and modification of habitat during the installation of the cofferdam and upgrades to the existing Keadby 1 Power Station river water abstraction structure (if required) during the construction period.

The Applicant concluded there would be no AEoI to habitats as a result of disturbance and modification. This was on the basis that the scale, location and type of construction activities are not likely to result in habitat disturbances that would meaningfully alter the extent, structure and function of the mudflat and estuary habitats.

NE [RR-010] was initially under the impression that saltmarsh habitat was present within the vicinity of the cofferdam, and therefore suggested that habitat reinstatement may be required. Following the confirmation that the temporary reduction in the extent of habitat is in relation to the mudflat feature, NE [REP6-036] confirmed that securing habitat reinstatement would not be required for the mudflat feature of the estuary, given its likely recoverability.

The ExA was of the view that there would be no AEoI from habitat disturbance and modification on the qualifying mudflat and estuary habitats of the Humber Estuary SAC and Ramsar site.

The Secretary of State is satisfied that an AEoI of estuaries, and mudflats and sandflats not covered by seawater at low tide qualifying features of the Humber Estuary SAC and Ramsar site from habitat disturbance and modification from the Project alone can be excluded.

5.1.4 River lamprey; Sea lamprey: Alone

5.1.4.1 Noise / vibration disturbance on lamprey species

The HRA AA Report [REP6a-055] provided information in relation to noise / vibration disturbance on lamprey species during the installation of the cofferdam and upgrades to the existing Keadby 1 Power Station river water abstraction structure (if required) during the construction period.

The Applicant secured use of soft-start piling methods for piling activity via the Deemed Marine Licence (DML) (Schedule 13 of the DCO), allowing migrating lamprey species associated with the sites to pass the development site before piling begins. NE confirmed [REP7-005] that it considers that this adequately secures the use of soft-start procedures within the DCO.

Given that lamprey species are categorised as low hearing sensitivity fish species, and subject to the mitigation as secured, the ExA considered that there would be no AEoI on the sea lamprey and river lamprey features of the Humber Estuary SAC and Ramsar site.

The Secretary of State is satisfied that, based upon the mitigation measures secured, an AEoI of river lamprey and sea lamprey qualifying features of the Humber Estuary SAC and Ramsar site from noise / vibration disturbance from the Project alone can be excluded.

5.1.4.2 Entrapment of lamprey species

The Applicant concluded no LSEs from the entrapment of lamprey species arising from the dewatering of the cofferdam during construction. The ExA considered the pathway for AEoI in light of the mitigation measures proposed by the Applicant.

The Landscaping and Biodiversity Management and Enhancement Plan [REP7-003] sets out the measures for inclusion in a Fish Management Plan:

- *"appropriate timings to minimise potential for capture of sensitive fish species e.g. migratory fish;*
- *Provision for screening of pump intakes to prevent fish being drawn into the pipe / pump;*

- *Supervision of dewatering of any cofferdam(s) by an appropriately experienced Clerk of Works to oversee fish welfare and to support the relocation of any stranded fish or associated wildlife back to the main channel of the relevant watercourse outside the working area; and*
- *If appropriate, e.g. to meet additional requirements of the relevant regulators, other specialist techniques to support the capture and relocation of fish to the main channel of the relevant watercourse outside the working area prior to drawdown."*

The HRA AA Report [REP6a-055] states that the size range of lampreys likely to be trapped within the cofferdam and their resilient morphology is sufficient to conclude that they would be detected during general fish rescue procedures and would suffer no injurious effect from fish rescue. NE [REP7-005] [REP-021] raised no objection to this conclusion.

The ExA was satisfied that, subject to the implementation measures as secured, there would be no AEoI on the lamprey species qualifying features of the Humber Estuary SAC and Ramsar site from the entrapment of lamprey during cofferdam installation.

The Secretary of State is satisfied that, based upon the mitigation measures secured, an AEoI of river lamprey and sea lamprey qualifying features of the Humber Estuary SAC and Ramsar site from entrapment from the Project alone can be excluded.

5.1.5 Estuaries; Mudflats and sandflats not covered by seawater at low tide; River lamprey; Sea lamprey: Alone

5.1.5.1 Deterioration of water quality

The Applicant identified LSEs from potential deterioration of water quality during the construction period on estuaries, mudflats and sandflats not covered by seawater at low tide, river lamprey and sea lamprey of the Humber Estuary SAC and Ramsar site.

The Framework CEMP sets out standard mitigation measures to minimise the risk of water pollution to watercourses. The HRA AA Report concludes that there will be no AEoI on protected sites as a result of water pollution during the construction of the Project.

NE [RR-010] was satisfied with the measures outlined to prevent water pollution impacts during the construction phase. Construction practice measures to avoid, prevent and reduce adverse effects on the water environment are committed to in the Framework CEMP [REP6-003], secured via Requirement 17 of the DCO, and foul water drainage measures for the treatment of sewage and grey water produced during the construction phase, secured via Requirement 13 of the DCO. NE [REP7-005] considered that water quality effects on protected sites had been adequately assessed.

The ExA was satisfied that subject to the implementation of mitigation measures as secured, there would be no AEoI on the qualifying features of the Humber Estuary SAC and Ramsar site.

The Secretary of State is satisfied that, based upon the mitigation measures secured, an AEoI of estuaries, mudflats and sandflats not covered by seawater at low tide, river lamprey and sea lamprey qualifying features of the Humber Estuary SAC and Ramsar site from deterioration of water quality from the Project alone can be excluded.

5.2 Appropriate Assessment: Humber Estuary SPA and Ramsar site

The Humber Estuary SPA is located approximately 9.8km from the Project.

The SPA covers an area of 37,630.24ha and comprises extensive wetland and coastal habitats. The inner estuary supports extensive areas of reedbed, with areas of mature and developing saltmarsh backed by grazing marsh in the middle and outer estuary. On the Lincolnshire coast, the saltmarsh is

backed by low sand dunes with marshy slacks and brackish pools. The estuary supports important numbers of waterbirds during the migration periods and in winter. In summer, it supports important breeding populations of bittern, marsh harrier, avocet and little tern.

The Criterion relating to species and ecological communities for which the Ramsar site is designated, and which have been carried forward for consideration of AEoI are:

- Criterion 3: The site supports a breeding colony of grey seal at Donna Nook.
- Criterion 5: The site supports assemblages of international importance during the non-breeding season.
- Criterion 6: The site supports species / populations occurring at levels of international importance:
    - Common shelduck;
    - European golden plover;
    - Red knot;
    - Dunlin;
    - Black-tailed godwit;
    - Bar-tailed godwit; and
    - Common redshank.
- Criterion 8: The Humber Estuary acts as an important migration route for both river lamprey and sea lamprey between coastal waters and their spawning areas.

The Secretary of State has considered the potential for the Project to constitute an AEoI for each qualifying feature for which a significant effect is likely.

5.2.1 All features: Alone

5.2.1.1 Atmospheric pollution

The Applicant identified LSEs from operational emissions to air, specifically emissions of nitrogen oxides (NO_x) and nitrogen deposition (with NH_3) on all features of the Humber Estuary SPA and Ramsar site.

The HRA AA Report [REP6a-055] concluded that there would be no AEoI on qualifying features of the Humber Estuary SPA and Ramsar site due to atmospheric emissions during operation of the Project. The basis for this conclusion was:

- The Predicted Environmental Concentration for the Humber Estuary sites is predicted to remain below the critical level set for NO_x so the potential impact from direct NO_x emissions is not significant; and
- After NH_3 abatement through acid wash, the process contribution to nitrogen deposition is not predicted to exceed 1% of the critical load at the Humber Estuary SPA and Ramsar site.

As discussed in more detail in Section 5.1.2.1, the Applicant confirmed that the Project includes SCR for the abatement of NO_x and the use of an acid wash to control NH_3 emissions. The SCR is required for regulatory purposes to meet the required Best Available Technique associated emission levels (BAT-AEL) limit values and to optimise the carbon dioxide efficiency.

NE confirmed that it was satisfied with the wording of the DCO with regard to the abatement measures to reduce the NO_x and NH_3 emissions.

The ExA acknowledged that further detail on atmospheric pollution would be provided in respect of the EP and that this would be subject to a separate HRA which would be issued by the Environment Agency after the Secretary of State is due to reach a conclusion on the DCO. Focussing on the land use that would be authorised by the DCO, the ExA was satisfied that subject to the implementation of the mitigation measures as secured, there would be no AEoI on the qualifying features of the Humber

Estuary SPA and Ramsar site arising from the effects of operational emissions to air as a result of the Project.

The Secretary of State is satisfied that, based upon the mitigation measures secured, an AEoI of all qualifying features of the Humber Estuary SPA and Ramsar site from atmospheric pollution from the Project alone can be excluded.

5.2.2 Common shelduck; European golden plover; Red knot; Dunlin; Ruff; Black-tailed godwit; Bar-tailed godwit; Common redshank; Waterbird assemblage: Alone

5.2.2.1 Visual and noise disturbance on bird species

The HRA AA Report [REP6a-055] provided information in relation to visual and noise disturbance on common shelduck, European golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, and waterbird assemblage qualifying features during installation of a cofferdam and upgrades to the existing Keadby 1 Power Station river water abstraction structure (if required) during the construction period.

This impact pathway is relevant to the non-breeding populations of wading bird species and common shelduck occurring in association with mudflat habitats of the Humber Estuary SPA and Ramsar site.

The Applicant did not undertake a specific assessment of visual disturbance as the noise impacts would extend further and therefore the noise assessment represented the worst-case scenario. The Applicant stated that construction activities would take place during summer when river flows are lowest and 9,384ha of mudflat habitat would be affected. In terms of mitigation, the Applicant committed to a soft-start approach to piling, with vibratory piling as standard and percussive piling only used if required to drive a pile to its design depth. This is secured in the DML under Schedule 13 of the DCO.

The HRA AA Report concludes that given the timing of construction activities, the small area of habitat affected as a proportion of available mudflat habitat, the highly mobile nature of the birds, and the location of the development, that there would be no AEoI of the relevant protected sites as a result of visual and noise disturbance of qualifying bird species during construction of the Project.

NE [RR-010] advised that the DCO should secure the avoidance of the wintering bird period for the cofferdam installation and associated piling works, to prevent noise and visual disturbance to the features of the Humber Estuary SPA and Ramsar site. The Applicant confirmed that provisions to avoid the wintering bird period for cofferdam installation were secured in detailed design, via Requirement 5(4)(d) of the DCO. This requires the timing of installation and removal to be approved prior to commencement of the work.

In light of the assessments provided by the Applicant and mitigation secured by the DCO, the ExA was of the view that an AEoI could be excluded on qualifying features of the Humber Estuary SAC and Ramsar site from visual and noise disturbance on bird species.

The Secretary of State is satisfied that, based upon the mitigation measures secured, an AEoI of common shelduck, European golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank and waterbird assemblage qualifying features of the Humber Estuary SPA and Ramsar site from visual and noise disturbance from the Project alone can be excluded.

5.2.2.2 Deterioration of water quality

The Applicant identified LSEs from potential deterioration of water quality during the construction period on common shelduck, European golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank and waterbird assemblage qualifying features of the Humber Estuary SPA and Ramsar site.

As discussed in Section 5.1.5.1, construction practice measures are committed to in the Framework CEMP [REP6-003], secured via Requirement 17 of the DCO, and foul water drainage measures for the treatment of sewage and grey water produced during the construction phase are secured via Requirement 13 of the DCO.

NE [REP7-005] considered that water quality effects on protected sites had been adequately assessed.

The ExA was satisfied that subject to the implementation of mitigation measures as secured, there would be no AEoI on the qualifying features of the Humber Estuary SAC and Ramsar site.

The Secretary of State is satisfied that, based upon the mitigation measures secured, an AEoI of common shelduck, European golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank and waterbird assemblage qualifying features of the Humber Estuary SPA and Ramsar site from deterioration of water quality from the Project alone can be excluded.

6 Habitats Regulations Assessment Overall Conclusions

The Secretary of State has carefully considered the information presented, including the RIES, the ES, representations made by Interested Parties, and the ExA's report itself. He considers that the Project, when considered alone, has the potential to have a LSE on three protected sites. These sites are listed below:

- Humber Estuary SAC
- Humber Estuary SPA
- Humber Estuary Ramsar site

The Secretary of State has undertaken an AA in respect of the conservation objectives of these three protected sites to determine whether the Project alone will result in an adverse effect on their integrity.

The Secretary of State has considered the available information and the mitigation measures secured through the DCO and DMLs, and has concluded that the Project, alone and in combination with other plans or projects, will not have an adverse effect on the integrity of any protected sites.

The recommendation of the ExA is that [ER: 5.5.5] *"… subject to the mitigation measures to be secured in the dDCO, AEoI on the European sites assessed from the Proposed Development when considered alone or in-combination with other plans or projects can be excluded from the impact-effect pathways assessed."*

The Secretary of State concludes that, in line with the recommendation of the ExA and subject to the mitigation secured in the DCO, an adverse effect on the integrity of the Humber Estuary SAC, SPA and Ramsar site from the effects of the Project, alone or in combination with other plans or projects can be excluded.

7 Transboundary Assessment

Given the potential for this Project to affect mobile features across a wide geographical area; the Secretary of State believes it important to consider the potential impacts on protected sites in European Economic Area ("EEA") states, known as transboundary sites, in further detail. The ExA also considered the implications for these sites, in the context of looking at the wider EIA considerations. The results of the ExA's considerations and the Secretary of State's own views on this matter are presented below.

In July 2020, under Regulation 32 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, the ExA (on behalf of the Secretary of State) undertook a transboundary screening and found the likelihood of transboundary effects resulting from the Project was so low that it did not warrant the issue of a detailed transboundary screening.

After the acceptance of the Project application for Examination in July 2021, the Planning Inspectorate took into account any changes made to the Project since the previous transboundary screening process. It found that the Project was unlikely to have a significant effect either alone or cumulatively on the environment in a European Economic Area State. This position remained under review throughout Examination, but no new or materially different information came forward to alter this conclusion.

The Secretary of State has not been presented with any substantive evidence to demonstrate that transboundary impacts would have a likely significant effect. As such, the Secretary of State is satisfied that the Project, either alone or in-combination with other plans or projects would not have a likely significant effect on any transboundary protected site.

Author: Amy McHugh BSc MSc

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