

Tarbert Power Station - Temporary Emergency Generation

Appropriate Assessment Screening Report

SSE Generation Ireland Limited

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Prepared for:

SSE Generation Ireland Limited

Prepared by:

AECOM Ireland Limited
1st floor, Montrose House
Carrigaline Road
Douglas, Cork T12 P088
Ireland

T: +353 21 436 5006

F: +353 21 436 5156

aecom.com

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1. Introduction

1.1 Background and Project Description

This Appropriate Assessment Screening Report has been prepared by AECOM on behalf of SSE Generation Ireland Limited ('the Applicant / Landowner') to accompany the application to the Minister for the Environment, Climate and Communications ('the Minister') for approval to carry out the development of Temporary Emergency Generation ('the Designated Development') within the boundary of Tarbert Power Station, Tarbert, Listowel, Co. Kerry.

The Appropriate Assessment Screening Report evaluates the Designated Development which will involve construction works, installation and operation and decommissioning and demolition of three gas turbine powered units with a total operational output of 150MWe on 2.4ha of land within the Tarbert Power Station Site.

The Site has been designated for Temporary Emergency Generation (TEG) development by the Irish Government under new legislation '*Development (Emergency Electricity Generation) Act 2022*¹'. The facility will be connected to the existing 220kV EirGrid substation to the south of the Tarbert Power Station Site via an underground cable circa. 560m in length.

1.2 Legislative Context

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, which is more commonly known as the 'Habitats Directive', requires Member States of the European Union (EU) to take measures to maintain or restore, at favourable conservation status, natural habitats and wild species of fauna and flora of Community interest. The provisions of the Habitats Directive require that Member States designate Special Areas of Conservation (SACs) for habitats listed in Annex I and for species listed in Annex II. Similarly, Directive 2009/147/EC on the conservation of wild birds, which is more commonly known as the 'Birds Directive', provides a framework for the conservation and management of wild birds. It also requires Member States to identify and classify Special Protection Areas (SPAs) for rare or vulnerable species listed in Annex I of the Birds Directive, as well as for certain regularly occurring migratory species. Collectively, SACs and SPAs are known as 'European sites'.

In Ireland, the habitats and/or species which are the reason(s) for designation of an SAC are referred to as 'Qualifying Interests' (QI). In relation to SPAs, the bird species for which a particular site is designated are referred to as the 'Special Conservation Interests' (SCI).

Under Article 6(3) of the Habitats Directive, any plan or project which is not directly connected with or necessary to the management of a European site but would be likely to have a significant effect on such a site, either individually or in-combination with other plans or projects, must be subject to an Appropriate Assessment (AA) of its implications for the SAC / SPA in view of the site's Conservation Objectives.

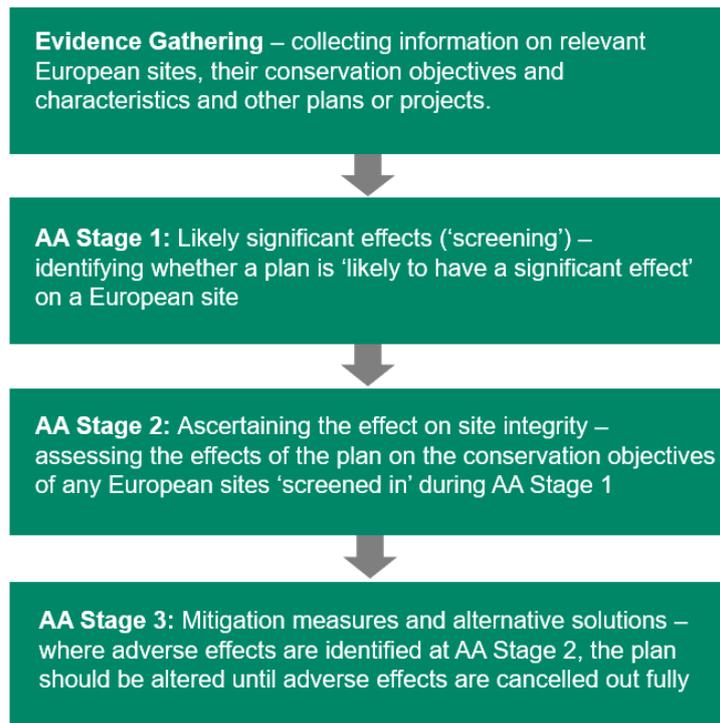
In Ireland, the requirements of Article 6(3) are transposed inter alia by the *European Communities (Birds and Natural Habitats) Regulations 2011* as amended (the 'Regulations of 2011'). Section 6 of the *Development (Emergency Electricity Generation) Act 2022* provides that on receiving an application under section 4, the Minister for the Environment, Climate and Communications (the Minister) shall arrange for an assessment of the Designated Development to be carried out by An Bord Pleanála (the 'Board') in accordance with Part 5 of the Regulations of 2011, subject to any modifications as to process as may be prescribed for the purposes of the Act.

1.3 Overview of the Appropriate Assessment process

The process required by Articles 6(3) and 6(4) of the Habitats Directive is stepwise and must be followed in sequence. **Image 1** outlines the stages of AA according to current European Commission (EC) guidance (European Commission, 2021). The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendations, and any relevant changes to the plan or project until no significant adverse effects remain.

¹ <https://data.oireachtas.ie/ie/oireachtas/bill/2022/99/eng/initiated/b9922d.pdf>

Image 1: The stages of Appropriate Assessment (taken from European Commission (2021))



The first step in the sequence of tests is to establish whether an AA is required. This is often referred to as ‘AA Screening’. The purpose of AA Screening is to determine, in view of best available scientific knowledge, whether a plan or project, either alone or in-combination with other plans or projects, could have likely significant effects on a European site, in view of that site’s Conservation Objectives.

For this purpose and as a result of case law ‘likely’ in practice means ‘possible’². Measures intended to avoid or reduce the harmful effects of the proposed development on European sites, (i.e., ‘mitigation measures’) or best practice measures have not been taken into account in the screening stage appraisal. If the competent authority determines that there are no likely significant effects (including ‘in-combination’ effects from other plans or projects), then no further assessment is necessary and the plan or project can, subject to any other issues, be taken forward. If, however, the competent authority determines that there are likely significant effects, or if there is reasonable scientific doubt, then the next step in the process must be initiated and a detailed AA must be undertaken.

The purpose of the stage of Appropriate Assessment is to further explore the potential impacts and effects and to determine whether a conclusion of no adverse effects on integrity can be drawn for any of the ‘screened in’ impacts / European sites.

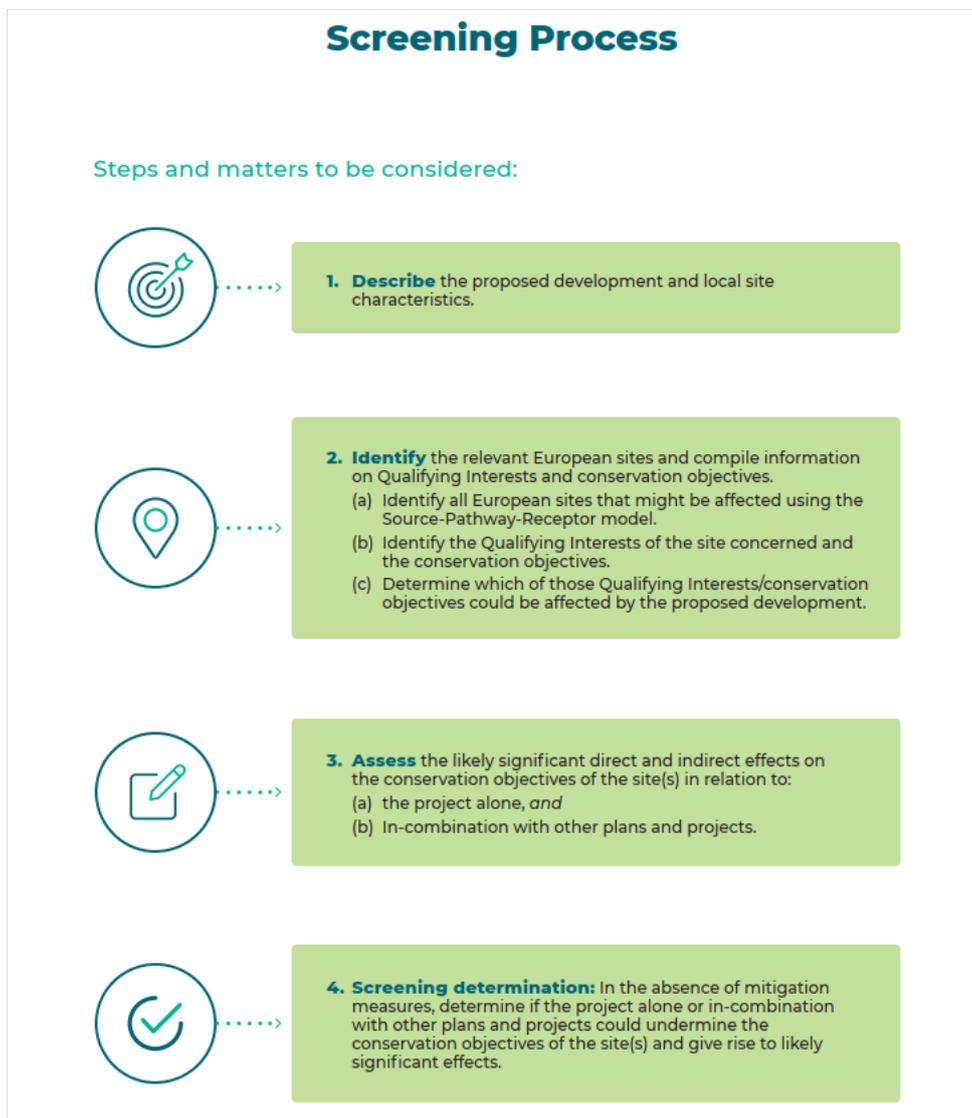
One of the key considerations during the stage of Appropriate Assessment is whether there is available mitigation that would entirely address potential effects.

1.4 Sources of Guidance

This AA Screening Report has been prepared in accordance with the European Commission guidance document Assessment of Plans and Projects in relation to Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (European Commission, 2021). It also accords with the guidance provided in the Office of the Planning Regulation (OPR) document Appropriate Assessment Screening for Development Management (OPR, 2021), and follows the structure and approach it recommends, as shown on **Image 2**.

² Waddenzee (C-127/02).

Image 2: The AA Screening process (taken from OPR (2021))



In addition, the following sources of guidance have also been considered during the preparation of this AA Screening Report:

- Appropriate Assessment of Plans and Projects in Ireland (DoEHLG, 2010);
- Managing Natura 2000 Sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC (EC, 2018); and,
- Appropriate Assessment under Article 6 of the *Habitats Directive: Guidance for Planning Authorities. Circular Letter NPWS 1/10 & PSSP 2/10 (NPWS, 2010).*

1.5 Purpose of this Report

Whilst the various steps involved in the AA process must be carried out by a competent authority, project proponents or their consultants may undertake a form of screening to establish if an AA is required and submit the information necessary to allow the competent authority to conduct a screening.

This AA Screening Report therefore serves to provide the information needed by the Competent Authority to make their own screening decision for the Designated Development.

For clarity, in the context of the Habitats Directive, the Designated Development represents a ‘project’ and no reference to ‘plans’ is made hereafter, except where required to consider the potential for in-combination effects to arise between the Designated Development and any relevant plans.

1.6 Quality Assurance and Statement of Authority

This AA Screening Report, and the appraisal described within it, has been completed in accordance with the AECOM Integrated Management System (IMS). Our IMS places emphasis on professionalism, technical excellence, quality, as well as covering health, safety, environment, and sustainability management. All AECOM staff members are committed to maintaining our accreditation to those parts of BS EN ISO 9001:2015 and 14001:2015, as well as BS OHSAS 18001:2007 that are relevant to a consultancy service.

The AA Screening has been carried out by AECOM ecologists with experience in conducting such appraisals. All are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) at the appropriate grade and adhered to their strict Code of Professional Conduct.

The AA Screening Report was authored by Susanne Dunne, a Qualifying Member of CIEEM and AECOM Ecologist. Susanne holds a BSc (Hons) in Ecology from University College Cork. She has more than four years' experience in professional consultancy and has prepared AA Screening Reports for projects and plans across Ireland.

The Report was reviewed by Tony Marshall CEcol MCIEEM, AECOM Technical Director. He holds a first-class honours degree in Biological Sciences (Ecology) from the University of Edinburgh. Tony leads AECOM's ecology teams in Ireland and Scotland and has over twelve years' experience as a professional ecological consultant. He has substantial experience in undertaking Appropriate Assessments, including Screening stage appraisals, for projects (and plans) in Ireland and Scotland, including a recently proposed power station development on the north-east coast of Scotland. He has been involved in assessments requiring detailed appraisal of air quality and noise impacts on sensitive ecological habitats and species, including the QI / SCI of European sites relevant to this AA Screening.

Dr James Riley CEnv MCIEEM is AECOM's Technical Director responsible for Appropriate Assessments across the UK and Ireland and undertook verification of this AA Screening Report. James is a Chartered Environmentalist with twenty years' consultancy experience. James has supervised hundreds of Appropriate Assessments including for clients such as Donegal County Council and Transport Infrastructure Ireland. He was the lead author on guidance published by the Chartered Institute of Ecology and Environmental Management on the assessment of air quality impacts on wildlife sites.

2. Methodology

2.1 Data sources

A desk-based study was carried out to help establish the baseline conditions relevant to the Designated Development. The following resources were analysed to determine the baseline description of the Site of the Designated Development (i.e., the area within the red line boundary of the development and the construction laydown area) and for assessing sensitivities of European sites:

- Environmental Protection Agency (EPA) maps website (<https://gis.epa.ie/EPAMaps/>) (accessed 28 October 2022);
- National Parks and Wildlife Service (NPWS) Protected Sites in Ireland website (<https://www.npws.ie/protected-sites>) (accessed 28 October 2022);
- Google maps website (<https://maps.google.com/>) (accessed 28 October 2022); and,
- The Status of European Union (EU) Protected Habitats and Species in Ireland (Article 17 Report) (<https://www.npws.ie/publications/article-17-reports/article-17-reports-2019>) (accessed 28 October 2022).

2.2 Establishing the zone of influence

2.2.1 Approach

Department of the Environment, Heritage and Local Government guidance (DoEHLG, 2010) states that European sites with the potential to be affected by a project should be identified taking into consideration the potential for direct, indirect and/or cumulative (in-combination) effects. It also states that the specific approach in each case is likely to differ depending on the scale and likely effects of the project. However, it advises that the following sites should generally be included:

- all European sites within or immediately adjacent to the project area;
- all European sites within the likely 'zone of influence' of the project; and,
- adopting the Precautionary Principle, all European sites for which there is doubt as to whether or not such sites might be significantly affected.

The likely zone of influence (Zol) of a project is the geographic extent over which it could affect the receiving environment in a way that could have significant effects on the QI or SCI of a European site (OPR, 2021). In the case of projects, the DoEHLG guidance acknowledges that the Zol must be devised on a case-by-case basis with reference to the following criteria:

- the nature, size / scale and location of the project;
- sensitivity of ecological features under consideration; and
- cumulative effects.

When seeking to identify the relevant European sites, consideration was given to identified impact pathways and the source-pathway-receptor approach (OPR, 2021), rather than adopting a purely 'zones'-based approach whereby European sites within, potentially arbitrary, set distances of the Designated Development would be assessed. The source-pathway-receptor approach is a standard tool in environmental assessment. In order for an effect to occur, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism means there is no possibility of an effect occurring. If, for example, there is a sensitive European site in the vicinity of the Designated Development but no mechanism by which the Designated Development would impact that site then there is no potential for an ecological effect. Furthermore, even where an impact is predicted to occur, it may not result in significant effects.

The process of determining which (if any) European sites are within the Zol of the Designated Development was therefore a progressive appraisal of the potential for each impact source which could arise from its construction, operation and/or decommissioning to affect the QI / SCI of such sites. This process is set out in **Table 1** and was conducted with cognisance of all of the impact sources described in Section 2.2.2.

2.2.2 Sources of impact from the Designated Development

A number of impacts could arise from the construction, operation and/or decommissioning of the Designated Development. A description of each, and their potential relevance to the QI / SCI of European sites, is given under the following sub-headings.

No consideration has been given to the loss of habitat from within the boundary of a European site as the Designated Development will involve no works inside any SAC or SPA and there is thus no possibility of this impact arising.

Loss of habitat outside of European sites but which supports QI / SCI species

Habitat outside of the boundary of a European site but which supports the QI / SCI species of that site, is defined as being 'functionally-linked' to it. The ruling in the *Holohan and Others v An Bord Pleanála (C-461/17)* case concluded that the loss of functionally-linked habitat could result in significant effects on the qualifying features of a European site, if this prevented the site from meeting its Conservation Objectives.

To determine whether habitat may be functionally-linked to a European site requires some level of detailed study, often including targeted field survey. However, this impact can only occur on mobile animal species which could be present outside of the European site for which they are designated. For several bird species, NatureScot has published guidance on the distances up to which qualifying species may use functionally-linked habitat outside of European sites (SNH, 2016). The distances given in this guidance were used when searching for SPAs which may be within the ZoI of the Designated Development. Accordingly, SPAs (with the exception of those designated for seabirds which exclusively inhabit the marine environment, and which do not use the terrestrial habitats within the Site of the Designated Development) up to 20km were searched for, as this is given as the largest core foraging range for any species (non-breeding pink-footed goose *Anser brachyrhynchus* and greylag goose *Anser anser*).

For other mobile terrestrial, aquatic or amphibious animals for which SACs are designated in Ireland, the following distances were used when searching for sites which could be impacted by loss of functionally-linked habitat:

- marsh fritillary *Euphydryas aurinia* – research by Wahlberg *et al.* (2002) found that the average dispersal distance of male marsh fritillaries was 1.3km, and up to 510m for females. On a precautionary basis, therefore, a distance of 1.5km was adopted;
- otter *Lutra lutra* – studies quoted in Harris and Yalden (2008) suggest that the mean linear range size for four male otters in north-east Scotland was 48km. For one male in Perthshire the maximum range was 39km and for another male in Suffolk the range was also 39km. Female otters generally have smaller ranges, quoted in Harris and Yalden (2008) as being between 16-21km. A buffer of 40km, and only where there is direct hydrological connectivity to the Designated Development, was used when searching for SACs designated for otter;
- lesser horseshoe bat *Rhinolophus hipposideros* – the Bat Conservation Trust (BCT) estimate that the 'core sustenance zone' (CSZ) for lesser horseshoe bats extends to around 2.5km from a roost site. The CSZ is the area surrounding a communal roost within which habitat availability and quality are expected to have a significant influence on the resilience and conservation status of the colony using the roost (BCT, 2016). The ZoI of the Designated Development on lesser horseshoe bats was therefore considered to extend to at least 2.5km from the Site of the project;
- all fish species – no set distance was used when considering potential impacts on fish species. Where a direct hydrological link exists between the Designated Development and an SAC designated for these species, it was considered that there could be impacts on these QI species; and
- marine mammals, including bottlenose dolphin *Tursiops truncatus*, harbour porpoise *Phocoena phocoena*, harbour seal *Phoca vitulina* and grey seal *Halichoerus grypus* – as for fish species, no set distance was used when considering potential impacts on marine mammals. The Shannon Estuary adjacent to the Designated Development is understood to be tidally influenced and it was therefore considered that any of these species could occur in the vicinity of the project. However, given the very large areas over which these species can travel (e.g. Carmen *et al.*, 2021; Sjöberg and Ball, 2011; <https://www.nature.scot/plants-animals-and-fungi/mammals/marine-mammals/seals>), the ZoI was considered to extend to a maximum distance of 15km from the Designated Development – impacts on animals belonging to SACs more distant than this are highly unlikely to be significant due to the availability of alternative habitat with the normal range of these species.

Although the whorl snails *Vertigo angustior*, *V. geyeri* and *V. moulinsiana*, and Kerry slug *Geomalacus maculosus* are all mobile species, their ability to move over any substantial distance is extremely limited. Functionally-linked habitat for these species was therefore considered to only exist up to a distance of 100m from any SAC for which these species are a QI.

Freshwater pearl mussel *Margaritifera margaritifera* is not a mobile species. However, it relies upon salmonid fish for part of its lifecycle. Therefore, in cases where a direct hydrological connection exists between the Designated Development and an SAC designated for freshwater pearl mussel, the potential impacts on this species were considered.

Waterborne pollution

Construction and operational works have the potential to pollute watercourses and/or waterbodies unless appropriately controlled. These could themselves represent QI of a European site, may be within a European site and support the QI of that site, or may be outside of a European site but be functionally-linked to such a site if used by the qualifying animals. Waterborne pollution may arise through spillages of fuels, oils, chemicals, or other pollutants, or from the uncontrolled released of sediment. Discharges of effluent, which could increase the nutrient levels in the water would also fall under this category of impact. There will only be discharge of stormwater run-off to existing outfalls within the site. This discharge will be uncontaminated and will be of no greater volume than the existing volumes discharged due to the existing industrial nature of the Site.

Waterborne pollution can degrade habitats and can lead to the direct mortality of QI species such as fish and freshwater pearl mussel. The distance over which such impacts could have effects would depend on the severity of the pollution. However, any European site which has a direct hydrological connection to the Designated Development, but not including estuarine or marine designations (where a huge dilution effect on any pollution would occur from the massive volume of the sea), has the potential to be within the Zol.

Airborne pollution

Airborne pollution could occur during the construction and decommissioning phases due to the generation of dust or from emissions from construction plant and vehicles. As for waterborne pollution, above, construction-phase airborne pollution could impact on qualifying, supporting or functionally-linked habitats.

Dust generated during construction activities can directly impact vegetation or aquatic environments and can indirectly impact animal species (for example where these habitats are used by them for foraging). During extended periods of dry weather, dust can cover plant foliage and adversely affect photosynthesis or other biological functions. Rainfall can then remove deposited dust and rapidly leach chemicals into the soil (Holman *et al.*, 2014). Guidance published by the Institute of Air Quality Management (IAQM) advises that consideration should be given to construction-related air quality impacts on nature conservation sites within 50m of works, including any access routes, extending to 500m from the entrance to the construction site (Holman *et al.*, 2014).

Vehicles and plant which operate via internal combustion engines emit airborne pollutants. The most important of these for European sites are oxides of nitrogen (NO_x). At close distances to source, NO_x can have a directly toxic effect on vegetation at very high concentrations. However, likely to be of greater concern is the contribution NO_x makes to the deposition of nitrogen to soils. Increases in nitrogen deposition from the atmosphere can, if sufficiently great, enhance soil fertility and lead to eutrophication. This can have adverse effects on community composition and quality of semi-natural, nitrogen-limited terrestrial and aquatic habitats (e.g., Wolseley *et al.*, 2006; Dijk, 2001; <http://www.apis.ac.uk/search-pollutant-impacts>). Both the IAQM and the Design Manual for Roads and Bridges (DMRB) advise that such impacts are only likely to extend to a maximum of 200m from a road (or works area), and that air pollution levels fall sharply within the first few tens of metres (Holman *et al.*, 2019; Highways England *et al.*, 2019).

Airborne pollution during the operational phase could arise from emissions caused by the combustion of the distillate fuel used by the Designated Development. Guidance published by the United Kingdom Environment Agency (EA) and Department for Environment, Food and Rural Affairs (Defra) (<https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#screen-out-pecs-from-detailed-modelling>), which applies to industrial air emissions sources, recommends a search area of 10km around an emitter to screen for European sites which may be affected by air quality impacts arising from its operation, with the search area being increased to 15km only for larger power generation sites of greater than 50 megawatts (MW). Given the Designated Development will have a combined generating capacity of 150MW, a 15km search radius around the Designated Development was therefore used as the likely Zol of the Designated Development.

Changes to surface water hydrology

Changes to surface water hydrology can occur as a result of engineering activities during the construction phase. Abstraction of water (e.g., for use in dust suppression or other construction works) can also reduce water levels, as can changes to the existing flows of surface water to a watercourse. However, no abstraction of water is proposed for the Designated Development. There will only be discharge of stormwater run-off to existing outfalls within the Site. This discharge will be uncontaminated and will be of no greater volume than the existing volumes discharged due to the existing industrial nature of the Site.

These impacts can act on the qualifying species of a European site if they pass through or occur within the relevant part of the watercourse. Therefore, any European site with direct freshwater hydrological connectivity (i.e., not including marine sites) could be impacted by changes to surface water hydrology.

Changes to groundwater flow or volume

Changes to groundwater conditions can occur as a result of excavations or the installation of piled structures (for example by interrupting groundwater flows). Guidance published by the Scottish Environment Protection Agency (SEPA) suggests that such activities could impact on groundwater dependent terrestrial ecosystems (GWDTE) up to 100m from excavations less than 1m in depth, extending up to 250m for deeper excavations (SEPA, 2017).

Disturbance of qualifying species

Construction activities have the potential to cause disturbance to qualifying animal species. In addition, maintenance works during the operational phase also have the potential to cause disturbance where they take place sufficiently close to qualifying species. Disturbance can be caused visually (for example by the presence of personnel and plant, or as a result of artificial illumination of habitats) and/or by the noise and vibration generated by works. This could impact qualifying species when inside the boundary of a European site, or outside of a European site when using functionally-linked habitat.

During the operational phase, the noise generated by the Designated Development could be sufficient to cause disturbance of QI or SCI species if they occur sufficiently close to the power station.

The potential for disturbance to be caused will depend on the location and nature of activities, the distribution of the qualifying species, and the sensitivity of the species to noise and visual disturbance from human activities. Where disturbance is caused, it can have multiple adverse effects on species including increased energy expenditure, reduced feeding time, behavioural changes, and displacement.

Based on the published guidance referenced below, the following distances were used when considering how far construction, operational and decommissioning activities may disturb qualifying species:

- otter – 150m, in accordance with NRA (2008) which suggests this distance for otter breeding sites, reduced to 20m for other resting sites not used for breeding purposes;
- lesser horseshoe bat – on a precautionary basis, a distance of 150m is considered the maximum at which disturbance could be caused to roosting lesser horseshoe bats by construction, operational and/or decommissioning activities;
- non-breeding waterbirds – the Waterbird Disturbance Mitigation Toolkit (Cutts *et al.*, 2003) provides species-specific information on the sensitivity of several bird species which are qualifying features of SPAs. However, it suggests that, in general, disturbance of non-breeding waterbirds can occur up to distances of around 300m from construction works; and,
- breeding birds – 1km, this being the maximum distance at which NatureScot consider disturbance could occur on the most sensitive species for which SPAs are designated (Goodship and Furness, 2022).

No published reference was found on the distance at which grey seal or harbour seal may be disturbed by construction activities. Disturbance of seals at haul-out or pupping sites was therefore considered to be possible up to a distance of approximately 200m from construction works, based on guidance in relation to recreational water sports (Wilson, undated). Disturbance of fish species and marine mammals such as bottlenose dolphin when occurring within the Shannon Estuary is considered to be possible where works take place within 50m of the watercourse, although even with this distance disturbance is unlikely due to the vibration damping effect of

intervening soil and rock. Although studies have found that sound does not transmit very well between air and water according to the Discovery of Sound in the Sea (DOSITS)³.

Snail and slug species have no acoustic sense (Chase, 2001) and are not considered to be vulnerable to disturbance as a result of construction works.

Injury or mortality of qualifying species

The direct injury or mortality of QI species could occur where the species in question may be using functionally-linked habitat outside of a European site boundary. When considering the latter possibility, the only relevant terrestrial or amphibious animal species which are sufficiently mobile to be at risk are marsh fritillary, otter and lesser horseshoe bat. These species could occur up to the distances set out under 'Loss of habitat outside of European sites but which supports qualifying species', above.

The potential for the direct mortality of fish species as a result of waterborne pollution is also considered above.

If sufficiently loud, piling works could cause noise or vibration at sufficient levels that injury is caused to fish species or marine mammals.

Except where nesting, birds are not considered to be vulnerable to injury or mortality as a result of construction works. However, there is the risk of collision of otter only with vehicles or plant.

During the operational phase there is not considered to be a risk of injury or mortality of any QI or SCI species.

Prevention of migratory movements of qualifying species

The only feasible way in which construction works could impact on species in such a way that their migratory movements could be prevented is where they take place in or near to watercourses. The pollution of a watercourse, or noise / visual disturbance could all act to prevent the migratory movement of QI fish species or marine mammals.

This impact was therefore considered to be possible where construction will take place within 50m of any SAC for which fish or marine mammals are a qualifying species, or within 50m of any watercourse which is directly connected to such a site.

The Designated Development will not act as a barrier to migratory or other routine movements of any QI or SCI species during its operation.

Spread of invasive non-native species

Invasive non-native species can have detrimental effects on native flora and fauna. The construction, operation and decommissioning of the Designated Development is very unlikely to result in the spread of any non-native animal species. However, construction / decommissioning works have the potential to spread invasive non-native plant species. This could introduce such species to a European site and have impacts on habitats and species.

When carrying out this AA Screening, it has been assumed that the spread of invasive non-native plants could occur where construction / decommissioning works take place up to a distance of 50m from a European site, or where there is otherwise a direct hydrological connection between the Designated Development and a European site.

Operation of the Designated Development will not be materially different to the existing operational power station with regards to the potential spread of invasive non-native species. The Designated Development footprint is small and sits within the boundary of the existing operational power station.

2.2.3 European Sites within the Zone of Influence

Taking the approach described in Section 2.2.1 and with cognisance of the impact sources set out in Section 2.2.2, the Zol for the Designated Development, and all of the European sites within it, was determined. This is set out in **Table 1**. The impacts of the construction and decommissioning phase are likely to be very similar, and are therefore considered together in **Table 1**.

The locations of all European sites within the Zol are shown on **Figure 1**.

³ <https://dosits.org/science/movement/how-does-sound-propagate-from-air-into-water/> Accessed 04 November 2022.

Not all impacts will have pathways for effects to the QI / SCI of all European sites within the Zol. Consequently, some sites may be within the Zol for certain impacts, but not for others.

Table 1. Establishing the Zol of the Designated Development

Impact source	Pathway to European site(s)	European sites within the potential Zol
Construction and decommissioning phases		
Direct loss of or damage to habitat within a European site.	<p>The closest European sites to the Designated Development are the River Shannon and River Fergus Estuaries SPA and Lower River Shannon SAC and which are 5m and 8.5m away respectively.</p> <p>No works will take place outside of the Designated Development boundary and there is consequently no possibility of direct loss of or damage to habitats within a European site.</p>	None.
Loss of habitat outside of European sites but which supports qualifying species (i.e., loss of functionally-linked habitat).	<p>The Designated Development is adjacent to River Shannon and River Fergus Estuaries SPA and Lower River Shannon SAC. However, there is no potential for loss of functionally-linked habitat of Lower River Shannon SAC as the habitat present within the site of the Designated Development and surrounding terrestrial environment is unsuitable for QI species of the SAC which are all strictly aquatic or, in the case of otter, use riparian habitats in addition to wetlands (which are absent from the site of the Designated Development).</p> <p>The Site of the Designated Development comprises predominantly areas of hard-standing with areas of grassland and grassy verges. These habitats could be used by non-breeding SCI bird species for roosting, and potentially for foraging. As set out in Section 2.2.2, a search area of up to 20km was used when considering the potential loss of functionally-linked habitat for relevant SCI species. Thus, River Shannon and River Fergus Estuaries SPA is within the potential Zol as it is directly adjacent to the Designated Development and so could be used by SCI species.</p> <p>Hen harrier <i>Circus cyaneus</i> is the only SCI species of Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA. The core foraging range of hen harrier is 2km (SNH, 2016) and given the SPA is 7km from the Designated Development, there is no likelihood of hen harriers travelling from the SPA to forage in the vicinity of the Designated Development. The Site is an unsuitable habitat for hen harrier as it is lowland and sparsely vegetated while also within the boundary of the operating Tarbert Power Station.</p> <p>Mid-Clare Coast SPA is 19.5km from the Designated Development. However, there are no SCI species of the SPA with a core foraging range greater than 15km away (barnacle goose <i>Branta leucopsis</i> being the SCI species with the greatest range, according to SNH (2016)). Mid-Clare Coast SPA is therefore considered to be outside of the Zol of the Designated Development.</p>	<ul style="list-style-type: none"> • River Shannon and River Fergus Estuaries SPA
Waterborne pollution of qualifying, supporting or functionally-linked habitat(s), or of qualifying or supporting species.	<p>The closest European sites to the Designated Development are the River Shannon and River Fergus Estuaries SPA and Lower River Shannon SAC and which are 5m and 8.5m away respectively.</p> <p>Given the proximity of those two European sites to the Designated Development there is the potential for waterborne pollution from run-off of pollutants / sediment during the construction of the Designated Development in the absence of mitigation. There are no other downstream European sites which could be impacted by run-off of pollutants during construction or decommissioning. However, there will only be discharge of stormwater run-off to existing outfalls within the Site. This discharge will be uncontaminated and will be of no greater volume than the existing volumes discharged due to the existing industrial nature of the Site, thus there is no potential impact from discharge of stormwater run-off. .</p>	<ul style="list-style-type: none"> • River Shannon and River Fergus Estuaries SPA • Lower River Shannon SAC
Airborne pollution of qualifying, supporting or	Construction and decommissioning works will involve plant machinery / equipment therefore construction vehicle emissions would occur, and dust generation is possible. On a precautionary basis, all European sites (with the exception of estuarine and marine sites which are not	<ul style="list-style-type: none"> • River Shannon and River

Impact source	Pathway to European site(s)	European sites within the potential Zol
functionally-linked habitat(s), or of qualifying or supporting species.	vulnerable to airborne pollution (e.g., http://www.apis.ac.uk/node/968) within 500m (to account for IAQM guidance in relation to construction site entrances (see Section 2.2.2, above) were considered to be within the potential Zol of this impact.	Fergus Estuaries SPA <ul style="list-style-type: none"> • Lower River Shannon SAC
Changes to surface water hydrology.	None. Construction works will not take place within any surface water system and there is no requirement for abstraction of any water. There will only be discharge of stormwater run-off to existing outfalls within the Site. This discharge will be uncontaminated and will be of no greater volume than the existing volumes discharged due to the existing industrial nature of the Site. There is consequently no mechanism by which construction or decommissioning of the Designated Development could cause hydrological changes to surface water.	None.
Changes to groundwater flows or volume.	Any terrestrial European site within 250m of the Designated Development could be impacted by changes to groundwater conditions.	<ul style="list-style-type: none"> • River Shannon and River Fergus Estuaries SPA • Lower River Shannon SAC
Disturbance of qualifying species (e.g., visual, noise, vibration or artificial light).	The potential for disturbance to be caused will depend on the location and nature of construction / decommissioning activities, the distribution of the qualifying species, and the sensitivity of the species to noise and visual disturbance from human activities. However, disturbance could be caused to animals occurring both within European site boundaries and in functionally-linked habitat, outside of the boundary of European sites. The potential zone of influence for this impact source is therefore considered to encompass the same European sites as for the loss of functionally-linked habitat, above, with the addition of Lower River Shannon SAC as there is the potential for impacts to QI species of the SAC when occurring within the boundary of that European site.	<ul style="list-style-type: none"> • River Shannon and River Fergus Estuaries SPA • Lower River Shannon SAC
Injury or mortality of qualifying species.	<p>Construction of the Designated Development is not situated in a location where qualifying mobile species would be likely to occur given it is an existing power station site, with the exception of qualifying birds and potentially otter. However, otter and qualifying birds of European sites that could occur (i.e., mobile adults and young), all are well able to move away from sources of injury such as plant machinery.</p> <p>Noise and vibration caused by construction and/or demolition works could transfer into the Shannon Estuary where, if sufficiently intense, it could cause harm to QI fish species or bottlenose dolphin.</p>	<ul style="list-style-type: none"> • Lower River Shannon SAC
Barriers to or displacement of QI / SCI or supporting species.	As described for injury / mortality of qualifying species, above, noise and/or vibration which is sufficiently intense in the Shannon Estuary could prevent the movements of fish species or bottlenose dolphin. This could have indirect consequences for QI species of any upstream sites which are either also designated for these species or for species which rely on them (e.g., freshwater pearl mussel).	<ul style="list-style-type: none"> • Lower River Shannon SAC
Spread of invasive non-native species.	The spread of invasive non-native plants could occur where construction works take place up to a distance of 50 m from a European site.	<ul style="list-style-type: none"> • River Shannon and River Fergus Estuaries SPA • Lower River Shannon SAC
Operational phase		
Direct loss of or damage to habitat within a European site.	There is no mechanism by which operation of the Designated Development could lead to the direct loss of or damage to habitats within the boundary of a European site.	None.
Loss of habitat outside of European sites but which supports qualifying species (i.e., loss of functionally-linked habitat).	There is no mechanism by which operation of the Designated Development could realistically lead to the loss of functionally-linked habitat.	None.

Impact source	Pathway to European site(s)	European sites within the potential Zol
Waterborne pollution of qualifying, supporting or functionally-linked habitat(s), or of qualifying or supporting species.	<p>The closest European sites to the Designated Development are the River Shannon and River Fergus Estuaries SPA and Lower River Shannon SAC and which are 5m and 8.5m away respectively.</p> <p>Given the proximity of those two European sites to the Designated Development there is the potential for waterborne pollution from run-off of pollutants / sediment during the operation of the Designated Development in the absence of mitigation. There are no other downstream European sites which could be impacted by run-off of pollutants during the operational phase. However, there will only be discharge of stormwater run-off to existing outfalls within the Site. This discharge will be uncontaminated and will be of no greater volume than the existing volumes discharged due to the existing industrial nature of the Site, thus there is no potential impact from discharge of stormwater run-off</p>	<ul style="list-style-type: none"> • River Shannon and River Fergus Estuaries SPA • Lower River Shannon SAC
Airborne pollution of qualifying or supporting habitat(s) or species.	<p>The Designated Development will emit pollutants to air during the operational phase.</p> <p>As previously discussed, for operational airborne pollution from stack emissions of power generation developments above 50MW, an initial consideration distance of 15 km has been used in accordance with UK-published guidance. Relevant features are primarily qualifying habitats within 15km but could potentially include non-qualifying habitats within European sites that support qualifying species.</p> <p>Operational airborne pollution of European sites could also occur through dust generation and emissions from vehicles, plant and machinery used during operation, although in this case impacts dissipate to negligible levels within short distances (Holman <i>et al.</i>, 2019; Highways England <i>et al.</i>, 2019).</p>	<ul style="list-style-type: none"> • River Shannon and River Fergus Estuaries SPA • Lower River Shannon SAC • Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA • Moanveanlagh Bog SAC
Changes to surface water hydrology.	<p>There will be no requirement for water abstraction during the operational phase and all water used by the Designated Development will be from mains supply. There will only be discharge of stormwater run-off to existing outfalls within the Site. This discharge will be uncontaminated and will be of no greater volume than the existing volumes discharged due to the existing industrial nature of the Site.</p>	None.
Changes to groundwater flows or volume.	<p>As described in relation to surface water hydrology, there will be no requirement for abstraction of water for the operation of the Designated Development. There is consequently no potential for impact on groundwater flows or volume during the operational phase.</p>	None.
Disturbance of qualifying species (e.g., visual, noise, vibration or artificial light).	<p>Conditions during the operation of the Designated Development are expected to be very similar to those already at the site of the existing power station. Consequently, the potential for disturbance of QI or SCI species is considered to be very low. However, on a precautionary basis, the Zol for this impact has been taken to be the same as during the construction / decommissioning phases.</p>	<ul style="list-style-type: none"> • River Shannon and River Fergus Estuaries SPA • Lower River Shannon SAC
Barriers to or displacement of QI / SCI or supporting species.	<p>Unlike at the construction and/or decommissioning phases, the Designated Development will not generate sufficient noise or vibration which could travel through air or ground to cause a barrier to or displace QI species in the Shannon Estuary.</p>	None.
Injury or mortality of qualifying species.	<p>There is no realistic pathway for this impact. Operation of the Designated Development does not pose any significant injury / mortality risk to QI / SCI species.</p>	None.
Spread of invasive non-native species.	<p>There is no mechanism by which the operation of the Designated Development could realistically lead to the spread of invasive non-native species into any European site. There are no activities which will lead to soil which could be infested with invasive non-native plants being transferred off the Site.</p>	None.

3. Test of Likely Significant Effects

3.1 Overview

This section assesses the potential for the identified construction, operational and decommissioning phase impacts, for which pathways exist to European sites, to have likely significant effects on those sites. 'Likely' in this context is taken to mean 'possible', while a 'significant' effect is one which could undermine the Conservation Objectives of a European site.

The purpose of AA Screening is to determine those elements of a project regarding which it can be stated, without detailed appraisal, that significant effects on a European site are unlikely. In line with case law⁴, consideration cannot be given at this stage to mitigation measures designed to avoid significant effects on a European site. Measures intended to avoid or reduce the harmful effects of the Designated Development on European sites, (i.e., 'mitigation measures') or best practice measures have not been taken into account in this Screening stage appraisal. The test of likely significant effects in this section is therefore necessarily a high-level appraisal, with a precautionary approach adopted when reaching a conclusion.

For those impacts for which likely significant effects cannot be 'screened out' (i.e., excluded), further appraisal at the Appropriate Assessment stage will be required.

3.2 Impacts with Pathways to European Sites

3.2.1 Impacts Screened out of Further Appraisal

On the basis of the initial assessment described in Section 2 of this document, the direct loss of or damage to habitats within the boundary of a European site, and changes to surface water hydrology during the construction and/or decommissioning phases were screened out as there is no possibility of these impacts arising.

Furthermore, the following possible operational phase impacts have been screened out of further appraisal because there is clearly no potential for them to occur on the qualifying features of any European site:

- direct loss of or damage to habitat within a European site;
- loss of habitat outside of European sites but which supports QI / SCI species (i.e., loss of functionally-linked habitat);
- changes to surface water hydrology;
- changes to groundwater flows or volume;
- barriers to or displacement of QI / SCI or supporting species;
- injury and/or mortality of QI / SCI species; and,
- spread of invasive non-native species.

3.2.2 Impacts Tested for Likely Significant Effects

For all other construction / decommissioning phase and operational phase impacts given in **Table 1**, the European sites within the potential zone of influence of the Designated Development was established. Possible impacts are as follows:

- during the construction and decommissioning phases:
 - loss of functionally-linked habitat;
 - waterborne pollution of qualifying, supporting or functionally-linked habitat(s), or of QI / SCI or supporting species;
 - airborne pollution of qualifying, supporting or functionally-linked habitat(s), or of QI / SCI or supporting species;
 - changes to groundwater flows or volume (only applies to the construction phase);

⁴ People Over Wind and Sweetman v Coillte Teoranta (C-323/17).

- disturbance of QI / SCI species;
 - injury or mortality of QI / SCI species;
 - barriers to or displacement of QI / SCI or supporting species; and,
 - spread of invasive non-native species.
- during the operational phase:
 - waterborne pollution of qualifying, supporting or functionally-linked habitat(s), or of QI / SCI or supporting species;
 - airborne pollution of qualifying, supporting or functionally-linked habitat(s), or of QI / SCI or supporting species; and,
 - disturbance of QI / SCI species.

3.3 Screening Assessment

For each European site, the construction, operational and/or decommissioning phase impacts for which that site was determined to be within the ZOI of the Designated Development are examined in **Tables 2-5** for their potential to result in significant effects on the qualifying features.

Information on each European site relevant to the test of likely significant effects, including the list of QI/ SCI, Conservation Objectives, and known existing threats or pressures, was obtained from the National Parks and Wildlife Service (NPWS) website (<https://www.npws.ie/>). A summary of this information for each European site is presented in **Appendix A**.

Table 2. AA Screening assessment for River Shannon and River Fergus Estuaries SPA

Impact source	Potential effects	Likely significant effects?
Construction and decommissioning phases		
Loss of habitat outside of European sites but which supports qualifying species (functionally-linked habitats)	At closest, the River Shannon and River Fergus Estuaries SPA is approximately 5m from the Designated Development. There is the potential for loss of habitat which could be functionally-linked to the European site if it is used by SCI bird species for roosting or foraging. This could affect the distribution of SCI birds within the SPA, which could prevent the corresponding Conservation Objective for the SPA from being met.	Yes
Waterborne pollution of qualifying, supporting or functionally-linked habitat(s), or of qualifying or supporting species.	At closest, the River Shannon and River Fergus Estuaries SPA is approximately 5m from the Designated Development. Given the proximity of the SPA to the Designated Development there is the potential for waterborne pollution from run-off of pollutants / sediment during the construction or decommissioning of the Designated Development in the absence of mitigation. This could degrade habitats on which the SCI birds rely, including by causing the direct mortality of prey species. This could lead to changes in distribution and/or abundance of SCI species and prevent relevant Conservation Objectives from being met.	Yes
Airborne pollution of qualifying, supporting or functionally-linked habitat(s), or of qualifying or supporting species.	Habitats within the SPA which support several of the SCI species are vulnerable to airborne pollution of the type which could be generated during the construction phase. Airborne pollution could have impacts on the SPA up to a distance of approximately 500m from works areas.	Yes
Changes to groundwater flows or volume.	At this stage, the depth of any excavations or piles required for the construction of the Designated Development is not known for certain, however it could range between 1.5m and 30m. Therefore, as the SPA lies within 250m of the Designated Development and it cannot yet be determined what impact there may be from changes to groundwater conditions, this impact has been screened into Appropriate Assessment to allow for more detailed appraisal, on the basis of fuller construction details.	Yes
Disturbance of qualifying species (e.g., visual, noise, vibration or artificial light).	Disturbance of SCI birds could arise when birds are present both within the SPA boundary (given its proximity to the Designated Development) and/or when using potentially functionally-linked habitat surrounding the Designated Development. Disturbance could arise due to the presence of personnel, plant and machinery (i.e., visually) and/or due to the noise generated by construction or demolition works. Any lighting used during these phases could also cause disturbance of SCI birds when foraging or roosting. Disturbance could cause birds to avoid areas otherwise suitable for foraging or roosting, causing their distribution within the SPA to be shifted and potentially leading to reduced abundance of birds within the SPA.	Yes
Spread of invasive non-native species.	At this stage, it is not known whether invasive non-native species are present within the site of the Designated Development. However, should any species be present, and they be spread into the SPA, this could degrade habitats used for foraging or roosting by SCI species.	Yes
Operational phase		
Waterborne pollution of qualifying, supporting or functionally-linked habitat(s), or of qualifying or supporting species.	At closest, the River Shannon and River Fergus Estuaries SPA is approximately 5m from the Designated Development. Given the proximity of the SPA to the Designated Development there is the potential for waterborne pollution from run-off during the operation of the Designated Development in the absence of mitigation. This could degrade habitats on which the SCI birds rely, including by causing the direct mortality of prey species. This	Yes

Impact source	Potential effects	Likely significant effects?
<p>could lead to changes in distribution and/or abundance of SCI species and prevent relevant Conservation Objectives from being met.</p>		
<p>Airborne pollution of qualifying or supporting habitat(s) or species.</p>	<p>The Designated Development will emit pollutants to air during the operational phase.</p> <p>In the absence of the results of air quality modelling at this stage, it is impossible to determine whether the deposition of pollutants, and in particular nitrogen, to sensitive habitats could occur at rates sufficiently high that it causes changes to vegetation structure. Any such changes could degrade habitat which supports SCI bird species. Therefore, adopting a precautionary approach, it is assumed that this could be the case, until detailed air quality modelling will be completed as part of the Appropriate Assessment and reported in the NIS.</p>	<p>Yes</p>
<p>Disturbance of qualifying species (e.g., visual, noise, vibration or artificial light).</p>	<p>The SPA is approximately 5m from the boundary of the Designated Development. Therefore, although operational phase maintenance works are likely to be relatively minor in nature given their infrequency, due to this proximity, the potential for disturbance of qualifying birds within the SPA to be caused cannot be ruled out. Similarly, there is abundant habitat immediately outside of the SPA boundary which could be functionally-linked to the European site. It is therefore possible that disturbance of birds using functionally-linked habitat could also occur.</p> <p>Disturbance could cause birds to avoid areas otherwise suitable for foraging or roosting, causing their distribution within the SPA to be shifted and potentially leading to reduced abundance of birds within the SPA.</p>	<p>Yes</p>

Table 3. AA Screening assessment for Lower River Shannon SAC

Impact source	Potential effects	Likely significant effects?
Construction and decommissioning phases		
Waterborne pollution of qualifying, supporting or functionally-linked habitat(s), or of qualifying or supporting species.	At closest, the Lower River Shannon SAC is approximately 8.5m from the Designated Development. Given the proximity of the SAC to the Designated Development there is the potential for waterborne pollution from run-off of pollutants / sediment during the construction or decommissioning of the Designated Development in the absence of mitigation. This could degrade QI habitats and/or habitats on which QI species rely, and/or could directly harm the QI species themselves. This could lead to changes in distribution and/or abundance of QI species and prevent relevant Conservation Objectives from being met.	Yes
Airborne pollution of qualifying, supporting or functionally-linked habitat(s), or of qualifying or supporting species.	Several QI habitats within the SAC are vulnerable to airborne pollution of the type which could be generated during the construction phase. Airborne pollution could have impacts on the SAC up to a distance of approximately 500m from works areas.	Yes
Changes to groundwater flows or volume.	At this stage, the depth of any excavations or piles required for the construction of the Designated Development are unknown. Therefore, as the SAC lies within 250m of the Designated Development and it cannot yet be determined what impact there may be from changes to groundwater conditions, this impact has been screened into Appropriate Assessment to allow for more detailed appraisal, on the basis of fuller construction details (this impact only applies to the construction phase).	Yes
Disturbance of qualifying species (e.g., visual, noise, vibration or artificial light).	Disturbance could be caused to animals occurring within the SAC given the proximity of the Designated Development to the European site. There is the potential for noise / vibration from construction works transferring to the Shannon Estuary and affecting otter, fish or marine mammals such as the bottlenose dolphin. Such impacts could lead to the displacement of QI species away from areas which would otherwise be suitable for foraging or commuting.	Yes
Injury or mortality of qualifying species.	Noise and vibration caused by construction and/or demolition works could transfer into the Shannon Estuary where, if sufficiently intense, it could cause harm to QI fish species or bottlenose dolphin. In the absence of further study into noise levels which could be generated during construction / decommissioning, it is assumed on a precautionary basis that these could be sufficient to cause harm to aquatic QI animals, in particular fish species and bottlenose dolphin. This will be investigated further as part of the Appropriate Assessment.	Yes
Barriers to or displacement of QI / SCI or supporting species.	As described for injury / mortality of qualifying species, above, noise and/or vibration which is sufficiently intense in the Shannon Estuary could prevent the movements of fish species or bottlenose dolphin. Similarly, artificial illumination of the watercourse caused by lighting used during construction or operation could also prevent fish species in particular from moving up- or downstream.	Yes
Spread of invasive non-native species.	At this stage, it is not known whether invasive non-native species are present within the site of the Designated Development. However, should any species be present, and they be spread into the SAC, this could degrade QI habitats and/or habitats which support QI species.	Yes
Operational phase		
Waterborne pollution of qualifying, supporting or functionally-linked habitat(s), or of qualifying or supporting species.	At closest, the Lower River Shannon SAC is approximately 8.5m from the Designated Development. Given the proximity of the SAC to the Designated Development there is the potential for waterborne pollution from run-off during the operation of the Designated Development in the absence of mitigation. This could degrade QI habitats and/or habitats on which QI species rely, and/or could directly harm the QI species themselves. This could lead to changes in distribution and/or abundance of QI species and prevent relevant Conservation Objectives from being met.	Yes

Impact source	Potential effects	Likely significant effects?
Airborne pollution of qualifying or supporting habitat(s) or species.	<p>The Designated Development will emit pollutants to air during the operational phase.</p> <p>In the absence of the results of air quality modelling at this stage, it is impossible to determine whether the deposition of pollutants, and in particular nitrogen, to sensitive habitats could occur at rates sufficiently high that it causes changes to vegetation structure. Any such changes could degrade habitat which supports SCI bird species. Therefore, adopting a precautionary approach, it is assumed that this could be the case, until detailed air quality modelling will be completed as part of the Appropriate Assessment and reported in the NIS.</p>	Yes
Disturbance of qualifying species (e.g., visual, noise, vibration or artificial light).	<p>The SAC is approximately 8.5m from the boundary of the Designated Development. Therefore, although operational phase maintenance works are likely to be relatively minor in nature given their infrequency, due to this proximity, the potential for disturbance of QI species within the SAC to be caused as a result of lighting or operational noise cannot be ruled out at this stage.</p>	Yes

Table 4. AA Screening assessment for Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA

Impact source	Potential effects	Likely significant effects?
Operational phase		
Airborne pollution of qualifying or supporting habitat(s) or species.	<p>The Designated Development will emit pollutants to air during the operational phase.</p> <p>In the absence of the results of air quality modelling at this stage, it is impossible to determine whether the deposition of pollutants, and in particular nitrogen, to sensitive habitats could occur at rates sufficiently high that it causes changes to vegetation structure. Any such changes could degrade habitat which supports SCI bird species. Therefore, adopting a precautionary approach, it is assumed that this could be the case, until detailed air quality modelling will be completed as part of the Appropriate Assessment and reported in the NIS.</p>	Yes

Table 5. AA Screening assessment for Moanveanlagh Bog SAC

Impact source	Potential effects	Likely significant effects?
Operational phase		
Airborne pollution of qualifying or supporting habitat(s) or species.	<p>The Designated Development will emit pollutants to air during the operational phase.</p> <p>In the absence of the results of air quality modelling at this stage, it is impossible to determine whether the deposition of pollutants, and in particular nitrogen, to sensitive habitats could occur at rates sufficiently high that it causes changes to vegetation structure. Any such changes could degrade habitat which supports SCI bird species. Therefore, adopting a precautionary approach, it is assumed that this could be the case, until detailed air quality modelling will be completed as part of the Appropriate Assessment and reported in the NIS.</p>	Yes

3.4 In-Combination Assessment

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM, 2019).

For all impacts which have been screened into Appropriate Assessment, it has been identified that the Designated Development alone could lead to likely significant effects on European sites within the Zol. The potential for all screened-in impacts to act in-combination with impacts arising from other projects or plans to result to adverse effects on the integrity of the relevant European sites will be considered as part of Stage 2 of the Appropriate Assessment.

For all of the impacts which have been screened out at this AA Screening stage, there is no possibility of these impacts arising at all, and therefore no possibility of any effect on European sites. It is therefore impossible for these impacts to act in-combination with the impacts of other plans or projects as they will not exist in reality and cannot be 'summed' to the effects of other plans or projects. For clarity, the impacts screened out at this AA Screening stage, and for which no in-combination effects are possible, are:

- direct loss of habitat from within the boundary of any European site at any stage of the Designated Development;
- changes to surface water hydrology during construction, operation or decommissioning of the Designated Development;
- loss of functionally-linked habitat during the operational phase;
- changes to groundwater conditions during the operational phase;
- barriers to or displacement of QI / SCI or supporting species during the operational phase;
- injury and/or mortality of QI / SCI species during the operational phase; and,
- spread of invasive non-native species during the operational phase.

4. Appropriate Assessment Screening Statement and Conclusion

With cognisance of all of the impact sources which could arise from the construction, operation and decommissioning of the Designated Development, and the possible pathways by which they could reach the QI or SCI of European sites, the Zol of the Designated Development was established. This was determined to encompass the following four European sites:

- River Shannon and River Fergus Estuaries SPA;
- Lower River Shannon SAC;
- Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA; and,
- Moanveanlagh Bog SAC.

However, not all impacts will have pathways for effects to the qualifying features of all European sites within the Zol. Consequently, some sites may be within the Zol for certain impacts, but not for others.

Therefore, for each European site, the construction, operational and decommissioning phase impacts for which that site was determined to be within the Zol of the Designated Development was examined for their potential to result in significant effects on the QI / SCI. **Table 6** sets out the impacts for which likely significant effects on QI / SCI of these sites could not be excluded at this stage, on the basis of objective scientific information and in the absence of avoidance or mitigation measures.

Table 6. Impacts on European sites within the Zol with likely significant effects

European site	Impacts for which likely significant effects cannot be ruled out and which are screened into Appropriate Assessment
River Shannon and River Fergus Estuaries SPA	<ul style="list-style-type: none"> • Loss of functionally-linked habitat (during the construction and decommissioning phases). • Waterborne pollution of habitat supporting the SCI species (during the construction, operational and decommissioning phases). • Airborne pollution of habitat supporting the SCI species (during the construction, operational and decommissioning phases). • Changes to groundwater flows or volume (during the construction phase only). • Disturbance of SCI species (during the construction, operational and decommissioning phases). • Spread of invasive non-native species (during the construction and decommissioning phases).
Lower River Shannon SAC	<ul style="list-style-type: none"> • Waterborne pollution of QI habitat and/or habitat supporting the QI species (during the construction, operational and decommissioning phases). • Airborne pollution of QI habitat and/or habitat supporting the QI species (during the construction, operational and decommissioning phases). • Changes to groundwater flows or volume (during the construction and decommissioning phases). • Disturbance of QI species (during the construction, operational and decommissioning phases). • Barriers to or displacement of QI or supporting species (during the construction and decommissioning phases). • Injury or mortality of QI (during the construction and decommissioning phases). • Spread of invasive non-native species (during the construction and decommissioning phases).
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA	<ul style="list-style-type: none"> • Airborne pollution of habitat supporting the SCI species (during the operational phase).
Moanveanlagh Bog SAC	<ul style="list-style-type: none"> • Airborne pollution of QI habitats (during the operational phase).

Further appraisal of the potential for these impacts to result in adverse effects on the integrity of the relevant European sites must therefore be undertaken as part of a detailed Appropriate Assessment of the Designated Development. At the AA stage, consideration can be given to available avoidance or mitigation measures.

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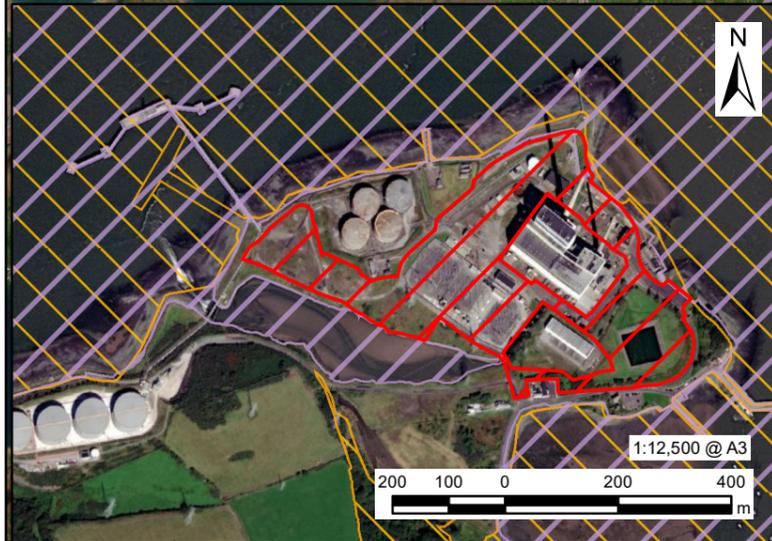
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6. Figures

Figure 1 – European sites within the Zol of the Designated Development



AECOM

PROJECT
 Tarbert Power Station
 Temporary Emergency
 Generation, Tarbert Co. Kerry

CLIENT
 SSE Generation Ireland
 Limited

CONSULTANT
 AECOM Limited
 4th Floor, Adelphi Plaza, George's Street
 Upper
 Dun Laoghaire
 Co. Dublin, A96 T927

LEGEND

- Designated Development Site
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- River Shannon waterbody

NOTES

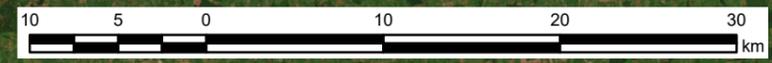
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
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ISSUE PURPOSE
 FINAL

PROJECT NUMBER
 60697004

FIGURE TITLE
 European sites within the Zol

FIGURE NUMBER
 Figure 1



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Appendix A Information on European sites within the Zol of the Designated Development

Below are details on the European sites which were established through the AA Screening reported in this document to be within the potential zone of influence of the construction, operation and/or decommissioning of the Designated Development. The sites are described in geographic order, with those closest to the Designated Development given first.

River Shannon and River Fergus Estuaries SPA

Site code: 0004077

Date of designation: January 1997

Local planning authority: Clare County Council, Kerry County Council and Limerick County Council

Total area: 322km²

Special Conservation Interests:

- Cormorant *Phalacrocorax carbo* [A017]
- Whooper swan [A038]
- Light-bellied brent goose *Branta bernicla hrota* [A046]
- Shelduck *Tadorna tadorna* [A048]
- Wigeon *Anas penelope* [A050]
- Teal *Anas crecca* [A052]
- Pintail *Anas acuta* [A054]
- Shoveler *Anas clypeata* [A056]
- Scaup *Aythya marila* [A062]
- Ringed plover *Charadrius hiaticula* [A137]
- Golden plover *Pluvialis apricaria* [A140]
- Grey plover *Pluvialis squatarola* [A141]
- Lapwing *Vanellus vanellus* [A142]
- Knot *Calidris canutus* [A143]
- Dunlin *Calidris alpina* [A149]
- Black-tailed godwit *Limosa limosa* [A156]
- Bar-tailed godwit *Limosa lapponica* [A157]
- Curlew *Numenius arquata* [A160]
- Redshank *Tringa totanus* [A162]
- Greenshank *Tringa nebularia* [A164]
- Black-headed gull *Chroicocephalus ridibundus* [A179]
- Wetland and waterbirds [A999]

Conservation objectives:

- To maintain the favourable conservation condition of cormorant which is defined by the following list of attributes and targets:
 - Breeding population abundance of apparently occupied nests: Target of no significant decline in numbers.
 - Productivity rate: Target of no significant decline in mean numbers.
 - Distribution of breeding colonies: Target of no significant decline of number, location or area (hectares).
 - Prey biomass available: Target of no significant decline in kilograms.
 - Barriers to connectivity: Target of no significant increase in number, location, shape, area (hectares).
 - Disturbance at the breeding site: Target that human activities should occur at levels that do not adversely affect the breeding cormorant population. Measurable by the level of impact.
 - Population trend: Long term population trend stable or increasing. Measurable by percentage change.
 - Distribution: There should be no significant decrease in the range, timing or intensity of use of areas by cormorant other than that occurring from natural patterns of variation. Measurable by range, timing and intensity of use.
- To maintain the favourable conservation condition of whooper swan, light-bellied brent goose, shelduck, wigeon, teal, pintail, shoveler, scaup, ringed plover, golden plover, grey plover, lapwing, knot, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank, greenshank, black-headed gull are defined by the following list of attributes and targets:
 - Population trend: Long term population trend stable or increasing. Measurable by percentage change.
 - Distribution: There should be no significant decrease in the range, timing or intensity of use of areas by the SCI bird species other than that occurring from natural patterns of variation. Measurable by range, timing and intensity of use.
- To maintain the favourable conservation condition of the wetland habitat in the River Shannon and River Fergus Estuaries SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.
 - Wetland habitat area: The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 32,261ha, other than that occurring from natural patterns of variation. Measurable by hectares.

Existing threats, pressures, and activities with impacts on the site:

The main threats to the River Shannon and River Fergus Estuaries SPA are disturbances from recreational activities, with walking being the most widespread. After walking, the second largest pressure comes from shooting and aircraft flying.

Lower River Shannon SAC

Site code: 002165

Date of designation: January 2002

Local planning authority: Clare County Council, Kerry County Council and Limerick County Council

Total area: 683km²

Qualifying Interests:

- Sandbanks which are slightly covered by sea water all the time [1110]
- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Coastal lagoons [1150]
- Large shallow inlets and bays [1160]
- Reefs [1170]
- Perennial vegetation of stony banks [1220]
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- *Salicornia* and other annuals colonising mud and sand [1310]
- Atlantic salt meadows [1330]
- Mediterranean salt meadows [1410]
- Watercourses of plain to montane levels [3260]
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils [6410]
- Alluvial forests with alder *Alnus glutinosa* and ash *Fraxinus excelsior* [91E0]
- Freshwater pearl mussel *Margaritifera margaritifera* [1029]
- Sea lamprey *Petromyzon marinus* [1095]
- Brook lamprey *Lampetra planeri* [1096]
- River lamprey *Lampetra fluviatilis* [1099]
- Atlantic salmon *Salmo salar* [1106]
- Common bottlenose dolphin *Tursiops truncatus* [1349]
- Otter *Lutra lutra* [1355]

Conservation objectives:

- To restore the favourable conservation condition of freshwater pearl mussel which is defined by the following list of attributes and targets:
 - Distribution: Maintain at 7km.
 - Population size: Restore to 10, 000 adult mussels.
 - Population structure (recruitment): No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution.
 - Population structure (mortality): No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution.
 - Habitat extent: Restore suitable habitat in more than 3.3km and any additional stretches necessary for salmonid spawning.
 - Water quality (macrovertebrate and phytobenthos (diatoms)): Restore substratum quality – filamentous algae: absent or trace (<5%).
 - Substratum quality (sediment): Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment.
 - Substratum quality (oxygen availability): Restore to no more than 20% decline from water column to 5 cm depth in substrate.
 - Hydrological flow regime (flow variability): Restore appropriate hydrological regimes.
 - Host fish: Maintain sufficient juvenile salmonids to host glochidial larvae
- To restore the favourable conservation condition of sea lamprey which is defined by the following list of attributes and targets:
 - Distribution (extent of anadromy): Greater than 75% of main stem length of rivers accessible from estuary.
 - Population structure of juveniles: At least three age/size groups present.
 - Juvenile density in fine sediment: Juvenile density at least 1/m².
 - Extent and distribution of spawning habitat: No decline in extent and distribution of spawning beds.
 - Availability of juvenile habitat: More than 50% of sample sites positive.
- To maintain the favourable conservation condition of brook lamprey and river lamprey which are defined by the following list of attributes and targets:
 - Distribution: Access to all water courses down to first order streams.
 - Population structure of juveniles: At least three age/size groups of brook/river lamprey present.
 - Juvenile density in fine sediment: Mean catchment juvenile density of brook/river lamprey at least 2/m².
 - Extent and distribution of spawning habitat: No decline in extent and distribution of spawning beds.
 - Availability of juvenile habitat: More than 50% of sample sites positive.
- To restore the favourable conservation condition of salmon which is defined by the following list of attributes and targets:
 - Distribution (extent of anadromy): 100% of river channels down to second order accessible from estuary.
 - Adult spawning fish: Conservation Limit (CL) for each system consistently exceeded.
 - Salmon fry abundance: Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling.
 - Out-migrating smolt abundance: No significant decline in number.
 - Number and distribution of redds: No decline in number and distribution of spawning redds due to anthropogenic causes.

Lower River Shannon SAC

- Water quality: At least Q4 at all sites sampled by EPA.
- To maintain the favourable conservation condition of sandbanks which is defined by the following list of attributes and targets:
 - Habitat distribution: The distribution of sandbanks is stable, subject to natural processes.
 - Habitat area: The permanent habitat area is stable or increasing, subject to natural processes.
 - Community distribution: Conserve the following community type in a natural condition; Subtidal sand to mixed sediment with *Nephtys* spp. community complex.
- To maintain the favourable conservation condition of estuaries which is defined by the following list of attributes and targets:
 - Habitat area: The permanent habitat area is stable or increasing, subject to natural processes.
 - Community distribution: Conserve the following community types in a natural condition: Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex; Estuarine subtidal muddy sand to mixed sediment with gammarids community complex; Subtidal sand to mixed sediment with *Nucula nucleus* community complex; Subtidal sand to mixed sediment with *Nephtys* spp. community complex; Furoid-dominated intertidal reef community complex; Faunal turf-dominated subtidal reef community; and Anemone-dominated subtidal reef community.
- To maintain the favourable conservation condition of mudflats and sandflats which is defined by the following list of attributes and targets:
 - Habitat area: The permanent habitat area is stable or increasing subject to natural processes.
 - Community distribution: Conserve the following community types in a natural condition; intertidal sand with *Scolelepis squamata* and *Pontocrates* spp. community; and Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex
- To restore the favourable conservation condition of coastal lagoons which is defined by the following list of attributes and targets:
 - Habitat area: Area stable or increasing, subject to natural processes. Favourable reference area 33.4ha- Shannon Airport Lagoon 24.2ha; Cloonconeen Pool 3.9ha; Scatterry Lagoon 2.8ha; Quayfield and Poulaweala Loughs 2.5ha
 - Habitat distribution: No decline, subject to natural processes.
 - Salinity regime: Median annual salinity and temporal variation within natural ranges.
 - Hydrological regime: Annual water level fluctuations and minima within natural ranges.
 - Barrier (connectivity between lagoon and sea): Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management.
 - Water quality (chlorophyll a): Annual median chlorophyll a within natural ranges and less than 5µg/L.
 - Water quality (Dissolved Inorganic Nitrogen (DIN)): Annual median DIN within natural ranges and less than 0.15mg/L.
 - Depth of macrophyte colonisation: Macrophyte colonisation to maximum depth of lagoons.
 - Typical plant species: Maintain number and extent of listed lagoonal specialists, subject to natural variation.
 - Typical animal species: Maintain listed lagoon specialists, subject to natural variation.
 - Negative indicator species: Negative indicator species absent or under control.
- To maintain the favourable conservation condition of large shallow inlets and bays which is defined by the following list of attributes and targets:
 - Habitat area: The permanent habitat area is stable or increasing, subject to natural processes.
 - Community distribution: Conserve the following community types in a natural condition: Intertidal sand with *Scolelepis squamata* and *Pontocrates* spp. community; Intertidal sand to mixed sediment with polychaetes, molluscs and crustaceans community complex; Subtidal sand to mixed sediment with *Nucula nucleus* community complex; Subtidal sand to mixed sediment with *Nephtys* spp. community complex; Furoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone- dominated subtidal reef community; and Laminaria- dominated community complex.
- To maintain the favourable conservation condition of reefs which is defined by the following list of attributes and targets:
 - Habitat distribution: The distribution of reefs is stable, subject to natural processes.
 - Habitat area: The permanent habitat area is stable, subject to natural processes.
 - Community distribution: Conserve the following reef community types in a natural condition: Furoid-dominated intertidal reef community complex; Mixed subtidal reef community complex; Faunal turf-dominated subtidal reef community; Anemone- dominated subtidal reef community; and Laminaria- dominated community complex.
- To maintain the favourable conservation condition of perennial vegetation of stony banks which is defined by the following list of attributes and targets:
 - Habitat area: Area stable or increasing subject to natural processes, including erosion and succession.
 - Habitat distribution: No decline, or change in habitat distribution, subject to natural processes.
 - Physical structure (functionality and sediment supply): Maintain the natural circulation of sediment and organic matter, without any physical obstructions.
 - Vegetation structure (zonation): Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
 - Vegetation composition (negative indicator species): Negative indicator species (including non-natives) to represent less than 5% cover.
- To maintain the favourable conservation condition of vegetated sea cliffs which is defined by the following list of attributes and targets:
 - Habitat length: Area stable or increasing, subject to natural processes, including erosion. For sub- sites mapped: Kilbaha- 4.1km; Ladder Rock- 1.0km; Moyarta- 0.9km; Lisheencrony- 1.1km; Burrane- 0.2km; Kerry Head- 33.4km; Ballyunion- 15.6km; Kilclogher- 4.9km; Loop Head- 6.1km.

Lower River Shannon SAC

- Habitat distribution: No decline, subject to natural processes.
- Physical structure (functionality and hydrological regime): No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures.
- Vegetation structure (zonation): Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession.
- Vegetation structure (vegetation height): Maintain structural variation within sward.
- Vegetation composition (typical species and sub-communities): Maintain range of sub-communities with typical species listed in the Irish Sea cliff survey.
- Vegetation composition (negative indicator species): Negative indicator species (including non-natives) to represent less than 5% cover.
- Vegetation composition (bracken and woody species): Cover of bracken (*Pteridium aquilinum*) on grassland and/or heath to be less than 10%. Cover of woody species on grassland and/or heath to be less than 20%.
- To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand which is defined by the following list of attributes and targets:
 - Habitat area: Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle - 0.005ha; Inishdea, Owenshere - 0.003ha; Knock - 0.029ha; Querin - 0.185ha; Rinevilla Bay - 0.001ha.
 - Habitat distribution: No decline, or change in habitat distribution, subject to natural processes.
 - Physical structure (sediment supply): Maintain natural circulation of sediments and organic matter, without any physical obstructions.
 - Physical structure (creeks and pans): Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession.
 - Physical structure (flooding regime): Maintain natural tidal regime.
 - Vegetation structure (zonation): Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
 - Vegetation structure (vegetation height): Maintain structural variation within sward.
 - Vegetation structure (vegetation cover): Maintain more than 90% of area outside creeks vegetated.
 - Vegetation composition (typical species and sub-communities): Maintain the presence of species-poor communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009).
 - Vegetation structure (negative indicator species- *Spartina anglica*): No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%.
- To restore the favourable conservation condition of Atlantic salt meadows which is defined by the following list of attributes and targets:
 - Habitat area: Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 6.774ha; Barrigone, Aughinish- 10.288ha; Beagh- 0.517ha; Bunratty- 26.939ha; Shepperton, Fergus Estuary- 37.925ha; Inishdea, Owenshere- 18.127ha; Killadysert, Inishcorker- 2.604ha; Knock- 0.576ha; Querin- 3.726ha; Rinevilla Bay- 11.883ha.
 - Habitat distribution: No decline or change in habitat distribution, subject to natural processes.
 - Physical structure (sediment supply): Maintain natural circulation of sediments and organic matter, without any physical obstructions.
 - Physical structure (creeks and pans): Maintain creek and pan structure, subject to natural processes, including erosion and succession.
 - Physical structure (flooding regime): Maintain natural tidal regime.
 - Vegetation structure (zonation): Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
 - Vegetation structure (vegetation height): Maintain structural variation within sward.
 - Vegetation structure (vegetation cover): Maintain more than 90% of the saltmarsh area vegetated.
 - Vegetation composition (typical species and sub-communities): Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009).
 - Vegetation structure (negative indicator species – *Spartina anglica*): No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%.
- To maintain the favourable conservation condition of bottlenose dolphin which is defined by the following list of attributes and targets:
 - Access to suitable habitat: Species range within the site should not be restricted by artificial barriers to site use.
 - Habitat use (critical areas): Critical areas, representing habitat used preferentially by bottlenose dolphin, should be maintained in a natural condition.
 - Disturbance: Human activities should occur at levels that do not adversely affect the bottlenose dolphin population at the site.
- To restore the favourable conservation condition of otter which is defined by the following list of attributes and targets:
 - Distribution: No significant decline.
 - Extent of terrestrial habitat: No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds.
 - Extent of marine habitat: No significant decline. Area mapped and calculated as 4,461.6ha.
 - Extent of freshwater (river) habitat: No significant decline. Length mapped and calculated as 500.1km.
 - Extent of freshwater (lake/lagoon) habitat: No significant decline. Area mapped and calculated as 125.6ha.
 - Couching sites and holts: No significant decline.

Lower River Shannon SAC

- Fish biomass available: No significant decline.
- Barriers to connectivity: No significant increase.
- To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) which is defined by the following list of attributes and targets:
 - Habitat area: Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Carrigafoyle- 4.193ha; Barrigone, Aughinish- 2.407ha; Bunratty- 0.865ha; Inishdea, Owenshere- 11.609ha; Killadysert, Inishcorker- 0.705ha; Knock- 0.143ha, Querin- 0.008ha; Rinevilla Bay- 2.449ha.
 - Habitat distribution: No decline or change in habitat distribution, subject to natural processes.
 - Physical structure (sediment supply): Maintain natural circulation of sediments and organic matter, without any physical obstructions.
 - Physical structure (creeks and pans): Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession.
 - Physical structure (flooding regime): Maintain natural tidal regime.
 - Vegetation structure (zonation): Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.
 - Vegetation structure (vegetation height): Maintain structural variation within sward.
 - Vegetation structure (vegetation cover): Maintain more than 90% of area outside creeks vegetated.
 - Vegetation composition (typical species and sub-communities): Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009).
 - Vegetation structure (negative indicator species – *Spartina anglica*): No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%.
- To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation which is defined by the following list of attributes and targets:
 - Habitat area: Area stable or increasing, subject to natural processes.
 - Habitat distribution: No decline, subject to natural processes.
 - Hydrological regime (river flow): Maintain appropriate hydrological regimes.
 - Hydrological regime (tidal influence): Maintain natural tidal regime.
 - Hydrological regime (freshwater seepages): Maintain appropriate freshwater seepage regimes.
 - Substratum composition (particle size range): The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (frequently sands, gravels and cobbles).
 - Water quality (nutrients): The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition.
 - Vegetation composition (typical species): Typical species of the relevant habitat sub-type should be present and in good condition.
 - Floodplain connectivity: The area of active floodplain at and upstream of the habitat should be maintained.
 - Riparian habitat: The area of riparian woodland at and upstream of the bryophyte-rich sub-type should be maintained.
- To maintain the favourable conservation condition of Molinia meadows on calcareous, peaty or clayey-silt laden soils (*Molinion caeruleae*) which is defined by the following list of attributes and targets:
 - Habitat area: Area stable or increasing, subject to natural processes.
 - Habitat distribution: No decline, subject to natural processes.
 - Vegetation structure (broadleaf herb grass ratio): Broadleaf herb component of vegetation between 40 and 90%.
 - Vegetation structure (sward height): 30-70% of sward between 10 and 80cm high.
 - Vegetation composition (typical species): At least 7 positive indicator species present, including 1 "high quality" species.
 - Vegetation composition (notable species): No decline, subject to natural processes.
 - Vegetation composition (negative indicator species): Negative indicator species collectively not more than 20% cover, with cover by an individual species less than 10%. Non-native invasive species, absent or under control.
 - Vegetation composition (negative indicator moss species): Bog mosses (*Sphagnum* spp.) not more than 10% cover; hair mosses (*Polytrichum* spp.) not more than 25% cover.
 - Vegetation structure (woody species and bracken (*Pteridium aquilinum*)): Cover of woody species and bracken not more than 5% cover.
 - Physical structure (bare ground): Not more than 10% bare ground.
- To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) which is defined by the following list of attributes and targets:
 - Habitat area: Area stable or increasing, subject to natural processes, at least c.8.5ha for sites surveyed.
 - Habitat distribution: No decline.
 - Woodland size: Area stable or increasing. Where topographically possible, 'large' woods at least 25ha in size and 'small' woods at least 3ha in size.
 - Woodland structure (cover and height): Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi- mature trees and shrubs; and well-developed herb layer.
 - Woodland structure (community diversity and extent): Maintain diversity and extent of community types.
 - Woodland structure (natural regeneration): Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy.
 - Hydrological regime (flooding depth/height of water table): Appropriate hydrological regime necessary for maintenance of alluvial vegetation.
 - Woodland structure (dead wood): At least 30m³/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both

Lower River Shannon SAC

- categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder).
- Woodland structure (veteran trees): No decline.
 - Woodland structure (indicators of local distinctiveness): No decline.
 - Vegetation composition (native tree cover): No decline. Native tree cover not less than 95%.
 - Vegetation composition (typical species): A variety of typical native species present, depending on woodland type, including alder (*Alnus glutinosa*), willows (*Salix* spp) and, locally, oak (*Quercus robur*) and ash (*Fraxinus excelsior*).
 - Vegetation composition (negative indicator species): Negative indicator species, particularly non-native invasive species, absent or under control.
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Existing threats, pressures, and activities with impacts on the site:

There are a wide number of threats and impacts to the site. Of the land use activities in the area, grazing by cattle is the most common. Over-grazing and poaching have damaged some areas within the site. A large amount of the lands adjacent to the river have been reclaimed and further reclamation still poses an active threat to the land. Planted cord-grass *Spartina* sp. risks out-competing other species of grass and could reduce mudflats available to foraging birds. While the water quality is generally satisfactory, further industrial development along the river is recognised as a potential threat. Local recreational activities in the area also pose a threat to birds and dolphins.

Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA

Site code: 004161

Date of designation: March 2007

Local planning authority: Kerry County Council, Cork County Council and Limerick County Council

Total area: 566km²

Special Conservation Interests:

- Hen harrier *Circus cyaneus* [A082]
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Conservation objectives:

- To restore the favourable conservation condition of hen harrier which is defined by the following list of attributes and targets:
 - Population size: Restore the numbers of confirmed breeding pairs to at least 38–39 confirmed breeding pairs.
 - Productivity rate: Maintain at least 1.0–1.4 fledged young per confirmed pair.
 - Spatial utilisation by breeding pairs: Restore the spatial utilisation of the SPA by breeding pairs to at least 97–98 %.
 - Extent and condition of heath and bog and associated habitats: Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation.
 - Extent and condition of low intensity managed grasslands and associated habitats: Restore the extent and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation.
 - Extent and condition of hedgerows: Maintain at least the length and quality of this resource to support the targets relating to population size, productivity rate and spatial utilisation.
 - Age structure of forest estate: Achieve an even and consistent distribution of age-classes across the forest estate.
 - Disturbance to breeding sites: Disturbance occurs at levels that does not significantly impact upon breeding hen harrier.
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Existing threats, pressures, and activities with impacts on the site:

Threats and pressures not listed on NPWS website or European Environment Agency.

Moanveanlagh Bog SAC

Site code: 002351

Date of designation: April 2003

Local planning authority: Kerry County Council

Total area: 2km²

Qualifying features [and latest assessed condition]:

- Active raised bogs [7110]
 - Degraded raised bogs still capable of natural regeneration [7120]
 - Depressions on peat substrates of the *Rhynchosporion* [7150]
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Conservation objectives:

- To restore the favourable conservation condition of active raised bogs which is defined by the following list of attributes and targets:
 - Habitat area: Restore area of active raised bog to 12.8ha, subject to natural processes.
 - Habitat distribution: Restore the distribution and variability of active raised bog across the SAC.
 - High bog area: No decline in extent of high bog necessary to support the development and maintenance of active raised bog.
 - Hydrological regime (water levels): Restore appropriate water levels throughout the site.
 - Hydrological regime (flow patterns): Restore, where possible, appropriate high bog topography, flow directions and slopes.
 - Transitional areas between high bog and adjacent mineral soils (including cutover areas): Restore adequate transitional areas to support/protect active raised bog and the services it provides.
 - Vegetation quality (central ecotope, active flush, soaks, bog woodland): Restore 6.4ha of central ecotope/active flush/soaks/bog woodland as appropriate.
 - Vegetation quality (microtopographical features): Restore adequate cover of high quality microtopographical features.
 - Vegetation quality (bog moss (*Sphagnum*) species): Restore adequate cover of bog moss (*Sphagnum*) species to ensure peatforming capacity.
 - Typical ARB species (flora): Restore, where appropriate, typical active raised bog flora.
 - Typical ARB species (fauna): Restore, where appropriate, typical active raised bog fauna.
 - Elements of local distinctiveness: Maintain features of local distinctiveness, subject to natural processes.
 - Negative physical indicators: Negative physical features absent or insignificant.
 - Vegetation composition (native negative indicator species): Native negative indicator species at insignificant levels.
 - Vegetation composition (nonnative invasive species): Non-native invasive species at insignificant levels and not more than 1% cover.
 - Air quality (nitrogen deposition): Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr.
 - Water quality: Water quality on the high bog and in transitional areas close to natural reference conditions.
 - The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Moanveanlagh Bog SAC.
 - Depressions on peat substrates of the *Rhynchosporion* is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Moanveanlagh Bog SAC.
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Existing threats, pressures, and activities with impacts on the site:

Land uses such as peat cutting and cattle grazing pose threats to the bog. These are compounded by additional pressures such as fires and dumping, which have resulted in habitat loss. Invasive species are also a plight to the site, with *Rhododendron ponticum* and the carnivorous pitcher plant *Sarracenia purpurea* having established there.
