

Environmental Impact Analysis

In respect of:

**The unauthorised deposition of material
(soil, stone, etc.) on lands at Cregganna Beg**

Client: **David O'Toole**

Site Location: **Cregganna Beg, Oranmore, County Galway**

Date: **28/06/2024**

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This report has been prepared by the author with all reasonable skill, care and diligence, taking account of the programme of work agreed between the author and the client on this project. All opinions, analysis, recommendations and conclusions contained in this report are based on existing site conditions and knowledge acquired during site surveys, consultations with the defendant (and named client), and desk studies. The author accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk. The author therefore shall have no legal responsibility for the content or the accuracy of the information provided, or for any loss or damage caused directly or indirectly in connection with reliance on the use of such information.

Author's name, qualifications, and contact email address on cover page of this report.

1. Introduction and Screening

1.1 Background and Methods

This document concerns works previously undertaken on lands at Cregganna Beg, Oranmore, County Galway. The works involved are infill works on the site under consideration, which have been deemed unauthorised by Galway County Council. This document has been prepared in part based on information received by the client on the recent relevant history of the site in terms of the infill works. Hence, this document's sections in this respect reflect the author best understanding of this information as received. The client David O'Toole has reviewed this document before its finalisation to ensure the author's understanding of the history of the infill works on the site and other relevant elements of received information has been correct.

The site in question is jointly owned by Roisin O'Toole, Niall O'Toole, and Saoirse O'Toole. The deposition of material and filling works at the site was carried out of behalf of David O'Toole (father of Roisin, Niall, and Saoirse). David O'Toole hence takes responsibility for the works undertaken as it has been his project of works on these lands. David O'Toole has asked the author to prepare this document, which is an Environmental Impact Analysis (EIA). The document firstly presents the context and recent history of the infilling works on the site. It then puts forward an analysis and evaluation of the potential environmental and ecological impacts of the infill material being retained on the site (and subsequent intended methods from David O'Toole to further improve biodiversity), and the potential removal of the loads of material used on the site and the likely environmental impacts. This dual analysis approach should be useful for ensuring that decision-makers can consider potential environmental impacts before proceeding with any removal of the infill works.

The author of this report has appropriate degree qualifications in the disciplines of environmental engineering, urban & regional planning, and ecology. The author has been working in the mix of these disciplines since 2003. The author possesses extensive experience in developing a variety of environmental and ecological reports for a range of development applications for many local authorities in Ireland. These include Screening Reports, Natura Impact Statements, Construction & Environmental Management Plans, Ecological Impact Assessments, Habitat Assessments, and Flood Risk Assessments. Further work has included the development of a Spatial Strategy, Site Appraisals, HRA Appropriate Assessment, and a Sustainability Appraisal for a local authority's development plan.

1.2 Infill works undertaken on site and official correspondence

Over the time period between the years 2021 – 2023, the deposition of material (soil, stone, etc.) and filling works of the lands under consideration at Cregganamore, Oranmore, County Galway was undertaken on behalf of David O'Toole, who lives adjacent to these lands. Correspondence concerning these works from both the Planning Authority of Galway County Council and the District Court of Galway has been to Roisin O'Toole, Niall O'Toole, Saoirse O'Toole, and David O'Toole. The adult children of David O'Toole - Roisin O'Toole, Niall O'Toole, and Saoirse O'Toole, are the owners of the lands under consideration. As

mentioned in Section 1.1, David O'Toole takes responsibility for authorising the intake of the deposition material and the subsequent infill works carried out on the site.

On 15th May 2023, the Planning Authority of Galway County Council issued a warning letter to Roisin O'Toole, Niall O'Toole, Saoirse O'Toole and David O'Toole concerning what the Planning Authority referred to as the unauthorised nature of these works. On 12th June 2023, the consulting engineers working on behalf of David O'Toole stated in a response letter that the filling of the lands was carried out in order to improve the soil on the site, so that their client could better grow native tree species and also sow and develop a wildflower meadow on these lands.

This response letter also gave detail on the circumstances of the infill works, as follows:

- There was an existing mound of soil to the rear of the site (figure 1 below), which was levelled and used to fill some of the land;
- The remainder of the filling was locally sourced with the aim of providing clean, uncontaminated fill to raise the site by less than one metre in height (some material which was subsequently found to be with glass and tiles was then removed from the site);
- A substantial amount of the fill (five loads) came from topsoil from a playing pitch of Oranmore GAA club, located close to the site;
- The fill was sourced from two local hauliers, namely the company of Barry Quinn Limited, and the haulier Mr. Declan Collins.



Figure 1: The previous raised mound of earth to the rear of the site. The defendant David O'Toole has stated there was good quality soil in the mound which was then used in the infill process (image courtesy of the applicant).

The letter from the client's consulting engineers goes on to state that David O'Toole is a keen nature enthusiast, and he has sown a wildflower meadow on the land, as well as planting native deciduous trees and fruit trees. The letter notes that David O'Toole is also an enthusiastic beekeeper and has the intention to keep beehives on the site. Since then, in June 2024, David O'Toole has applied to the Department of Agriculture for registration as a primary producer of honey. The letter notes that before the land was filled, it was not suitable for growing a wildflower meadow or trees due to the lack of proper soil / topsoil. Notwithstanding the above, in order to rectify the situation of the unauthorised nature of the works, if required by Galway County Council, the consulting engineers employed by David O'Toole stated that their client was willing to apply for a retention planning application to retain the fill imported on his lands.

The Planning Authority of Galway County Council issued an Enforcement Notice dated the 31st of July 2023 to Roisin O'Toole, Niall O'Toole, Saoirse O'Toole, and David O'Toole. This Enforcement Notice requested that these named individuals remove the unauthorised deposition of material (soil, stone, etc.), and have it delivered to an authorised site within a specified period of time, namely, within 12 weeks of the date of service of the Enforcement Notice.

David O'Toole subsequently requested that the consulting engineering firm to make a retention planning application concerning the infill works to Galway County Council. The author of this document was then asked by David O'Toole to prepare environmental and ecological documents to analyse the biodiversity on the site, and the potential impacts on the Cregganna Marsh SPA as a result of the infill works. The author hence prepared a Natura Impact Statement and an Ecological Impact Assessment as part of the retention application documentation, which was submitted to the Council by the client's consulting engineers in December 2023.

Galway County Council subsequently advised that the documentation of the submitted application could not be accepted and analysed by the Planning Authority. This is due to the requirements of the EU Habitats Directive (Council Directive 92/43/EEC). The Habitats Directive requires that any project likely to have a significant effect on a Natura 2000 site must undergo an appropriate assessment (AA). The Planning Authority had the view that allowing this retention application with a Natura Impact Assessment would mean the project has already been completed or significantly progressed without this prior assessment, thus violating the directive.

A compliant was made to the District Court at Galway that the defendants of Niall O'Toole, Roisin O'Toole, Saoirse O'Toole, and David O'Toole on the 20th of March 2024 in the townland of Cregganna Beg did commit an offence by failing to comply with the terms of an Enforcement Notice dated the 31st of July 2023, served on the defendants under the provisions of Section 154 of the Planning and Development Act, 2000 and contrary of the provisions of Sections 154 and 156 of the said Act, as amended by Section 46 of the Planning and Development (Amendment) Act, 2010. The Enforcement Notice issued by the Planning Authority required that the defendants take notice that the Planning Authority hereby:

1. Requires that the development, being a development for which no permission has been granted would cease;
2. That the defendants remove the unauthorised deposition of material (soil, stone, etc.) and have it delivered to an authorised site within a specified period of time, namely, within 12 weeks of the date of service of this notice;
3. Gives the defendants warning if the steps specified in this Notice to be taken are not taken within the period specified above or within such extended period as the Planning Authority may allow, the Planning Authority may enter on the land and take such steps, including the removal, demolition or alteration of any structure, and may recover from the defendants any expenses reasonably incurred by it in that behalf;
4. Requires the defendants to refund to the Planning Authority the costs and expenses reasonably incurred by the Planning Authority in relation to the investigation, detection and issue of this Notice (any warning letter under Section 152), including costs incurred in respect of the remuneration and other expenses of employees, consultants and advisors, and the Planning Authority may recover these costs and expenses incurred by it in that behalf;
5. Gives the defendants warning that if within the period specified in the Notice or such an extended period, not being more than six months, as the Planning Authority may allow, the steps specified in the Notice to be taken are not taken, the defendants may be guilty of an offence.

On the 27th of May 2024, a command was issued by Judge Mary Fahy of the District Court at Galway for the defendants of Niall O'Toole, Roisin O'Toole, Saoirse O'Toole, and David O'Toole to appear before the District Court Area of Galway in relation to the matter.

One of the defendants, David O'Toole, who takes responsibility for the deposition of material on the site, has asked the author to prepare this document. This Environmental Impact Analysis report is aimed at providing the environmental context and explanation in biodiversity terms of the defendant David O'Toole for the deposition of material on the site, and then providing information in terms of the potential environmental and ecological impacts of (a) retaining the infill material on the site, or (b) the removal of this infill material.

On the 6th of June 2024, as part of the preparation for this document, the defendant David O'Toole stated to the author by written communication that, during the first inspection of Galway County Council to the site in April 2022, he was out of the country on work business. Whilst David O'Toole was away, he reports that some fill material of poor quality was brought onto the site, which was found to have some plastic, glass, and tile fragments within the material load. To rectify this situation, a company working on behalf of David O'Toole removed these loads of fill.

Documents were obtained by David O'Toole to show that these loads had been removed and given to a recognised waste removal site on 29th May 2022. These loads of material were transferred to Barna Waste & Recycling by the company Barry Quinn Limited. The defendant David O'Toole states that he subsequently sent these document receipts to Galway County Council. David O'Toole wishes to highlight that this action of the removal of fill material thought to be substandard, in addition to the removal of the container that Galway County Council objected to on the site, showed that he complied with a previous waste management order from Galway County Council.

2. Scoping Methodology

2.1 The methods and objectives of scoping

The information in this chapter identifies the key environmental issues that are to be addressed in this document. This stage has involve extensive verbal and written consultation with the key stakeholder, David O'Toole, and a review and study of existing documentation relating to the works carried out on the site, including those documents issued by Galway County Council and the professionals employed by David O'Toole during the infill works.

In this respect, Section 1.1 has detailed the key elements of the correspondence between the Planning Authority, the District Court, and David O'Toole relating to this, and also set out some the recent history of the site in terms of the infill works, which this and forthcoming chapters will expand on. The document will study and assess the current state of the environment at the site, including the flora and fauna present, so that an informed analysis can be made. Relating from this work, this scoping chapter outlines the focus and methodology of the EIA, including which impacts will be studied and how.

2.2 Site Location and Characteristics

The site is located at Cregganna Beg, Oranmore, in southern County Galway (see figures 2 & 3). The site is accessed via a local road L-8106 from the N67 route which connects Galway city and the town of Oranmore to the north, and to the settlements of Clarinbridge and Kilcolgan to the south. The site area is 1.14 hectares. The site is surrounded to the south and to the east by residential development of single dwellings and their curtilages. To the northwest are agricultural holdings, and to the north and northeast are the lands of Cregganna Marsh SPA. Between the subject site area and the designated SPA boundary is a buffer of agricultural land in private ownership.

The subject site was purchased by David O'Toole in the late 1990s. The site has a history as an agricultural holding with livestock grazing, and it does not presently host livestock. The applicant has now some trees planted on the subject site after having undertaken some infilling in certain sections of the land in question. These infill works are discussed in detail in the next section.

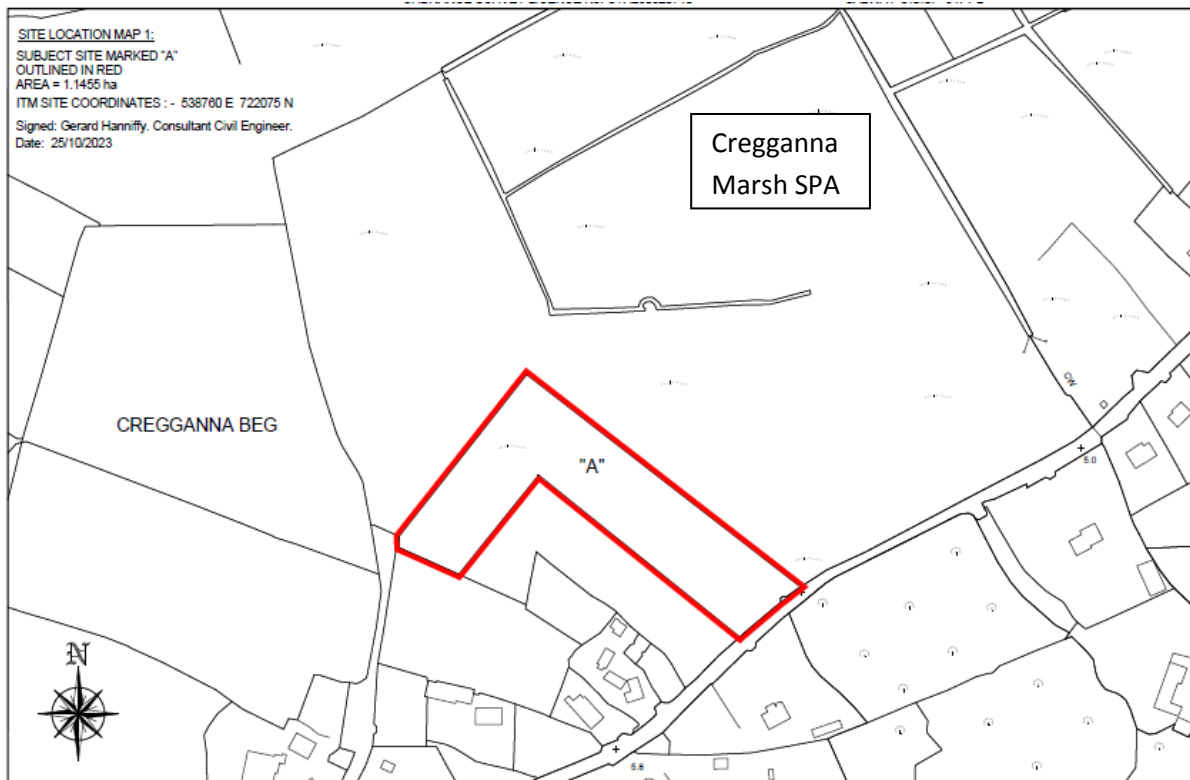


Figure 2: The site area in red outline marked 'A' in the context of the surrounding landscape (image courtesy of the applicant's planning representative).



Figure 3: The Cregganna Marsh SPA (blue colour) in the context of the surrounding region in southern County Galway (image courtesy of the applicant's planning representative).

3. Baseline Environmental Study of the Site and Surrounding Lands

3.1 Purpose

This chapter has the purpose of gathering comprehensive data on the current state of the environment in the areas affected by the infill works. This includes physical, biological, and socio-economic aspects. This analysis, detailing the existing environmental conditions, puts further information against which potential impacts can be measured. Desktop work, plus three surveys of the site and the surrounding area were undertaken in October 2023, November 2023, and June 2024.

3.2 Description of Surrounding Environment to the Site

The area of County Galway in which the site is located has a rich ecological heritage as it is located close to the Special Area of Conservation (SAC) and Special Protection Area (SPA), entitled the Galway Bay Complex SAC and Inner Galway Bay SPA respectively.

As mentioned in Section 2.2, the site is surrounded to the south and to the east by residential development of single dwellings and their curtilages. Both the site, and the adjacent home and curtilage of the defendant David O'Toole, is served by a local road network off the main road between the towns of Oranmore and Clarinbridge (see figure 4 below). To the northwest are agricultural holdings, and to the north and northeast are the lands of Cregganna Marsh SPA. Between the subject site area and the designated SPA boundary is a buffer of agricultural land in private ownership.

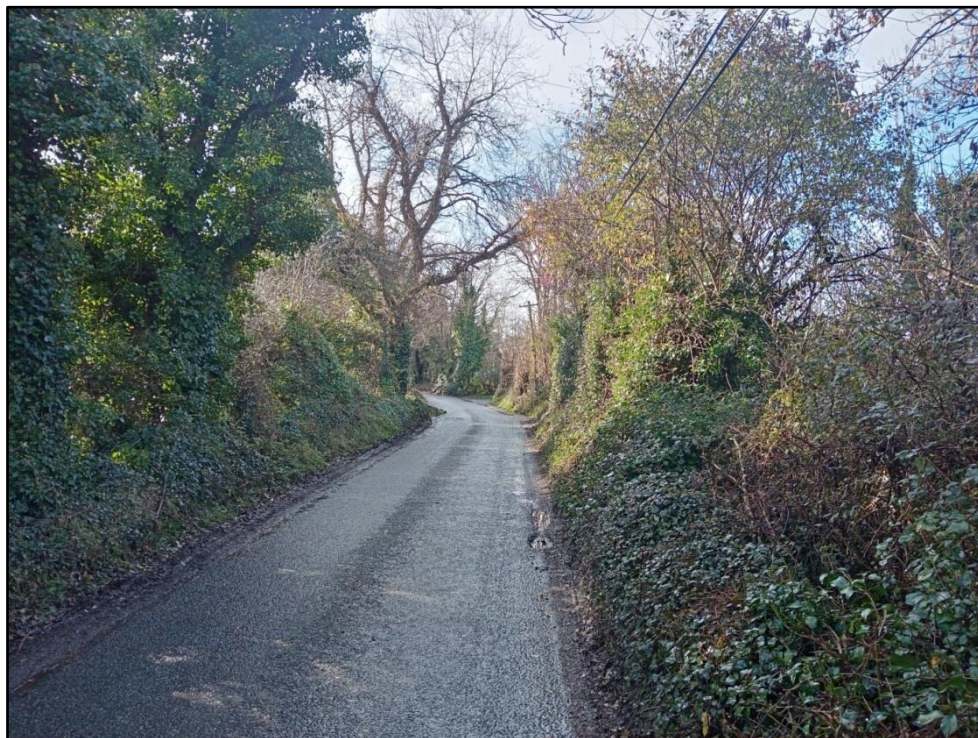


Figure 4: View of the local road network in the vicinity of the subject site (image taken on 08/11/2023).

3.3 Description of Ecological Environment

From the desktop study, it has been noted that there four Special Protection Areas and eight Special Areas of Conservation within 15km of the proposed site. The three SPAs and the seven Special Areas of Conservation are as follows:

- Inner Galway Bay SPA (site code: 004301);
- Cregganna Marsh SPA (site code: 004142);
- Rahasane Turlough SPA (site code: 004089);
- Lough Corrib SPA (site code: 004042);
- Galway Bay Complex SAC (site code: 000268);
- Lough Fingall Complex SAC (site code: 000606);
- Kiltiernan Turlough SAC (site code: 002185);
- Ardahan Grassland SAC (site code: 002244);
- Castletaylor Complex SAC (site code: 000242);
- Rahasane Turlough SAC (site code: 000322);
- Cahermore Turlough SAC (site code: 002294);
- Ballinduff Turlough SAC (site code: 002295);
- Lough Corrib SAC (site code: 000297).

The qualifying interests, conservation objectives and site synopsis of each of these SPAs and SACs are presented in Appendix I. It is noted that the eight SACs in question are a mix of turlough habitat, grassland, and coastal habitats. Given the land type nature of these SACs, and their further distance from the site compared to Cregganna Marsh SPA, it is not thought that there are any significant pathways to the conservation objectives of the SACs from the discussed elements of the subject site. There is no construction of buildings or wastewater treatment systems involved with this site.

For example, the Galway Bay Complex SAC is located at a sufficient distance away from the site and without a hydrological conduit to it, and hence it is not expected that the elements of the development (i.e. unauthorised fill) will have any significant on the conservation objectives of this SAC. The boundary of the Cregganna Marsh SPA is located approximately 50 metres away from the nearest boundary of the subject site. The qualifying interest and the supporting habitats of the Cregganna Marsh SPA will be hence now analysed in more detail in this section.

Cregganna Marsh SPA [site code: 004142]

Qualifying Interest

Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]

Site Synopsis

Cregganna Marsh is situated about 3 km south of Oranmore, to the west of the Galway - Ennis road. The predominant habitats on the site are lowland wet grassland and improved grassland, but areas of limestone pavement and other exposed rock, Hazel (*Corylus avellana*) scrub, freshwater marsh, drainage ditches and dry grassland are also represented. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose.

The site is of major conservation importance as a feeding site for a nationally important flock of Greenland White-fronted Goose (157 – 5 year mean peak between 1994/95 and 1998/99). The birds using this site form part of the Rahasane flock. Cregganna Marsh SPA is of ornithological importance because it is regularly utilised by a nationally important flock of Greenland White-fronted Goose, a species listed on Annex I of the E.U. Birds Directive.

Figure 5 below shows Cregganna Marsh area from the subject site, and figure 6 overleaf shows the area and outline of the Cregganna Marsh SPA in the context of the surrounding environment. Some of the northern boundary of the SPA is adjacent to the expanse of the Oranmore urban area. Other boundaries of the SPA feature adjoining agricultural fields, with dispersed single housing in close proximity.



Figure 5: A view of the Cregganna Marsh SPA in the context of the surrounding landscape during the winter months (image taken on 08/11/2023).

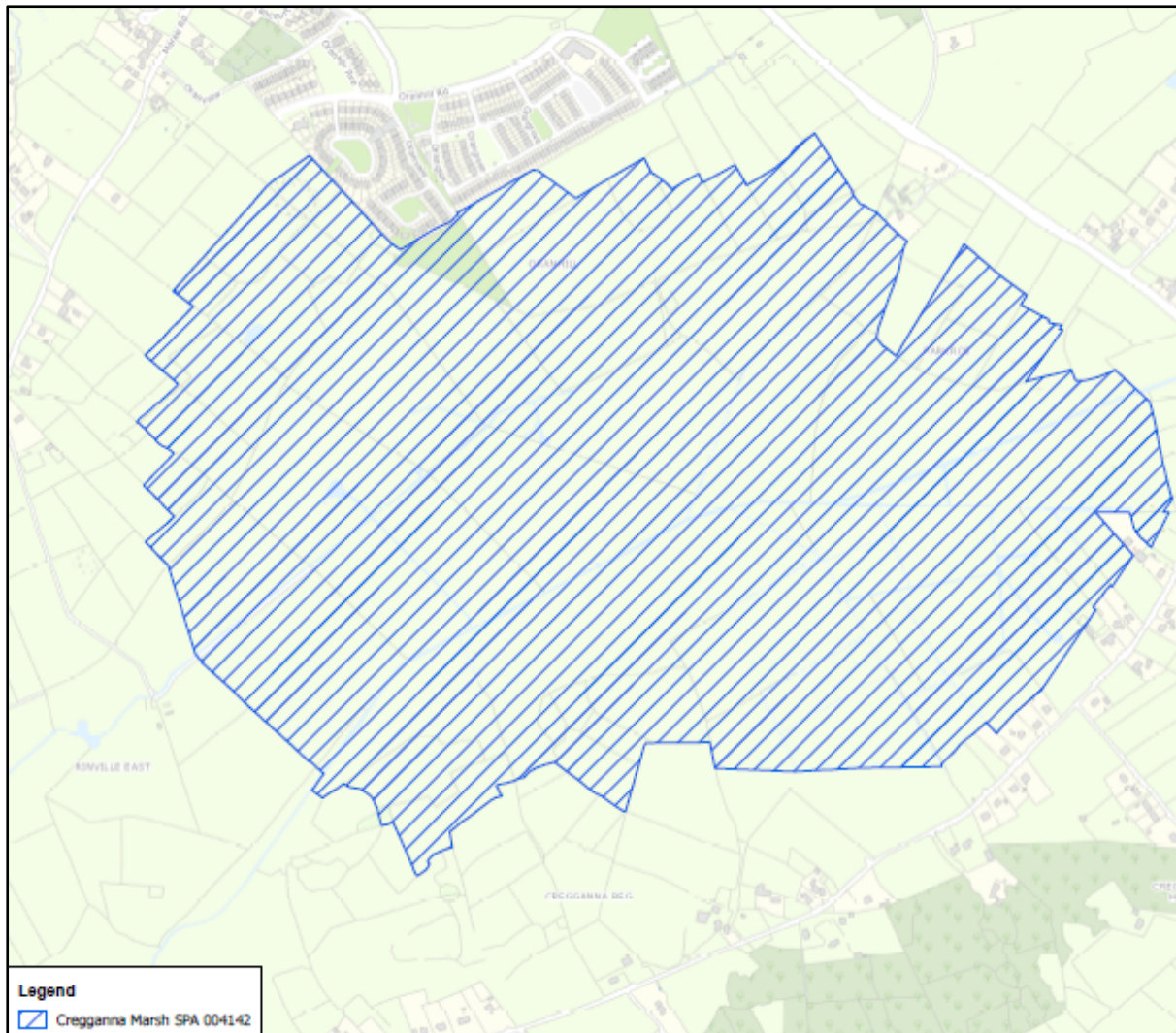


Figure 6: The outline of the Cregganna Marsh SPA in the context of the surrounding landscape (map taken from the National Parks and Wildlife Service website).

4. Potential Environmental Impacts of Retaining the Infill Material

4.1 Purpose

The purpose of this chapter is to predict the likely environmental impacts of the potential retention of the infill works, as the defendant David O'Toole wishes. This involves qualitative and quantitative assessment methods to assess both the potential positive and negative impacts. The output is an impact assessment that describes the predicted impacts, their significance, and the methodologies used for assessment.

As part of the original documentation for the submitted retention application, the author carried out site surveys on 16th October 2023 and 8th November 2023 in the company of the client, David O'Toole. These surveys analysed the potential impacts of the fill material on the surrounding environment, including the nearby Cregganna Marsh SPA. For the purposes of

this document, a further survey site was undertaken on 19th June 2024, and this survey allowed the site to be analysed in terms of viewing how the vegetation has developed during the intervening eight months since the second site survey and into summer conditions.

4.2 Description of the site at present

The development works consist of the infill material and what Galway County Council has identified as unauthorised fill on parts of the land in question. The applicant has infilled in portions of the subject site with selected material, and he has provided information for the purposes of this document on the infill works carried out to date. In terms of sources, the applicant has stated that there was an extensive earth mound already in place on the site before infill work commenced. The applicant has stated that this mound was levelled out first and then the remainder of the infill was sourced externally.

The defendant David O'Toole has stated to the author that he estimates that approximately 20% of the fill came from material sourced from the Oranmore Maree GAA pitch development, which he states was a new development at the time of the infill works. David O'Toole has stated that there were some other infill loads from the Oranmore locality brought by an individual known to him. David O'Toole stated he was careful to avoid the introduction of any invasive plant species such as Japanese knotweed or any other harmful foreign plant material before accepting any external fill. David O'Toole has stated that the total amount of infill now comprises approximately 40% of the area of the site.

From the three surveys of the site area, it does not appear that the infill works have unduly interfered with the small stream running through the site. Vegetation has grown over in the infill areas (see figure 7 overleaf), and there are no obvious slopes on the site, apart from a depression in which a small pond of water exists. These details are discussed in greater detail later in this report.



Figure 7: A view of the current vegetation cover on the site, and one of the boundaries of the subject site which adjoins an agricultural strip of land in separate ownership (image taken on 19/06/2024).

4.3 Biodiversity Enhancement Measures

- Tree planting program

If the infill works were to be retained on site, the defendant David O'Toole intends to complete the native tree planting program which he has undertaken to date on the site. In such a scenario, the applicant expects that the completion of the tree planting would be by the end of the year 2025. David O'Toole has planted a range of native tree species (namely beech, oak, hazel, rowan, alder, willow, silver birch, and hawthorn), and he also has used grass seed across the whole site area to produce a wildflower meadow. David O'Toole has stated that the completion of his tree planting program would include further native deciduous trees and some coniferous trees. Figure 8(a) & (b) below shows the existing tree species either growing on the site, or as tree samplings in plant boxes from which the applicant hopes to plant on the site in the near future.

David O'Toole intends to also undertake further hedging work comprised of white hawthorn along the remainder of the boundary fence of the site. David O'Toole states that about 100 yards of hawthorn hedge was already planted approximately 30 metres from the road in the year 2019. To date, David O'Toole has planted approximately 20 fruit trees on the site such

as clover (plants of the genus *Trifolium*) and borage (*Borago officinalis*), and if the deposition material on site is retained, he intends to plant another 15 fruit trees within a period of the next 1.5 - 2 years.

The list of native trees planted by David O'Toole, or to be planted on the site, are:

- Sycamore (*Acer pseudoplatanus*)
- Oak (*Quercus robur*);
- Silver birch (*Betula pendula*);
- Mountain ash / Rowan (*Sorbus aucuparia*);
- Alder (*Alnus glutinosa*);
- Hazel (*Corylus avellana*);
- Willow (*Salix alba*);
- Hawthorn (*Crataegus monogyna*);
- Spruce (*Picea abies*);
- Fir (*Abies alba*);
- Larch (*Larix decidua*).





Figure 8(a) The tree species planted on the lands, or on the site in pots, and **(b)** the tree saplings in David O'Toole's yard awaiting plantation (images taken on 19/06/2024).

Native trees provide numerous benefits for biodiversity in Ireland. These trees are integral to the local ecosystems throughout the country, and they support a wide range of wildlife. For example, David O'Toole has reported the presence of the marsh harrier bird (*Circus aeruginosus*) very close to the subject site during the month of June 2024. Some key benefits of native trees include:

- (a) Habitat Creation: native trees such as oak, ash, birch, provide essential habitats for various species of birds, insects, mammals, and fungi. The oak tree alone can support hundreds of different species of insects, which in turn provide food for birds and small mammals;
- (b) Food Sources: many native trees produce fruits, nuts, and seeds that are vital food sources for wildlife. Rowan berries, acorns, and hazelnuts are a few examples of the foods that sustain birds and mammals through different seasons;
- (c) Supporting Pollinators: trees like hawthorn and willow offer nectar and pollen for bees, butterflies, and other pollinating insects. This is crucial for the reproduction of many plant species and the overall health of ecosystems;
- (d) Maintaining Soil Health: the roots of native trees help stabilise the soil, preventing erosion. They also contribute to the nutrient cycle by decomposing leaves and organic matter, enriching the soil and supporting diverse plant life;

- (e) Climate Regulation: Trees act as carbon sinks, absorbing CO₂ and helping to mitigate climate change. This contributes to a stable environment where biodiversity can thrive;
- (f) Water Regulation: Tree roots improve water infiltration and reduce runoff, helping maintain healthy water systems. This supports aquatic life and reduces the risk of flooding;
- (g) Cultural and Genetic Heritage: Native trees are part of Ireland's natural heritage and have evolved alongside local wildlife. They maintain the genetic diversity of the region and support the resilience of ecosystems to diseases and environmental changes.

During the site survey in June 2024, it was observed that a wildflower meadow now exists which has developed to a very good condition, consisting of plants and flowers which are beneficial to bees and other wildlife. During the site survey, it could be seen that this flora includes red clover, bog iris, dandelions, borage, and buttercups.

A wildflower meadow is a diverse habitat characterised by a rich variety of native wildflower species and grasses. Unlike manicured lawns or intensively managed agricultural fields, wildflower meadows are designed to mimic natural grasslands, providing a habitat for a wide range of flora and fauna.

- Bee keeping on site and associated favourable plant species

The defendant David O'Toole is a member of the local Kilcolgan bee keeping group, and intends to keep and look after beehives on a small section of the site. Subject to the infill works being retained, David O'Toole hopes to introduce bee-friendly plants such as borage, cornflowers, goldenrod, sunflowers, foxgloves, and lavender. In the first half of June 2024, David O'Toole applied to the Department of Agriculture for registration as a primary producer of honey, and he received bee hives on site during that month.

On the 19th of June 2024, David O'Toole received a Horticultural Food Registration Certificate from the Department of Agriculture, Food and the Marine, to confirm that he is registered as a Food Business Operator for the following activity: *Primary Producer of Food of Animal Origin*. This certificate allows David O'Toole to operate as a certified honey producer.

Beekeeping and honey production in Ireland offer a variety of benefits that extend beyond the production of honey itself. These benefits are ecological, economic, and social, contributing to environmental sustainability, local economies, and community well-being.

Ecological benefits:

- Pollination: bees are vital pollinators for many crops and wild plants. Their activity enhances the yield and quality of fruit, vegetables, and seeds, supporting biodiversity and agricultural productivity;

- Biodiversity support: beekeeping encourages the growth of diverse plant species, as bees pollinate a wide range of flora. This promotes a rich and varied ecosystem, which is beneficial for other wildlife, including birds, mammals, and other insects;
- Ecosystem Stability: By supporting pollination and plant reproduction, bees contribute to the stability and resilience of ecosystems. This helps maintain ecological balance and supports natural processes like nutrient cycling and soil formation.

Economic Benefits

- Honey Production: Irish honey is a valuable product with a growing market. It supports local economies by providing income for beekeepers and creating opportunities for related businesses such as equipment suppliers and local markets;
- By-products: Beesmax, propolis, and royal jelly are valuable by-products of beekeeping. These can be used in various industries, including cosmetics, pharmaceuticals, and food production, further boosting local economies;
- Agricultural Enhancement: Improved pollination from bees can lead to higher yields and better-quality crops. This benefits farmers and can contribute to food security and agricultural sustainability.

Environmental Benefits:

- Conservation Efforts: Beekeeping can support conservation efforts by increasing awareness about the importance of pollinators and encouraging the protection of natural habitats. This can lead to greater efforts to preserve wildflower meadows, hedgerows, and other important ecosystems;
- Sustainable Practices: Many beekeepers adopt sustainable and organic practices, which promote environmental health and reduce the use of harmful chemicals. This can have positive effects on local biodiversity and ecosystem services.

Social and Educational Benefits:

- Community Engagement: Beekeeping can foster a sense of community as people come together to learn about and practice beekeeping. It provides opportunities for community gardens, educational programs, and local events focused on sustainability and conservation;
- Educational Opportunities: Beekeeping offers educational benefits, teaching people about ecology, agriculture, and the importance of pollinators. Schools, community groups, and environmental organisations can use beekeeping as a tool for environmental education;
- Health and Well-being: Consuming local honey can have health benefits, including allergy relief and nutritional value. Additionally, the practice of beekeeping itself can be therapeutic and rewarding, offering a connection to nature and a sense of accomplishment.

In summary, beekeeping and honey production in Ireland provide multifaceted benefits, contributing to ecological health, economic prosperity, and social well-being. By supporting

pollination, enhancing biodiversity, and fostering community engagement, beekeeping plays a crucial role in sustainable development and environmental stewardship in Ireland.

- Stream and Pond on site

If the works on site were to be retained, the applicant has stated that he can undertake measures to remove any nutrient enrichment identified in the stream within the centre of the site. The applicant has also stated that he can leave the existing pond on the site in place in its existing condition, or work with the Council to make whatever modifications to the pond which may be required. The applicant's objective is for the site to be a suitable overall condition to support biodiversity, and he is hence content to work with the Council on any recommended works which may be required.

- Fenced paddock proposal

The defendant David O'Toole intends to host a fenced paddock area comprising of approximately 0.5 acres near the boundary of the existing building in his ownership adjacent to the subject site. David O'Toole hopes to accommodate a small pony for his daughter within the paddock. The paddock area would represent less than half of the total site area.

This proposal, combined with the beehive area, hawthorn hedging along the site boundaries, and the extensive tree planting coverage, would mean that the site has no intended future use for permanent built facilities or significant human disturbance of any kind, and that the site as a whole can be a valuable and vibrant area for biodiversity.

4.4 Mitigation Measures

The aim of this chapter is to develop strategies to avoid, minimise, mitigate, or compensate for adverse environmental impacts. This includes modifying the project design, implementing control measures, and developing monitoring plans. The output is a mitigation plan that outlines specific measures to address each identified impact, including responsibilities and timelines.

- As described previously, David O'Toole has stated that good construction site hygiene has been employed when external infill was used to prevent the introduction and spread of problematic invasive alien plant species (e.g. Rhododendron, Japanese Knotweed, Giant Rhubarb etc.);
- David O'Toole has stated that infill material used on site which was sourced externally was from local, known sources that were free of any invasive species;
- For the wildflower meadow, periodic mowing or grazing helps control aggressive species and maintain the diversity of the meadow. Management should avoid using chemical fertilisers and pesticides to preserve the natural balance;

- Monitoring and maintenance of the site would include regularly monitoring the meadow for invasive species and managing them appropriately. Over time, it is important to adjust management practices to enhance meadow health and biodiversity.

4.5 Potential impacts of infill material being retained on site

Whilst the defendant David O'Toole now recognises that the infill works carried out on the site were unauthorised, he wishes to put forward the case that removal of the fill material as per the enforcement notice of the Council would be detrimental to the local environment. Furthermore, David O'Toole states that the further tree planting and vegetation that he wishes to implement on site depend on the current infill works being retained.

The section of the report lists any potential impacts arising from the infill works development and the likely potential impacts, if any, on designated European Sites within the zone of influence of the development, in view of their conservation objectives (qualifying interests). The table below outlines this list of potential impacts.

Potential direct or indirect impacts and zone of impact of the potential effects	Are there any designated European sites within the Zone of Influence?
Habitat loss Habitat loss will be confined to the lands within the boundary of the subject lands.	No. There are no designated European sites within the boundary of the subject lands.
Habitat degradation as a result of hydrological impacts Habitats and species downstream of the subject site.	Yes, a potential impact to be further analysed. Cregganna Marsh SPA, Galway Bay Complex SAC, and Inner Galway Bay SPA are of particular consideration here.
Habitat degradation as a result of hydrogeological impacts Groundwater-dependant habitats, and the species those habitats support, in the local area that lie downgradient of the subject site.	Yes, a potential impact to be further analysed. Cregganna Marsh SPA, Galway Bay Complex SAC, and Inner Galway Bay SPA are of consideration here.
Habitat degradation as a result of air quality impacts Habitat areas within potentially several kilometres of the emissions location, depending on emission concentrations and environmental conditions such as prevailing wind direction.	No. This is primarily due to the nature and characteristics of the infills works development. Post infilling, the applicant is not proposing any permanent built structures on the land, and instead to enhance biodiversity on the site. Emission concentrations will henceforth be effectively zero.
Disturbance and displacement impacts Potentially up to several hundred metres from the boundary of the lands, dependent upon the predicted levels of noise, vibration and visual disturbance associated with the retention development, in conjunction with the sensitivity of the qualifying interest species to disturbance effects.	No. This is primarily due to the nature and characteristics of the infill works development, and the fact that no further construction activity is henceforth required on site. Noise, vibration and visual disturbance will now be effectively zero.

Cumulative impacts How the infill works development may act in combination with other developments in the locality to produce potential impacts.	No cumulative impacts likely. The surrounding environment features a number of single dwellings and their curtilages. The infill works development does not feature similar characteristics to such other development in the area, and hence does not act in combination with such development.
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Table 1: Potential direct or indirect impacts of retaining the deposition material on the site.

This section provides a detailed analysis of the potential for hydrological connectivity between the site of the infill works and the aforementioned designated European sites, by analysing the context and characteristics of the deposition material and infill works. The potential hydrological connectivity routes from this proposal are principally via any flooding episodes or any pollution events. There is no potential for flooding at this site as there are no permanent built structures to impede the natural soakage of water into the ground or into the stream running through the subject site. Post infill, there are no construction activities required. This section considers effects on the hydrological and hydrogeological characteristics of the site, which can include:

- Potential impacts on water quality (including both surface water and groundwater bodies) and assessment of risks from chemical pollution or sedimentation;
- Assessment of flood risk, and the potential for direct and indirect impacts of the retention development on flood risk at the site;
- Impacts on flow regimes, water quality or the geomorphological characteristics of watercourses; and
- The potential for the deposition of material and infill works to impact groundwater dependent terrestrial ecosystems.

In this context, it is important to analyse the potential hydrological impacts of the infill works development on the conservation objectives of the Cregganna Marsh SPA, Galway Bay Complex SAC, Inner Galway Bay SPA and the groundwater dependent designations. The local hydro-geological regime in the vicinity of the subject site contributes to, and supports, the marine habitats of the latter two named designations above and their qualifying interests and conservation objectives.

A pollution event, of a sufficient magnitude, has the potential to affect the receiving aquatic and marine environments (either alone or in combination with other pressures on water quality) to an extent that undermines the conservation objectives of these designated European sites. This can be particularly the case for the Cregganna Marsh SPA given its proximity to the subject site, so the potential impacts on this SPA are analysed in detail in the paragraphs below.

Phase 1 Habitat Surveys were undertaken during the months of October and November, the time of year when the Greenland White-fronted Goose (*Anser albifrons flavirostris*) which is the qualifying interest of the nearby Cregganna Marsh SPA, has recently returned to Ireland from its summer breeding residence in western Greenland. The Cregganna Marsh SPA represents one of the strongholds for Greenland White-fronted Goose on the island of Ireland. From the analysis of the Phase 1 Habitat Survey, there is no evidence of the subject site itself supporting the presence of this species.

The Greenland White-fronted Goose has been of conservation concern for many years. Threats to the conservation interests of this bird include habitat loss from drainage, inappropriate development, and disturbance. Habitat loss and degradation are major global threats to Greenland White-fronted Geese. In particular, disturbance by humans, wetland habitat degradation due to drainage, peat-extraction and changing management practices are threats to the feeding and roosting habitats used by this species across its range. Collision impacts with inappropriately located wind energy developments are identified as a potential threat, with a prerogative on appropriate survey and impact assessment. It is in relation to these threats to the Greenland White-fronted Goose, and the habitats of the Cregganna Marsh SPA that it depends on, that the subject site and the works undertaken within the subject site are to be henceforth considered.

The defendant David O'Toole has infilled in portions of the subject site with selected material, and he has provided information for the purposes of this document on the infill works carried out to date. These details have been provided in Chapter 2 of this report. From three surveys of the site area, it does not appear that the infill works have unduly interfered with or contaminated the small stream running through the site. There was no debris or obstacles to the flow of the water in the stream visible during the site surveys. Vegetation has grown over in the infill areas (figure 9 below), and there are no obvious slopes on the site, apart from the depression in which a small pond of water exists.



Figure 9: The land of the subject site now is covered by thick vegetation including some young trees which the applicant has planted (image taken on 19/06/2024).

The works undertaken do not result in any habitat loss from drainage. The site area does not function as a wetland, and hence there is no wetland degradation in evidence due to drainage or otherwise. There are no permanent built structures in place on the site, nor or any proposed. It is the intention of the defendant David O'Toole to have the site in question to help and boost biodiversity in the locality, particularly given the site's proximity to Cregganna Marsh SPA.

The human disturbance was temporary and limited to the infill works. There is no on-going human disturbance within the site as there are no built or permanent structures with human occupancy on the site, or tarmacked laneways to facilitate vehicular movement. There hence seem to be no threats to the feeding or roosting habitats of the Greenland White-fronted Goose in Cregganna Marsh SPA from the retention of the infill on this site. Figure 10 below shows the habitats of this SPA, as viewed from the subject site.



Figure 10: The boundary fence separating the subject site from neighbouring lands, with the Cregganna Marsh SPA in the background. The tall grasses within the subject site are in evidence (image taken on 04/06/2024).

The possible retention of the works will not remove habitat for the qualifying interests of the Cregganna Marsh SPA, in terms of the key species, namely the Greenland White-fronted Goose. In contrast, the semi-natural landscape of the existing site (and its ongoing proposed measures for biodiversity enhancement – see Section 4.2) are likely to complement the adjacent habitats of the SPA. The subject site is hence free from built development, and from the perspective of the defendant David O'Toole it is focused on biodiversity enhancement. This means that the Cregganna Marsh SPA has a significant portion of land to its southwest free from human disturbance, and favourable to biodiversity enhancement.

The conservation objective of the SPA is to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA, namely the Greenland White-fronted Goose. The potential pathways from the subject site are not deemed to be significant in terms of a threat to these conservation objectives, and indeed for the reasons above, the nature of the subject site should support this conservation objective.

Having regard to the location of the subject site close to the boundary of the Cregganna Marsh SPA, potential effects are also considered here. At the time of the three site surveys, a walk around the perimeter and internal space of the site was undertaken. There was some evidence of surface water present on the land, which was not surprising given the periods of

heavy rain preceding the visits in mid-October and early November 2023. No surface water was evident during the site survey in June 2024. It was observed that there was quite a level site, most likely assisted by infill works, with no obvious sloping apart from the small depression for the aforementioned pond of water. There also seems to be little difference in the heights of the subject lands and the neighbouring lands.

There is one small stream which runs through the site, generally during winter and spring months, with water drying up by the months of May or June (see figure 11(a) & (b) below), and hence there can be an ecological conduit from the subject site to the designated SPA in the form of gravity flow. David O'Toole has stated that he has previously improved its drainage, and he has installed piping under an access crossing to facilitate the movement of the stream water. The stream seems to move underground where the subject site has its boundary with adjacent agricultural lands between it and the SPA lands.

If the infill works were retained, David O'Toole has stated that he intends to clean up any excessive nutrient enrichment that exists within the stream, and he can work with the relevant team(s) of Galway County Council to undertake this as required. Upon inspection during the site surveys, as noted previously the stream does not appear to have any debris from the previous infill works, and the stream has an unobstructed pathway through the subject site. Hence the infill works appear to have not resulted in producing a potential pathway in hydrological terms that would negatively affect the qualifying interests and conservation objectives of the range of SACs and SPAs under consideration in this report.





Figure 11: (a) the stream's water that flows through the centre of the subject site is evident in Autumn and Winter, but as seen in photograph (b), it tends to dry up in the summer months (images taken on 16/10/2023 and 19/06/2024).

The second pathway is a potential pollution risk from the site related to any flooding episodes related to the subject site. As noted previously, the site is quite level overall with no obvious sloping of the land apart from the pool area. During the survey, there was analysis of the surrounding environment, comprising of existing dwellings and their curtilages, tree cover, agricultural fields close to and adjacent to the subject site. There is no wastewater treatment system associated with these works, or any facility which could potentially add pollutants to the nearby Cregganna Marsh SPA or other designated European sites considered in this report within the vicinity of the subject site. During heavy rain episodes on the subject site, rainwater can soak underground easily without any building impediments or be transferred via the existing stream towards the Cregganna Marsh SPA.

It is hence not expected that a pathway can exist in terms of a potential pollution risk from flooding, as accumulation of water on this site can readily be avoided. Moreover, it was noticed during the second survey on 8th November 2023 that surface water had accumulated within the boundary of the Cregganna Marsh SPA which was not in evidence during the first survey work on 16th October 2023. After a period of rain in the second half of October, water can accumulate in the freshwater marsh environment of the SPA, including taking water from surrounding lands. Hence, the subject site is not considered to be at reasonable risk from

flooding, and the infill works do not seem to pose a pollution risk to the habitats of the Cregganna Marsh SPA.

The cumulative impact of the infill works is negligible considering the nature and type of the development. The subject site is primarily focused on enhancing and supporting biodiversity, and these lands can act to support the habitat and wildlife of the Cregganna Marsh SPA. The site does not host residential, commercial, or any permanent buildings, and so it does not act in a cumulative manner with built development in the area. Based on the site analysis and the information put forward by the client David O'Toole, it can be concluded that the works, individually or in-combination with other plans or projects, would not have a likely significant effect on the integrity and qualifying interests / conservation objectives of the Cregganna Marsh SPA, Galway Bay Complex SAC, Inner Galway Bay SPA, or other designated European sites within its zone of influence.

It was noted in Section 3.2 that the qualifying interests of the Inner Galway Bay SPA feature numerous listed bird species, and the conservation objectives of the Galway Bay Complex SAC aim to protect the habitats associated with these bird species. The conservation objective of the SPA is to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. The potential pathways from the subject site are not deemed to be significant in terms of a threat to these conservation objectives.

5. Potential Impacts of Removing the Infill Material

5.1 Introduction

The defendant David O'Toole understands that the deposition of material (soil, stone etc.) and the infilling works at the subject site was unauthorised work and which would have required planning permission from the Planning Authority of Galway County Council. However, David O'Toole is of the opinion that removing the material at this point would be disruptive and damaging to the local environment, and the biodiversity that has been established on the site. David O'Toole also believes that removing the material at this stage would greatly undermine his attempts at further improving the biodiversity value through further native tree planting and bee hive establishment on the site.

Removing large amounts of infill material from a grass meadow such as that in the ownership of Roisin O'Toole, Niall O'Toole, Saoirse O'Toole at Cregganna Beg, can have several potential environmental and ecological impacts, which are put forward and analysed in this section. Firstly, the next section details the likely actions involved on site if the removal works had to proceed on the site.

5.2 Likely Actions on Site to Remove Material

The removal of large amounts of soil and stone material from meadowland would involve a series of steps and actions. The following is a detailed breakdown of the possible process:

Site Assessment and Planning:

- Conduct a survey to determine the extent and volume of material to be removed;
- Evaluate the environmental impacts of the material removal;
- Develop a plan that includes timelines, equipment needs, and safety measures.

Site Preparation:

- Clear vegetation and any obstacles from the area;
- Mark boundaries and set up erosion control measures such as silt fences or sediment basins to prevent runoff.

Excavation:

- Use heavy machinery like excavators, bulldozers, and backholes to remove soil and stone;
- Employ dump trucks to transport the excavated material to designated disposal sites or for reuse.

Sorting and Processing:

- If necessary, separate soil and stone material;
- Screen and crush stone material for reuse in construction or landscaping projects.

Transportation:

- Load the material onto trucks for transportation;
- Ensure safe transport routes and minimise disruption to surrounding areas.

Site Restoration:

- Level and grade the area to desired specifications. The current level of the subject site with the deposition material and infill is approximately the same as neighbouring lands;
- Implement soil stabilization techniques such as mulching, seeding, or laying sod to prevent erosion;
- Restore vegetation and habitat as per environmental regulations and guidelines.

Waste Management:

- Dispose of unusable material in designated landfills or recycling facilities;
- Manage any hazardous materials according to environmental regulations.

Monitoring and Maintenance:

- Regularly monitor the site for signs of erosion or settling;
- Maintain erosion control measures until vegetation is established and the site is stable.

Documentation and Reporting:

- Keep detailed records of all activities, including volume of material removed, disposal methods, and site restoration efforts.

Each step involves coordination with multiple stakeholders including haulage contractors and Galway County Council. Proper planning and execution are crucial to minimise environmental impact and ensure the project is completed efficiently and safely. Hence, there would be much work, and likely environmental disruption and potentially damage during such a process.

5.3 Potential Impacts of Removing the Deposited Material

There are numerous potential impacts of the possible removal of the deposited material and infill works from this subject site, and these potential impacts are listed below:

(a) Soil Structure and Stability

- Erosion: the removal of infill material can disrupt the soil structure, making the area more susceptible to erosion by wind and water. Figure 12 shows the state of the lands prior to the infill works being completed, and the possible removal works could produce a similar visual scenario;
- Soil compaction: heavy machinery used in the removal process can compact the soil, reducing its porosity and permeability, which can negatively affect root growth and water infiltration.



Figure 12: The state of the lands upon the commencement of the infill works (image provided by the defendant David O'Toole).

(b) Hydrology

- **Water Retention:** infill removal can alter the grass meadow's ability to retain water, leading to changes in the local water table and potentially causing drying out of the area or waterlogging;
- **Surface Runoff:** changes in soil structure and stability can increase surface runoff, potentially leading to downstream flooding and sedimentation in nearby water bodies.

(c) Vegetation

- **Plant Damage:** Existing vegetation may be uprooted or damaged during the removal process, leading to a loss of plant cover and biodiversity;
- **Invasive Species:** Disturbed soils can provide an opportunity for invasive species to establish themselves, outcompeting native flora and altering the ecosystem balance;
- **Recovery Time:** Natural recovery of the vegetation may take a long time, especially if native seed banks are disturbed or depleted.

(d) Wildlife Habitat

- **Habitat Disruption:** Many species rely on meadow habitats for food, shelter, and breeding. Removing infill can destroy these habitats, leading to displacement or loss of wildlife. The land would have a similar appearance, devoid of cover, as was the case during the period of the infill works (see figure 13);
- **Food Sources:** The loss of plant species can reduce food availability for herbivores, which in turn can affect predator species.



Figure 13: The loads of material (soil, stone, etc.) ready to be rolled to level the site during the infill works (image provided by the defendant David O'Toole).

(e) Microbial Communities

- **Soil Microbes:** Soil microorganisms, which play a critical role in nutrient cycling, may be adversely affected by soil disturbance and compaction;
- **Fungal networks:** Mycorrhizal fungi, which form symbiotic relationships with plant roots, could be disrupted, affecting plant health and soil fertility.

(f) Carbon Sequestration

- **Carbon Release:** Disturbing the soil can release stored carbon dioxide into the atmosphere, contributing to greenhouse gas emissions;
- **Reduction in Sequestration:** The loss of vegetation reduces the meadow's capacity to sequester carbon, affecting long-term carbon storage.

(g) Aesthetic and Recreational Value

- **Visual Impact:** The removal of infill and associated vegetation can degrade the visual appeal of the meadow, reducing its recreational value for activities like walking, bird watching, and picnicking;
- **Noise and Dust:** The process of removing infill can generate noise and dust, impacting local wildlife, in addition to the enjoyment of the area by visitors and potentially affecting nearby residential areas.

5.4 Mitigation Strategies

To mitigate these impacts, careful planning and management practices are essential:

- **Phased Removal:** Gradually removing infill can help minimise soil and vegetation disturbance;
- **Erosion Control Measures:** Implementing silt fences, erosion blankets, and re-vegetation can help stabilise soils;
- **Use of Low-Impact Equipment:** Choosing machinery that minimises soil compaction and disturbance;
- **Rehabilitation Plans:** Developing and implementing plans for re-vegetation and habitat restoration post-removal;
- **Monitoring and Adaptive Management:** Regularly monitoring the impacted area and adjusting management practices based on observed outcomes.

By considering these factors and implementing appropriate mitigation strategies, the negative environmental and ecological impacts of infill removal from a grass meadow can be minimised somewhat, although there is likely to be some or all of the potential impacts listed previously, at least to some degree.

6. Review and Conclusions

6.1 Summary of Assessment

This Environmental Impact Analysis report has provided an assessment of the background and methods to this report, including desktop studies and information gathered through three site surveys, local habitat analysis, and extensive correspondence with the defendant David O'Toole. It provides a description of the infill works, including the site location and description of the site boundaries and surrounding area. The document has identified and described all the designated European sites within the likely zone of impact. The document provides an assessment of any cumulative or in-combination effects, and potential direct or indirect effects on the designated European sites under consideration if the deposition material and infill works were to be retained on site. It also lists the likely works required and the potential impacts if the material was to be removed from the site. The document includes a habitat survey analysis and mapping of the surrounding environment towards the end of the report in Appendix I.

6.2 Determination of Potential Impacts

For any development in the area, there are potential risks to the designated European sites in terms of water quality deterioration, and thus interference of the habitats of the Cregganna Marsh SPA, Inner Galway Bay SPA and Galway Bay Complex SAC. In this regard, in terms of any flooding or pollution risk, this document concludes that the pathways for the deposition material to interfere with the conservation objectives of the designated European sites under consideration are either not existing or can be successfully mitigated or blocked. The infill activity seems not to have contaminated or obstructed the flow of water within the stream on the site.

The defendant David O'Toole has commenced a small native tree planting program on the site which he intends to complete if the infill works were to be retained. Alongside proposed bee keeping activity and associated bee friendly trees, David O'Toole intends to enrich and further improve the biodiversity potential on this site and hence to support the habitats of the nearby Cregganna Marsh SPA. He has stated that he has witnessed some considerable biodiversity improvements on these lands since the infill works; e.g. a large covering of flowering plants in the month of May 2024, and during June 2024, as noted previously David O'Toole took photographs of marsh harrier birds flying very close to these lands (figure 14 below). David O'Toole wishes to keep the land of the subject site free of any permanent built structures, and hence there will be no in-combination or cumulative impact with residential or commercial development in the surrounding area.



Figure 14: The defendant David O'Toole identified marsh harrier birds in close proximity to the subject lands in June 2024 (image courtesy of defendant David O'Toole).

Therefore, it is concluded that the infill works, by itself or in combination with other development in the vicinity, is not deemed to have any significant negative effects on the designated European sites under consideration, their qualifying interests or conservation objectives. If the infill works are retained, the site itself should continue have a positive impact on biodiversity and natural habitats in the locality and support the Cregganna Marsh SPA in this respect.

The defendant David O'Toole recognises and understands that the infill works is stated as unauthorised development by the Planning Authority of Galway County Council. However, there may be potential that removing all the loads of infill at this stage could disrupt and damage the local environment, including the habitats of the nearby Cregganna Marsh SPA. Removing the infill works would also have the potential to damage and disrupt the noted biodiversity of flora and fauna that seems to have successfully developed on the subject site since the infill works were implemented.

The defendant David O'Toole therefore hopes that an agreement can be found where the infill works would be retained on the subject site. Thereafter, David O'Toole would be willing to work with the Planning Authority on aspects within the site that the Council see as necessary to maintain the ecological qualities that have developed on the site. He would also be willing to work with the Planning Authority to improve other elements on the site that the Planning Authority may identify to further promote valuable natural habitats on the site, and to protect the nearby Cregganna Marsh SPA and related local environments.

Appendix I: Habitat Survey and Mapping

A map of the habitats and artificial surfaces in the surrounding environs of the subject site is shown on the following page. The legend to accompany the map is contained in the table below. In the map, the site boundaries are shown in red colour. Figures 14 and 15 show key examples of the habitat and landscape types shown overleaf. Figure 16 shows the existing roadway to access the subject site, and its tree-lined boundary to this road. Within Cregganna Marsh SPA, the habitats consist of lowland wet grassland, improved grassland, limestone pavement, hazel scrub, freshwater marsh, drainage ditches, and dry grassland. Many of these habitats are highlighted in the mapping overleaf.



Figures 14: The mix of habitats that make up the area of the Cregganna Marsh SPA, as viewed from the subject site (image taken on 08/11/2023).



Figure 15: The habitats of the Cregganna Marsh SPA are bordered to the south by a network of fields and hedgerows (image taken on 08/11/2023).

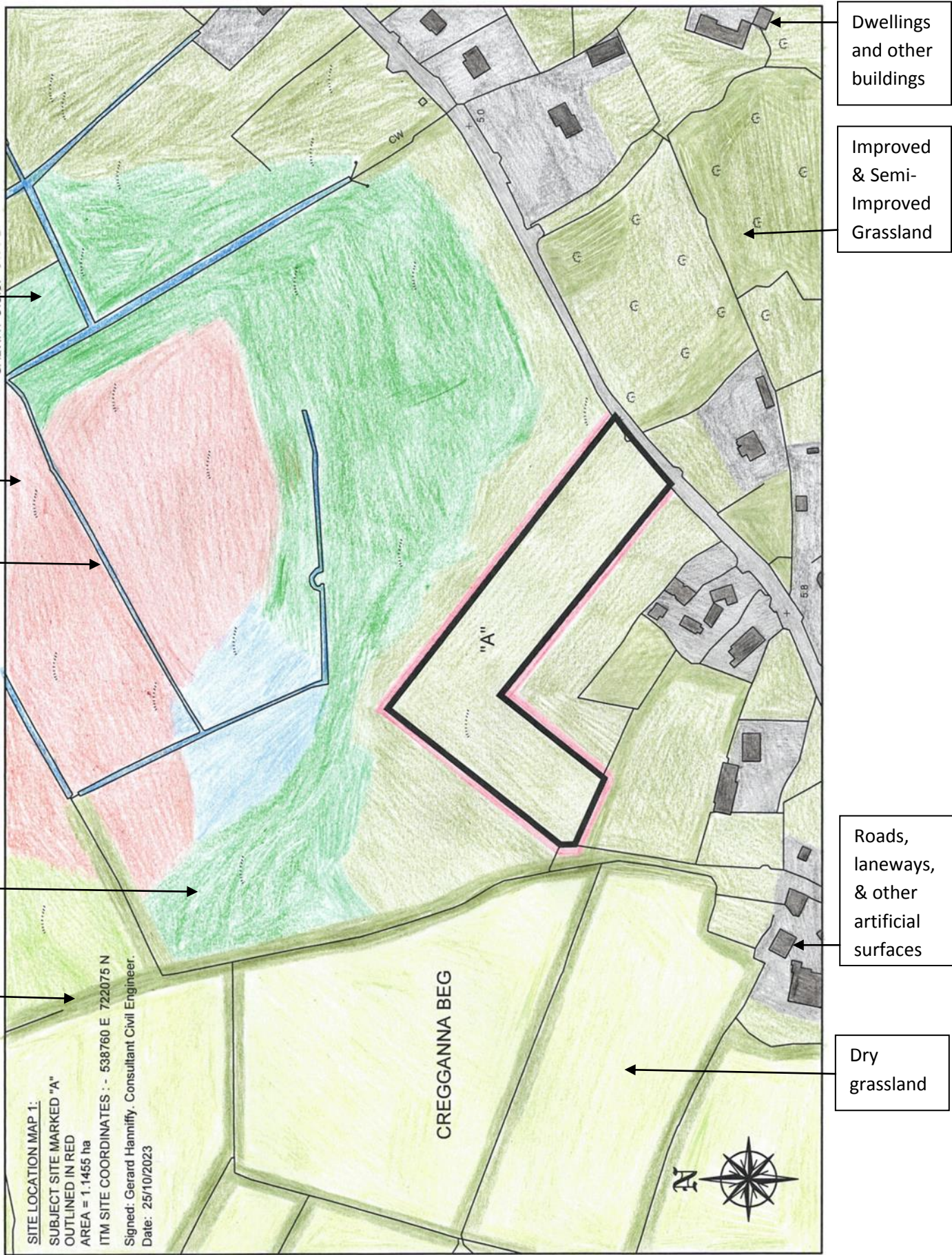


Figure 16: To the south of the Cregganna Marsh SPA is the narrow roadway lined with hedgerows and trees to serve the dispersed dwellings in the area (image taken on 08/11/2023).

Map Legend

Colour	Habitat Type
	Dry Grassland
	Trees and Hedgerows
	Freshwater Marsh
	Roads, laneways, and other artificial surfaces
	Dwellings and other buildings
	Improved & Semi-Improved Grassland
	Freshwater Marsh
	Hazel Scrub
	Lowland Wet Grassland
	Outline of Applicant's Site

Habitat Mapping (overleaf; map to be read in landscape view)



Appendix I: Qualifying Interests, Conservation Objectives and Site Synopses of Designated European Sites

This section shows the qualifying interests, conservation objectives, and the site synopses of each designated Special Protection Area (SPA) and Special Conservation Area (SAC) within 15km of the subject site.

Cregganna Marsh SPA [site code: 004142]

Qualifying Interest

Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]

Site Synopsis

Cregganna Marsh is situated about 3 km south of Oranmore, to the west of the Galway - Ennis road. The predominant habitats on the site are lowland wet grassland and improved grassland, but areas of limestone pavement and other exposed rock, Hazel (*Corylus avellana*) scrub, freshwater marsh, drainage ditches and dry grassland are also represented. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose.

The site is of major conservation importance as a feeding site for a nationally important flock of Greenland White-fronted Goose (157 – 5 year mean peak between 1994/95 and 1998/99). The birds using this site form part of the Rahasane flock. Cregganna Marsh SPA is of ornithological importance because it is regularly utilised by a nationally important flock of Greenland White-fronted Goose, a species listed on Annex I of the E.U. Birds Directive.

Lough Fingall Complex SAC [site code: 000606]

Qualifying Interests

Turloughs [3180] Alpine and Boreal heaths [4060]

Juniperus communis formations on heaths or calcareous grasslands [5130]

Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]

Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]

Limestone pavements [8240] *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]

Conservation Objectives

3180 Turloughs

To restore the favourable conservation condition of Turloughs* in Lough Fingall Complex SAC, which is defined by a stated list of attributes and targets.

4060 Alpine and Boreal heaths

To maintain the favourable conservation condition of Alpine and Boreal heaths in Lough Fingall Complex SAC, which is defined as a stated list of attributes and targets.

5130 *Juniperus communis* formations on heaths or calcareous grasslands

To maintain the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Lough Fingall Complex SAC, which is defined by a stated list of attributes and targets.

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)(*important orchid sites)

To restore the favourable conservation condition of semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites) in Lough Fingall Complex SAC, which is defined by a stated list of attributes and targets.

7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*

To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** in Lough Fingall Complex SAC, which is defined by a stated list of attributes and targets.

8240 Limestone pavements

To maintain the favourable conservation condition of Limestone pavements* in Lough Fingall Complex SAC, which is defined by a stated list of attributes and targets.

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To maintain the favourable conservation condition of Lesser Horseshoe Bat in Lough Fingall Complex SAC, which is defined by a stated list of attributes and targets.

Site Synopsis

This site is situated immediately south-east of Ballindeereen in Co. Galway, and within 2-3 km of Galway Bay. It is within the stretch of flat low-lying bare limestones known as the Ardahan limestones, which extend from the foot of the Burren hills northwards towards Craughwell. The site comprises a complex of habitats, the dominant being turloughs and limestone pavement.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [3180] Turloughs* [4060] Alpine and Subalpine Heaths [5130] Juniper Scrub [6210] Orchid-rich Calcareous Grassland* [7210] Cladium Fens* [8240] Limestone Pavement* [1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*).

The turloughs at this site are oligotrophic (nutrient-poor) and calcareous in character. Their catchment areas are relatively small and water tends to remain in them for considerable periods of time. The surface waters usually occupy distinct separate basins in most years but during extreme floods these can be linked together as one large expanse of open water. Taken together these turloughs represent one of the largest expanses of oligotrophic turlough vegetation in the country. Ballinderreen turlough occupies a flat limestone pavement basin and supports extensive areas of Black Bog-rush (*Schoenus nigricans*) and sedge (*Carex* spp.) fen vegetation.

Marl ponds occur in the lower lying parts, with Shoreweed (*Littorella uniflora*), Bulbous Rush (*Juncus bulbosus*), Many-stalked Spike-rush (*Eleocharis multicaulis*), Alternate Water-milfoil (*Myriophyllum alternifolium*), along with a little Horned Pondweed (*Zannichellia palustris*) and stonewort (*Chara hispida* var. major). Rare plants found at this turlough include Fen Violet (*Viola persicifolia*), a Red Data Book species, Water Germander (*Teucrium scordium*) and Marsh Fern (*Thelypteris palustris*).

A smaller area to the south-east of Ballinderreen, Frenchpark turlough, contains a Black Bog-rush/Purple Moor-grass (*Molinia caerulea*) stand with patches of Great Fensedge (*Cladium mariscus*) within it. Cuilidooish turlough is of linear shape with a high central section. It has level limestone pavement forming its eastern side and is aligned and lies parallel with Lough Fingall, which is effectively also a turlough.

There is much Buckthorn (*Rhamnus catharticus*) scrub here and at the northern end of the main lake. Carraghadoo turlough has a shallow basin without standing water in summer and with less peat. Creeping Willow (*Salix repens*) and Common Sedge (*Carex nigra*) are the main species here. The shores of Tullaghnafrankagh Lough flood during winter and have a similar, if slightly more eutrophic (nutrient-rich), vegetation.

Alder Buckthorn (*Frangula alnus*), a Red Data Book species, grows on sloping limestone pavement close to the limit of winter flooding in several places. Limestone pavement occurs throughout the site. It varies from the classic bare open pavement, with little vegetation, to pavement and shattered limestone blocks interspersed with calcareous grassland, heath, turlough and scrub.

A rich and diverse flora occurs, with many of the typical Burren species represented - Bloody Crane's-bill (*Geranium sanguineum*), Herb-Robert (*G. robertianum*), Rustyback (*Ceterach officinarum*), Burnet Rose (*Rosa pimpinellifolia*) and Wood Sage (*Teucrium scorodonia*), along with some rarer species such as Spring Gentian (*Gentiana verna*) and Mountain Avens (*Dryas octopetala*). Orchid species present in areas of calcareous grassland at the site include Fly Orchid (*Ophrys insectifera*), Lesser Butterfly-orchid (*Platanthera bifolia*), Early-purple Orchid (*Orchis mascula*) and several *Dactylorhiza* species.

In the past, the scarce Denseflowered Orchid (*Neotinea maculata*) has been recorded from the site. Lough Fingall, Cloghballymore Lough and Cahernalinsky Lough are shallow infilling lakes with stands of Great Fen-sedge and other fen and wetland vegetation such as Common Reed (*Phragmites australis*) and Tufted-sedge (*Carex elata*). Juniper scrub and lowland alpine heath occur in close association with one another.

The juniper scrub is dominated by Juniper (*Juniperus communis*), with Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and rose (*Rosa* spp.) species. Lowland alpine heath is characterised by Bearberry (*Arctostaphylos uva-ursi*) and Mountain Avens, a rare vegetation type known from a few areas in the Burren, the Lough Fingall area and the Moycullen area near Lough Corrib.

Cloghballymore House provides a summer breeding site for the Lesser Horseshoe Bat, a species listed on Annex II of the E.U. Habitats Directive. The bats use the large roof space, although a smaller number roost in a boiler house, gaining access by means of gaps around the pipes. The surrounding mixed woods provide suitable foraging habitat within a short radius of the day roost site. In 1993 more than 200 bats were counted at this site, which makes it of international importance. The site is of local importance for wintering waterfowl, particularly Lapwing (max. count 381 in 1995/96), with 6 breeding pairs recorded in 1996. Some scarce invertebrate species have been recorded from the Lough Fingall area.

The main land use in the site is cattle grazing, which is mostly of light to moderate intensity. Clearance of limestone pavement and scrub has taken place in the past and burning is a threat to the heath habitats. A drainage scheme to relieve exceptional flooding has been implemented recently. There are no immediate threats facing the bat population. This site is of great conservation importance for the presence of six E.U. Habitats Directive habitats, including four priority habitats. The transitions and gradations between habitats, for example between turloughs, lakes and limestone pavement, gives rise to a range of physical conditions that favour many uncommon species. In addition, the site supports an internationally important population of Lesser Horseshoe Bats.

Inner Galway Bay SPA [site code: 004301]

Qualifying Interests

Black-throated Diver (*Gavia arctica*) [A002] Great Northern Diver (*Gavia immer*) [A003]
Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028]
Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Wigeon (*Anas penelope*) [A050]
Teal (*Anas crecca*) [A052] Red-breasted Merganser (*Mergus serrator*) [A069]
Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140]
Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149]
Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160]
Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169]
Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Common Gull (*Larus canus*) [A182]
Sandwich Tern (*Sterna sandvicensis*) [A191] Common Tern (*Sterna hirundo*) [A193]
Wetland and Waterbirds [A999]

Conservation Objectives

To maintain the favourable conservation condition of numerous bird species shown below in Inner Galway Bay SPA, which is defined by a stated list of attributes and targets.

A003	Great Northern Diver	<i>Gavia immer</i>	A017	Cormorant	<i>Phalacrocorax carbo</i>
A028	Grey Heron	<i>Ardea cinerea</i>	A046	Brent Goose	<i>Branta bernicla hrota</i>
A050	Wigeon	<i>Anas Penelope</i>	A052	Teal	<i>Anas crecca</i>
A056	Shoveler	<i>Anas clypeata</i>	A069	Red-breasted Merganser	<i>Mergus serrator</i>
A137	Ringed Plover	<i>Charadrius hiaticula</i>	A140	Golden Plover	<i>Pluvialis apricaria</i>
A142	Lapwing	<i>Vanellus vanellus</i>	A149	Dunlin	<i>Calidris alpina alpina</i>
A157	Bar-tailed Godwit	<i>Limosa lapponica</i>	A160	Curlew	<i>Numenius arquata</i>
A162	Redshank	<i>Tringa totanus</i>	A169	Turnstone	<i>Arenaria interpres</i>

A179	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	A182	Common Gull	<i>Larus canus</i>
A191	Sandwich Tern	<i>Sterna sandvicensis</i>	A193	Common Tern	<i>Sterna hirundo</i>
A999	Wetlands				

Site Synopsis

Inner Galway Bay SPA is a very large, marine-dominated site situated on the west coast of Ireland. The inner bay is protected from exposure to Atlantic swells by the Aran Islands and Black Head. Subsidiary bays and inlets (e.g. Poul-na-clough, Aughinish and Kinvarra Bays) add texture to the patterns of water movement and sediment deposition, which lends variety to the marine habitats and communities. The terraced Carboniferous (Viséan) limestone platform of the Burren sweeps down to the shore and into the sublittoral. The long shoreline is noted for its diversity, and comprises complex mixtures of bedrock shore, shingle beach, sandy beach and fringing salt marshes. Intertidal sand and mud flats occur around much of the shoreline, with the largest areas being found on the sheltered eastern coast between Oranmore Bay and Kinvarra Bay.

A number of small islands and rocky islets in the Bay are included within the site. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Black-throated Diver, Great Northern Diver, Cormorant, Grey Heron, Light-bellied Brent Goose, Wigeon, Teal, Redbreasted Merganser, Ringed Plover, Golden Plover, Lapwing, Dunlin, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull, Common Gull, Sandwich Tern and Common Tern.

The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. Inner Galway Bay supports an excellent diversity of wintering wetland birds, with divers, grebes, cormorants, dabbling duck, sea duck and waders all well represented.

There are internationally important wintering populations of Great Northern Diver (88) and Light-Bellied Brent Goose (676) and nationally important wintering populations of an additional sixteen species i.e. Black-throated Diver (36), Cormorant (266), Grey Heron (102), Wigeon (1,168), Teal (700), Red-breasted Merganser (249), Ringed Plover (335), Golden Plover (2,030), Lapwing (3,969), Dunlin (2,155), Bartailed Godwit (447), Curlew (697), Redshank (505), Turnstone (182), Black-headed Gull (1,941) and Common Gull (1,066) - all figures given are five year mean peaks for the seasons 1995/96 to 1999/2000. Of note is that the populations of Red-breasted Merganser and Ringed Plover represent 6.8% and 2.3% of the respective all-Ireland totals.

Other species which occur in notable numbers include Little Grebe (35), Long-tailed Duck (21), Scaup (44) and Herring Gull (216). In addition, the following species also use the site: Great Crested Grebe (16), Mallard (200), Common Scoter (87), Oystercatcher (576), Grey Plover (60), Black-tailed Godwit (46), Mute Swan (150) and Great Black-backed Gull (129). The site provides both feeding and roost sites for most of the species. Little Egret, a species which has recently colonised Ireland, also occurs at this site.

The site has several important populations of breeding birds, most notably colonies of Sandwich Tern (81 pairs in 1995) and Common Tern (98 pairs in 1995 on Green Island and 46 pairs in 2001 on Mutton Island). A large Cormorant colony occurs on Deer Island - this had 200 pairs in 1985 and 300 pairs in 1989.

Inner Galway Bay SPA is of high ornithological importance with two wintering species having populations of international importance and a further sixteen wintering species having populations of national importance. The breeding colonies of Sandwich Tern, Common Tern and Cormorant are also of national importance. Also of note is that six of the regularly occurring species are listed on Annex I of the E.U. Birds Directive, i.e. Black-throated Diver, Great Northern Diver, Golden Plover, Bar-tailed Godwit, Sandwich Tern and Common Tern. Inner Galway Bay is a Ramsar Convention site and part of the Inner Galway Bay SPA is a Wildfowl Sanctuary.

Galway Bay Complex SAC [site code: 000268]

Qualifying Interests

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 (*Glauco-Puccinellietalia maritimae*) [1330]
Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
Turloughs [3180] *Juniperus communis* formations on heaths or calcareous grasslands [5130]
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]
Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]
Alkaline fens [7230] Limestone pavements [8240] *Lutra lutra* (Otter) [1355]
Phoca vitulina (Harbour Seal) [1365]

Conservation Objectives

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation of mudflats and sandflats not covered by seawater at low tide in Galway Bay Complex SAC, which is defined by a stated list of attributes and targets.

1150 Coastal lagoons

To restore the favourable conservation condition of coastal lagoons in Galway Bay Complex SAC, which is defined by a stated list of attributes and targets.

1160 Large shallow inlets and bays

To maintain the favourable conservation condition of large shallow inlets and bays in Galway Bay Complex SAC, which is defined by a stated list of attributes and targets.

1170 Reefs

To maintain the favourable conservation condition of reefs in Galway Bay Complex SAC which is defined by a stated list of attributes and targets.

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Galway Bay Complex SAC, which is defined by a stated list of attributes and targets.

1310 Salicornia and other annuals colonising mud and sand

To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in Galway Bay Complex SAC, which is defined by a stated list of attributes and targets.

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Galway Bay Complex SAC, which is defined by a stated list of attributes and targets.

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in Galway Bay Complex SAC, which is defined by a stated list of attributes and targets.

Site Synopsis

Situated on the west coast of Ireland, this site comprises the inner, shallow part of a large bay which is partially sheltered by the Aran Islands. The Burren karstic limestone fringes the southern sides and extends into the sublittoral. West of Galway city the bedrock geology is granite. There are numerous shallow and intertidal inlets on the eastern and southern sides, notably Muckinish, Aughinish, and Kinvarra Bays.

A number of small islands composed of glacial deposits are located along the eastern side. These include Eddy Island, Deer Island, and Tawin Island. A diverse range of marine, coastal and terrestrial habitats, including several listed on Annex I of the E.U. Habitats Directive, occur within the site, making the area of high scientific importance.

Galway Bay South holds a very high number of littoral communities. They range from rocky terraces, to sandy beaches with rock or sand dunes behind. The intertidal sediments of Galway Bay support good examples of communities that are moderately exposed to wave action. A well-defined talitrid zone in the upper shore gives way to an intertidal, mid shore zone with sparse epifauna or infauna. On the lower, flat part of the shore, the tubes of the deposit-feeding terebellid worm, *Janice conchilega*, are common on the surface.

Nereid and cirratulid polychaete worms (*Hediste diversicolor*, *Arenicola marina*), small crustaceans and bivalves (*Angulus tenuis*, *Cerastoderma edule* and *Macoma balthica*) are present. The area has the country's only recorded example of the littoral community characterised by *Fucus serratus* with sponges, ascidians and red seaweeds on tide-swept lower eulittoral mixed substrata. This community has very high species richness (85 species), as do the sublittoral fringe communities on the Finavarra reef (88 species). The rare Purple Sea Urchin *Paracentrotus lividus* and the foliose red alga *Phyllophora sicula* are present at Finavarra, whereas the red alga *Rhodomyenia delicatula* and the rare brown alga, *Ascophyllum nodosum* var. *mackii*, occur in Kinvarra and Muckinish Bays. Sublittorally, the area has a number of distinctive and important communities.

Of particular note is that Ireland's only reported piddock (bivalve mollusc) bed thrives in the shallows of Aughinish Bay. The rare sponge, *Mycale contarenii*, is also found here. There is further interest in an extensive maerl bed of *Phymatolithon calcareum* which occurs in the strong tidal currents of Muckinish Bay. There is also maerl off Finavarra Point and in Kinvarra Bay (*Lithothamnion*

corallioides, *Lithophyllum dentatum* and *Lithophyllum fasciculatum*). An oyster bed in Kinvarra Bay and seagrass (*Zostera* spp.) beds off Finavarra Point are also important features. Other significant habitats which occur include secondary maerl beds and communities strongly influenced by tidal streams.

Saltmarshes are frequent within this extensive coastal site, with both E.U. Habitats Directive types. 'Atlantic Salt Meadow' and 'Mediterranean Salt Meadow' well represented. Most of the saltmarshes are classified as the bay type, with the substrate being mud or mud/sand. There is one lagoon type and one estuary type. Lagoon saltmarshes are the rarest type found in Ireland. The best examples of saltmarsh are located in inner Galway bay, east of a line running between Galway city and Kinvarra.

In this area the coastline is highly indented, thus providing the sheltered conditions necessary for extensive saltmarsh development. Common saltmarsh species include Thrift (*Armeria maritima*), Red Fescue (*Festuca rubra*), Common Scurvygrass (*Cochlearia officinalis*), Lax-flowered Sea-lavender (*Limonium humile*), Common Saltmarsh-grass (*Puccinellia maritima*), Saltmarsh Rush (*Juncus gerardi*) and Sea Rush (*Juncus maritimus*).

On the lower levels of the saltmarshes and within pans there occurs Glasswort (*Salicornia europaea* agg.). A noteworthy feature of the saltmarsh habitat within this site is the presence of dwarfed brown seaweeds in the vegetation. These are also known as "turf fucoids" and typical species include *Fucus* spp., *Ascophyllum nodosum* and *Pelvetia canaliculata*. A number of locally rare vascular plant species also grow in saltmarsh areas within the site. These include Reflexed Saltmarsh-grass (*Puccinellia distans*) and Sea-purslane (*Halimione portulacoides*), which are both relatively rare in the western half of the country.

Shingle and stony beaches can be found throughout the site, with the best examples along the more exposed shores to the south and west of Galway city and to the north and east of Finavarra, Co. Clare. In general, these shingle shorelines are sparsely vegetated and frequently occur interspersed with areas of sandy beach and/or bedrock shore. The associated flora is dominated by plant species of frequently disturbed maritime habitats. To the south and west of Galway city, typical plants include Curled Dock (*Rumex crispus*), Common Couch (*Elymus repens*), Sea Sandwort (*Honkenya peploides*), Sea Beet (*Beta vulgaris* subsp. *maritima*), Sea Mayweed (*Matricaria maritima*), Silverweed (*Potentilla anserina*) and Oraches (*Atriplex* spp.). Two rare plant species are associated with the habitat: Henbane (*Hyoscyamus niger*), a threatened species listed in the Irish Red Data Book, grows on shingle beach to the south of Lough Atalia; there are also old records for the threatened plant species Sea-kale (*Crambe maritima*).

Soft coastal cliffs reaching heights in excess of 10m occur at Rusheen. These support coastal grassland with very sparse vegetation cover. Species recorded include Sea Plantain (*Plantago maritima*), Creeping Bent (*Agrostis stolonifera*), False Oat-grass (*Arrhenatherum elatius*), Cock's Foot (*Dactylis glomerata*), Red Fescue, Common Bird's-foot-trefoil (*Lotus corniculatus*), and the lichens *Ramalina* sp. and *Xanthoria parietina*. They are considered highly representative of the rarer soft type of sea cliffs in Ireland.

An excellent range of lagoons of different types, sizes and salinities occurs within the site. This habitat is given priority status on Annex I of the E.U. Habitats Directive. One unusual type of lagoon, karstic rock lagoon, is particularly well represented. This type of lagoon is common on the Aran Islands, but on mainland Ireland, all but one are confined to this site. Additionally, the best example of all karstic lagoons in the country, Lough Murree, is found at this site.

The flora of the habitat is rich and diverse, reflecting the range of salinities in the different lagoons. It is typically brackish, with two species of Tasselweed (*Ruppia* spp.), two Red Data charophytes *Chara canescens* and *Lamprothamnion papulosum*, and *Chaetomorpha linum*, an alga (all lagoonal specialists). The fauna of the lagoon is also rich, diverse and lagoonal. At least 10 lagoonal specialist species were recorded in 1996 and 1998 from the combined habitat of all the lagoons, which is one of the highest number for any lagoonal habitat in the country. Many of the species appear to be rare. The lagoons within this site are excellent examples of the habitat type and of high conservation importance.

Inner Galway Bay provides extensive good quality habitat for Common Seal (maximum count of 317 in the all-Ireland survey of 2003). This species is listed on Annex II of the E.U. Habitats Directive. The seals use a range of haul-out sites distributed through the bay – these include inner Oranmore Bay, Rabbit Island, St. Brendan's Island, Tawin Island, Kinvarra Bay, Aughinish Bay and Ballyvaughan. The site provides optimum habitat for otter, also an Annex II-listed species.

Galway Bay is a very important ornithological site. The shallow waters provide excellent habitat for Great Northern Divers (35), Black-throated Divers (28), Scaup (39), Long-tailed Duck (27) and Red-breasted Merganser (232). Figures given are peak average maxima over the three winters 1994/95 to 1996/97. All of these populations are of national importance. The intertidal areas and shoreline provides feeding and roosting habitat for wintering waterfowl, with Brent Goose (517) having a population of international importance and a further 11 species having populations of national importance.

Four of the regular wintering species are listed on Annex I of the E.U. Birds Directive – Golden Plover, Bat-tailed Godwit and the two diver species. Breeding birds are also of importance, with significant populations of Sandwich Terns (81 pairs in 1995) and Common Terns (99 pairs in 1995), both also being listed on Annex I of the E.U. Birds Directive. A large Cormorant colony (approximately 300 pairs in 1989) occurs on Deer Island.

Fishing and aquaculture are the main commercial activities within the site. A concern is that sewage effluent and detritus of the aquaculture industry could be deleterious to benthic communities. Reef and sediment communities are vulnerable to disturbance or compaction from tractors accessing oyster trestles. The *Paracentrotus lividus* populations have been shown to be vulnerable to over-fishing. Extraction of maerl in Galway Bay is a threat. Owing to the proximity of Galway city, shoreline and terrestrial habitats are under pressure from urban expansion and recreational activities. Eutrophication is probably affecting some of the lagoons and is a continued threat. Drainage is a general threat to the turlough and fen habitats. Bird populations may be disturbed by aquaculture activities.

This large coastal site is of immense conservation importance, with many habitats listed on Annex I of the E.U. Habitats Directive, four of which have priority status (lagoon, Cladium fen, turlough and orchid-rich calcareous grassland). The examples of shallow bays, reefs, lagoons, and saltmarshes found within this site are amongst the best in the country. The site supports an important Common Seal colony and a breeding Otter population (Annex II species), and six regular Annex I E.U. Birds Directive species. The site also has four Red Data Book plant species, plus a host of rare or scarce marine and lagoonal animal and plant species.

Rahasane Turlough SPA [site code: 004089]

Qualifying Interests

Whooper Swan (*Cygnus cygnus*) [A038]

Wigeon (*Anas penelope*) [A050]

Golden Plover (*Pluvialis apricaria*) [A140]

Black-tailed Godwit (*Limosa limosa*) [A156]

Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] Wetland and Waterbirds [A999]

Conservation Objectives

To maintain or restore the favourable conservation condition of the wetland habitat at Rahasane Turlough SPA as a resource for the regularly-occurring migratory water birds that utilise it.

Site Synopsis

Rahasane Turlough lies in gently undulating land, approximately 2 km west of Craughwell, Co. Galway. It consists of two basins which are connected at times of flood but separated as the waters recede. The larger of these, the northern basin, takes the Dunkellin River westwards. Rahasane was formerly the natural sink of the Dunkellin River, but now an artificial channel takes some of the water further downstream.

Water escapes the artificial channel to sweep around the northern basin, and again in the west, where it flows into an active swallow hole system. Some minor collapses are found elsewhere in the turlough, as well as a small number of more permanent pools. The substrate consists largely of silty clay.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation importance for the following species: Whooper Swan, Greenland White-fronted Goose, Wigeon, Golden Plover and Black-tailed Godwit. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Water birds.

Rahasane is a traditional site for Greenland White-fronted Goose, and supports a population of national importance (157 individuals - five year mean peak for the period 1994/95 to 1998/99). It is of international importance for Black-tailed Godwit (437 - all figures are five year mean peaks for the period 1995/96 to 1999/2000). It also has nationally important populations of Whooper Swan (165), Wigeon (3,430), and Golden Plover (6,613).

The site has the largest inland population of Dunlin (864) in the country and also supports Mute Swan (57), Teal (307), Mallard (142), Pintail (19), Shoveler (28), Tufted Duck (32), Grey Heron (31), Lapwing (2,220), Curlew (197), Redshank (134) and Black-headed Gull (280). Little Egret, a species which has recently colonised Ireland, also occurs at this site. Rahasane Turlough SPA is of high ornithological importance; it supports nationally important populations of four species and an internationally important population of one.

The Wigeon and Golden Plover populations are of particular note as they each represent approximately 4% of the All-Ireland totals of these species. The regular occurrence of Greenland White-fronted Goose, Whooper Swan and Golden Plover is of note as these species are listed on Annex I of the E.U. Birds Directive.

Ardrahan Grassland SAC [site code: 002244]

Qualifying Interests

Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Limestone pavements [8240]

Common species include Blue Moor-grass (*Sesleria albicans*), Wild Thyme (*Thymus praecox*), Flea Sedge (*Carex pulicaris*), Quaking-grass (*Briza media*), Devil's-bit Scabious (*Succisa pratensis*) and Heather (*Calluna vulgaris*). Pockets of Hazel (*Corylus avellana*) scrub have developed, and there are

lesser amounts of Blackthorn (*Prunus spinosa*), Bracken (*Pteridium aquilinum*) and Hawthorn (*Crataegus monogyna*). At the north of the site Juniper scrub forms a dense mat over limestone pavement along with Bearberry and Mountain Avens. Further south it occurs on higher undulating ground over a species rich calcareous heath with Wild Thyme, Carlina Thistle (*Carlina vulgaris*), Tormetill (*Potentilla erecta*), Bloody Cranesbill (*Geranium sanguineum*), Black Bog-rush (*Schoenus nigricans*), Heather and occasional Bearberry. Areas of orchid-rich calcareous grassland are found across the site, interspersed with areas of scrub, pavement and less species-rich grassland.

At least eleven orchid species have been recorded from the site, many in good numbers. The best areas of grassland are very species rich, and support an excellent suite of calcareous indicators. Species such as Kidney Vetch (*Anthyllis vulneraria*), Squinancywort (*Asperula cynanchica*), Spring-sedge (*Carex caryophyllea*), Glaucus Sedge (*Carex flacca*), Common Knapweed (*Centaurea nigra*), Eyebright (*Euphrasia officinalis* agg.), Lady's Bedstraw (*Galium verum*), Juniper, Rough Hawkbit (*Leontodon hispidus*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Sea Plantain (*Plantago maritima*), Yellow-rattle (*Rhinanthus minor*), Blue Moor-grass, Devil's-bit Scabious and Red Clover (*Trifolium pratense*) have been commonly recorded.

Species such as Mountain Avens and Spring Gentian are also present, and the Flora (Protection) Order, 2015 species Wood Bitter- vetch (*Vicia orobus*), has been recently documented. Many areas of orchid-rich grassland are however becoming swamped and overtaken by Purple Moor-grass (*Molinia caerulea*). Brackloon Lough occurs in the south of the site and is a fine example of a small shallow marl lake, one of very few in this locality.

This open lake has a pronounced whitish appearance and a flora of lime-encrusted Thread-leaved Water-crowfoot (*Ranunculus trichophyllus*) and a little Curled Pondweed (*Potamogeton crispus*) occurs. Shoreweed (*Littorella uniflora*) is locally abundant on the shoreline, where it grows with Many-stalked Spike-rush (*Eleocharis multicaulis*), Pink Water-speedwell (*Veronica catenata*), Lesser Water-plantain (*Baldellia ranunculoides*) and some Amphibious Bistort (*Polygonum amphibium*). Although small, the lake seems in a relatively natural state.

There are two small turloughs present within the site. Both are well grazed and consist of a short-turf peaty vegetation with Common Sedge (*Carex nigra*), Lesser Spearwort (*Ranunculus flammula*), Creeping Buttercup (*Ranunculus repens*) (turlough form), Lesser Marshwort (*Apium inundatum*), Cuckooflower (*Cardamine pratensis*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Water Mint (*Mentha aquatica*), along with Common Marsh-bedstraw (*Galium palustre*), Creeping Bent (*Agrostis stolonifera*), Jointed Rush (*Juncus articulatus*) and Common Spike-rush (*Eleocharis palustris*). Bird species recorded from the site include Snipe, Mute Swan and Curlew. Land use at this site consists mainly of the traditional practise of winter grazing by cattle.

This is a low intensity farming practise generally confined to the Burren in Ireland and one that is vital to the maintenance of the high scientific interest of this site. However, recent agricultural improvement has damaged the scientific interest of part of the site through loss of habitat in the turlough and limestone pavement areas. Intensification of the land usage around Brackloon Lough could lead to a deterioration in the water quality of the lake. A modification of the current grazing regime is needed to help deal with the spread of Purple Moor-grass in the best of the grassland areas of the site. Ardrahan Grassland contains a mosaic of calcareous habitats including good examples of four habitats listed on Annex I of the E.U. Habitats Directive - limestone pavement, alpine heath, orchid-rich calcareous grassland and Juniper scrub. The presence of a relatively unpolluted marl lake adds further diversity and interest of this important site.

Castletaylor Complex SAC [site code: 000242]

Qualifying Interests

Turloughs [3180] Alpine and Boreal heaths [4060]

Juniperus communis formations on heaths or calcareous grasslands [5130]

Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Limestone pavements [8240]

Conservation Objectives

3180 Turloughs

To restore the favourable conservation condition of Turloughs in Castletaylor Complex SAC, which is defined by a stated list of attributes and targets.

4060 Alpine and Boreal heaths

To restore the favourable conservation condition of Alpine and Boreal heaths in Castletaylor Complex SAC, which is defined by a stated list of attributes and targets.

5130 *Juniperus communis* formations on heaths or calcareous grasslands

To maintain the favourable conservation condition of *Juniperis communis* formations on heaths or calcareous grasslands in Castletaylor Complex SAC, which is defined by a stated list of attributes and targets.

6120 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites) in Castletaylor Complex SAC, which is defined by a stated list of attributes and targets.

8240 Limestone pavements*

To restore the favourable conservation condition of Limestone pavements* in Castletaylor Complex SAC, which is defined by a stated list of attributes and targets.

Site Synopsis

The Castletaylor Complex is situated approximately 4 km south-east of Kilcolgan in Co. Galway and lies in a gently undulating limestone topography. Although relatively small in area, the site contains a diverse range of habitats. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [3180] Turloughs* [4060] Alpine and Subalpine Heaths [5130] Juniper Scrub [6210] Orchid-rich Calcareous Grassland* [8240] Limestone Pavement* Caranavoodaun turlough dominates the north-western half of the site.

It occupies a shallow basin set among ridges of limestone outcrop and thin glacial drift and is an excellent example of a calcareous and extremely oligotrophic (nutrient-poor) turlough. It has a limited throughput of water, with a considerable precipitation of marl and some accumulation of peat.

Some stands of Black Bog-rush (*Schoenus nigricans*), with sparse Variegated Horsetail (*Equisetum variegatum*), occur at the upper levels, surrounded by patches of Buckthorn (*Rhamnus catharticus*) and Hawthorn (*Crataegus monogyna*) scrub. To the south-east the scrub includes Ash (*Fraxinus excelsior*), Yew (*Taxus baccata*), Whitebeam (*Sorbus aria*) and Irish Whitebeam (*Sorbus hibernica*).

Below this there is an extensive area of sedge fen vegetation with species such as Tawny Sedge (*Carex hostiana*), Carnation Sedge (*C. panicea*), Purple Moor-grass (*Molinia caerulea*), Meadow Thistle (*Cirsium dissectum*) and Devil's-bit Scabious (*Succisa pratensis*). Along the western and south-western sides the low-lying ground supports a community of Shoreweed (*Littorella uniflora*), Spike-rushes (*Eleocharis palustris* and *E. multiflora*) and Bulbous Rush (*Juncus bulbosus*) growing in shallow water that persists into June.

The deeper pools are colonised by Pondweeds (*Potamogeton gramineus*, *P. polygonifolius* and *P. coloratus*). North of the turlough and to the south of the site there is a mosaic of other habitats. The limestone pavement occurs mainly as scattered boulders with no extensive areas of flat pavement. It has a rich flora with species such as Bloody Crane's-bill (*Geranium sanguinum*), Herb-Robert (*G. robertianum*), Burnet Rose (*Rosa pimpinellifolia*), Wood Sage (*Teucrium scordonia*), Quaking-grass (*Briza media*) and the scarce species Spring Gentian (*Gentiana verna*) and Mountain Avens (*Dryas octopetala*). Limestone pavement breaks through the turlough floor in places, and supports scrub vegetation with Dewberry (*Rubus caesius*), Dog Rose (*Rosa canina*), stunted Ash and Blackthorn (*Prunus spinosa*).

The Red Data book species Alder Buckthorn (*Frangula alnus*) occurs amongst this community. Limestone outcrops also occur within the wooded area of the site. The dry calcareous grassland that occurs amongst the limestone pavement and heath is species-rich, particularly with orchids, including Autumn Lady's tresses (*Spiranthes spiralis*), Early Marsh-orchid (*Dactylorhiza incarnata*), Lesser Butterflyorchid (*Platanthera bifolia*), Fragrant Orchid (*Gymnadenia conopsea*), Broad-leaved Helleborine (*Epipactis helleborine*) and the scarce Dense-flowered Orchid (*Neotinea maculata*).

The heath at this site is characterised by the presence of Juniper (*Juniperus communis*) and Mountain Avens. The presence of Bearberry (*Arctostaphylos uva-ursi*) indicates that some of the heath is similar to the *Arctostaphylos-Dryas* vegetation of the Burren limestone area, a rare lowland alpine type heath. The eastern and much of the southern parts of the site are dominated by dry broadleaved woodland.

Species present include Downy Birch (*Betula pubescens*), Ash, Yew, Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*) and Spindle (*Euonymus europaeus*). Some mature planted conifers are found to the south of the road. The turlough does not hold any significant wintering populations of birds, owing to the extreme oligotrophic conditions. Three pairs of Lapwing bred at the site in 1996.

The main land use within the open areas of the site is light grazing by cattle. Some clearance of scrub within parts of the woodland has caused some damage and is a further threat. This site is of high conservation interest, in particular for the presence in a relatively small area of good examples of five habitats that are listed on Annex I of the E.U. Habitats Directive. The transition from the wetland to the surrounding habitats is particularly well shown.

Kiltiernan Turlough SAC [site code: 001285]

Qualifying Interests

Turloughs [3180]

Conservation Objectives

3180 Turloughs

To restore the favourable conservation condition of Turloughs in Kiltiernan Turlough SAC, which is defined by a stated list of attributes and targets.

Site Synopsis

Kiltiernan Turlough lies in a linear depression running south-westwards from the main Galway-Limerick road, north-west of Ardrahan in Co. Galway. It has a flattish basin which lies approximately 2 m below road level, and includes about eight further depressions which are joined in times of high water. The site includes a low ridge on the south-eastern side. Towards the west the topography becomes flatter and the basin breaks into separate hollows.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [3180] Turloughs* This site comprises a relatively dry turlough with a limited, though regular, flood in winter. The vegetation is mostly species-poor grassland dominated by White Clover (*Trifolium repens*), Silverweed (*Potentilla anserina*) and Creeping Bent (*Agrostis stolonifera*), with some areas of species-rich grassland found in the western half.

Beside the road, the rocky outcrops support limestone grassland and there are narrow fringes of scrub along each side of the basin. The scrub is predominantly of Blackthorn (*Prunus spinosa*), but some Buckthorn (*Rhamnus catharticus*) and Alder Buckthorn (*Frangula alnus*), a rare Red Data Book species, also occur. The grassland occurring in the main depressions of this site have been modified by trampling and over-grazing. Here the main species found are Northern Bedstraw (*Galium boreale*) and Creeping Cinquefoil (*Potentilla reptans*), which grow in clumps with much Silverweed and Greater Plantain (*Plantago major*). Hollows in this vegetation contain Common Sedge (*Carex nigra*) and Amphibious Bistort (*Polygonum amphibium*).

In the less intensified eastern section of the site the Red Data Book species Fen Violet (*Viola persicifolia*) occurs. Lapwing, Pochard, Teal and Wigeon have been recorded at the site, and other bird species may visit from the nearby Tullaghnafrankagh Lough. Land use on the site comprises grazing, particularly in the eastern half, with some areas of tillage found in the west. Kiltiernan Turlough is an example of a partly modified, relatively dry turlough, without any accumulation of peat. It includes a variety of typical dry turlough vegetation types and is notable for the presence of the rare plant species, Alder Buckthorn and Fen Violet. Turloughs are important habitats that are listed with priority status on Annex I of the E.U. Habitats Directive and, as such, are of considerable conservation significance.

Cahermore Turlough SAC [site code: 002294]

Qualifying Interests

Turloughs [3180]

Conservation Objectives

3180 Turloughs

To restore the favourable conservation condition of turloughs in Cahermore Turlough SAC, which is defined by a stated list of attributes and targets.

Site Synopsis

Cahermore Turlough SAC is situated in the limestone lowlands of south Co. Galway, about 5 km north-west of Gort and 5.5 km south-east of Kinvara. It is part of a series of lakes and turloughs in the region, most of which are Special Areas of Conservation (SACs) or Natural Heritage Areas (NHAs). The nearest is Caherglassaun Turlough, the water levels of which are slightly higher than Cahermore.

The site is mostly covered by drift which is mounded into hillocks in the south-eastern parts. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [3180] Turloughs* The turlough is on the dry end of the spectrum, and there is no standing water in summer except for a few small ponds dug for cattle.

A few collapse features occur in the drift on the southern side with a regular swallow-hole at the edge of the flooded area. Another hole occurs in the south-east corner. The turlough appears to flood largely from the southern side. The site has quite a uniform grassland cover. Creeping Bent (*Agrostis stolonifera*), Rough Meadow-grass (*Poa trivialis*), Smooth Meadow-grass (*Poa pratensis*), Red Fescue (*Festuca rubra*) and Couch Grass (*Elymus repens*) are the main constituents. Hairy Sedge (*Carex hirta*) and Common Sedge (*C. nigra*) are widespread over the site. Marsh Foxtail (*Alopecurus geniculatus*) grows in the southern half.

Pools dug into the drift have a varied flora, some have Pond Water-crowfoot (*Ranunculus peltatus*) and Common Duckweed (*Lemna minor*) while others have Amphibious Bistort (*Polygonum amphibium*), Floating Sweet-grass (*Glyceria fluitans*), Water Forget-me-not (*Myosotis scorpioides*) and Common Spike-rush (*Eleocharis palustris*). Two areas of limestone pavement which are largely scrub-covered occur. The one in the east is grazed by sheep and has grassland plant species such as Wild Thyme (*Thymus praecox*) and Downy Oat-grass (*Avenula pubescens*).

The shrubs on this pavement include Blackthorn (*Prunus spinosa*), Burnet Rose (*Rosa pimpinellifolia*), Juniper (*Juniperus communis*) and the exotic species Small-leaved Cotoneaster (*Cotoneaster microphyllus*). A larger area of turlough scrub in the northern part is impenetrable and consists of Hawthorn (*Crataegus monogyna*), Buckthorn (*Rhamnus catharticus*), Blackthorn and Spindle (*Euonymus europaeus*). There is some Crested Dog's-tail (*Cynosurus cristatus*) grassland on the fringes of this scrub.

The site holds a diverse population of wintering water birds at times of flood. Dunlin are not common inland but occurred throughout the 1998/99 winter season. The following counts were made on 15th December 1998 and, in parentheses, 30th November 2000: Whooper Swan 49 (35); Mute Swan 9 (5); Wigeon 180 (160); Teal 10 (-); Mallard 6 (22); Pochard 86 (12); Tufted Duck - (8); Lapwing 250 (150); Curlew 25 (-); Dunlin 120 (70); Redshank - (4). Bewick's Swan (7, winter 1995/96) and Golden Plover (60) have been recorded. Cahermore Turlough supports a wide range of turlough habitats with well-developed plant communities. The amount and quality of the developing woodland is a special feature of this turlough. Whooper Swan, Bewick's Swan and Golden Plover are listed on Annex I of the E.U. Birds Directive, and their presence at the site adds further to its importance and value.

Qualifying Interest

Turloughs [3180]

Conservation Objective

3180 Turloughs

To maintain the favourable conservation condition of Turloughs in Ballinduff Turlough SAC, which is defined by a stated list of attributes and targets.

Site Synopsis

Ballinduff Turlough is situated in a narrow basin in the limestone lowlands of south Co. Galway, 5 km north-east of Gort. It is part of the Coole Lough complex of lakes and turloughs, most of which are Special Areas of Conservation (SACs) or Natural Heritage Areas (NHAs). There are rock outcrops around the northern half and glacial drift in the south. There is a low hill to the south outside the site. The boundary in the south-west is the Galway-Limerick railway line. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [3180] Turloughs* The turlough is late-draining and a pool persists into June or July and re-floods easily.

There is a marshy hollow in the middle of the southern section which receives an inflow of water from the south. The hydrology of the site is probably controlled by a complex of swallow holes and subsidence near Coolfin. During floods the turlough drains overland towards Coole Lough. The main habitats on the site are various types of turlough grassland and turlough scrub which are related to the flooding regime.

The turlough grassland types vary. In the wettest parts plant species such as Marsh Horsetail (*Equisetum fluviatile*), Amphibious Bistort (*Polygonum amphibium*) and Common Spike-rush (*Eleocharis palustris*) occur with some Common Club-rush (*Scirpus lacustris* subsp. *lacustris*). Higher up Long-stalked Yellow-sedge (*Carex lepidocarpa*), Marsh Pennywort (*Hydrocotyle vulgaris*) and Jointed Rush (*Juncus articulatus*) occur on marly rises, while the common community includes Common Sedge (*Carex nigra*), Creeping Bent (*Agrostis stolonifera*), Creeping Cinquefoil (*Potentilla reptans*) and Silverweed (*Potentilla anserina*). There is also a wide band of nutrient-poor grassland with Purple Moor-grass (*Molinia careulea*), Common Sedge, Long-stalked Yellow-sedge and Tawny Sedge (*C. hostiana*).

An unusual feature of the vegetation at this turlough is that Shoreweed (*Littorella uniflora*) is very widespread and prominent throughout the turlough and is present in all of the above plant communities. Low dense woodland which is liable to flood is the other main habitat on the site, mostly along the north-western edge of the basin. Ash (*Fraxinus excelsior*), Buckthorn (*Rhamnus catharticus*) and Hawthorn (*Crataegus monogyna*) are the main constituents, with other shrubs such as Guelder-rose (*Viburnum opulus*) and Spindle (*Euonymus europaeus*).

The vicinity of the swallow-holes has a good woodland edge with tall herbs such as Yellow Loosestrife (*Lysimachia vulgaris*), Dewberry (*Rubus caesius*) and a large colony of Common Meadow-rue (*Thalictrum flavum*). Other habitats include scrub not subject to flooding and the inflowing drain from the south-east which contains abundant water-cress (*Nasturtium* sp.), around which wet grassland with Sharp-flowered Rush (*Juncus acutiflorus*) occurs. The rest of the site is mainly improved grassland, which is included for water quality protection reasons. In winter, Whooper Swans and Bewick's Swans have been recorded at the site. These feed mainly on improved pasture

on Corker Hill to the south, but roost on the open water of the turlough. They are considered to be part of the large swan population that is centred at Coole Lough.

In winters 1996/97 and 1997/98, between 200 and 300 Whooper Swans were recorded, and 10-50 Bewick's Swans. Lower numbers of Whooper Swans occurred in subsequent winters and Bewick's Swans are now rarely recorded in south Galway (a trend reflected throughout Ireland). Both of these swan species are listed on Annex I of the E.U. Birds Directive, and the numbers of Whooper Swans recorded in the above years were of international importance.

Numbers of other waterbirds using the site in winter are low. The rare invertebrate *Eurycercus glacialis* (Order Cladocera), which was first found in Ireland in 1985, occurs at Ballinduff Turlough. In Ireland, the species is seen to be a turlough specialist of the east Galway region, and it is rare elsewhere in Atlantic Europe. Its presence at the site adds to the ecological interest. Grazing intensity on the turlough grassland is very low. Some clearance of dry scrub has taken place recently.

Ballinduff Turlough offers a wide range of turlough habitats with plant communities well-developed and with little grazing. The widespread presence of Shoreweed within different plant communities is an unusual turlough feature. The development of Buckthorn woodland and the swallow-hole vegetation are other unusual features. The presence of a rare turlough invertebrate adds to the ecological interest.

Rahasane Turlough SAC [site code: 000322]

Qualifying Interests

Turloughs [3180]

Conservation Objectives

To maintain the favourable conservation condition of Turloughs in Rahasane Turlough SAC, which is defined by a stated list of attributes and targets.

Site Synopsis

Rahasane Turlough lies in gently undulating land, approximately 2 km west of Craughwell, Co. Galway. It consists of two basins which are connected at times of flood but separated as the waters decline. The larger of these, the northern basin, takes the Dunkellin River westwards. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [3180] Turloughs* Rahasane Turlough was formerly the natural sink of the Dunkellin River, but now an artificial channel takes some of the water further downstream.

Water escapes the artificial channel to sweep around the northern basin, and again in the west, where it flows into an active swallow-hole system. The main swallow-holes here are constantly changing, but reach 5 m in diameter and 2-3 m deep. Some minor collapses are found elsewhere in the turlough, as well as a small number of more permanent pools. Mostly, the edges of the turlough rise gradually into the surrounding land, but in places, rocks mark a more sudden transition. The southern basin is an impressive feature, with high rocky sides above an undulating base, strewn with boulders.

There is a low hill on the south side of the main basin, and another on the north-east, near Shanbally Castle, where smooth limestone pavement is evident. The major part of the turlough is open, flat and grassy, with occasional depressions and dry channels. The substrate consists largely of silty clay with shell fragments, reaching over 3 m in thickness. Locally in the main basin there are signs of marl, but peat is absent everywhere. Like the southern basin, the eastern end of the main (northern) basin is distinguished by the presence of large rocks scattered over the floor.

The vegetation of Rahasane is divided between dry and wet communities. Because of its large catchment, the turlough is naturally eutrophic and this, together with a lack of peat, limits the sedges (*Carex spp.*) which are usually abundant in turlough vegetation. In places with outcropping limestone, the vegetation is predominantly dry grassland with Red Fescue (*Festuca rubra*) and Crested Dog's-tail (*Cynosurus cristatus*), among a generally calcicole community.

Large areas in the drier parts of the turlough are covered by a community characterised by an abundance of Creeping Cinquefoil (*Potentilla reptans*), with Common Sedge (*Carex nigra*), Silverweed (*Potentilla anserina*) and Creeping Bent (*Agrostis stolonifera*). Where the soil is less well-drained, Creeping Cinquefoil disappears from this community and the rare species, Fen Violet (*Viola persicifolia*), which is listed in the Irish Red Data Book, occurs.

In these areas, the presence of Common Spike-rush (*Eleocharis palustris*) suggests that water is close to the surface. Wet communities are associated with the river channels and pools. Fully aquatic communities include such species as Fan-leaved Water Crowfoot (*Ranunculus circinatus*), Fennel Pondweed (*Potamogeton pectinatus*), Lesser Pondweed (*P. pusillus*), Fat Duckweed (*Lemna gibba*), Whorled Water-milfoil (*Myriophyllum verticillatum*) and Needle Spike-rush (*Eleocharis acicularis*).

Semi-aquatic communities fringe the main channel of the river and colonise muddy pools in the basin. Species such as Lesser Water-parsnip (*Berula erecta*), Fool's Water-cress (*Apium nodiflorum*), River Waterdropwort (*Oenanthe fluviatilis*) and Amphibious Bistort (*Polygonum amphibium*) occur, along with the rare species, Northern Yellow-cress (*Rorippa islandica*), which is listed in the Irish Red Data Book.

There are also some narrow fields with Yellow Iris (*Iris pseudacorus*). There are small areas of scrub on the southern and north-western sides of the turlough, but the area of flooded woodland is small. The scrub is made up of Buckthorn (*Rhamnus cathartica*), Ash (*Fraxinus excelsior*) and Hazel (*Corylus avellana*). The trees support a range of epiphytic mosses such as *Leskea polycarpa*, *Amblystegium riparium*, *Isopterygium elegans*, *Isothecium myosuroides* and *Thuidium tamariscinum*.

Rahasane Turlough is renowned for its wintering wildfowl populations, but it also supports nesting waders in summer, which include Lapwing, Redshank, Snipe and Dunlin. Figures stated in the following account represent mean (and peak) counts obtained during the three seasons, 1984/85 to 1986/87. Internationally important numbers of Whooper Swan 179, Golden Plover 17680, Wigeon 7760 and Shoveler 498 are found. The first two species, together with Bewick's Swan, below, are listed on Annex I of the E.U. Birds Directive.

Species recorded in nationally important numbers are Bewick's Swan 132, Mute Swan 125, Teal 3005, Mallard 777, Pintail 102, Pochard 356, Tufted Duck 381, Coot 1289, Lapwing 3995, Dunlin 3569 (5653), Blacktailed Godwit 170 and Curlew 1205. Small numbers of the internationally important Greenland White-fronted Goose regularly overwinter at Rahasane (average count, as above, 59), but numbers have been declining over the years. There is a small run of Atlantic Salmon (*Salmo salar*) through the Dunkellin River when it is flowing overground. The fish pass through the turlough but do not use it for spawning.

This species is listed on Annex II of the E.U. Habitats Directive. The Fairy Shrimp (*Tanymastix stagnalis*, Class Crustacea) was first recorded in Ireland from the southern basin at Rahasane, though it has since been recorded elsewhere. It requires isolation from predators to grow to reproductive age and so cannot occur in permanent waterbodies.

The turlough is closely grazed by cattle, sheep and horses. Grazing is a critical factor in maintaining a balance between open swards and woodland development at the edges of the turlough. Drainage is a major threat to turloughs, but the Dunkellin River has not been arterially drained. The river was straightened many years ago where it crosses the turlough, and the artificial channel was dredged again in 1992, but this does not appear to have affected winter flooding.

Some degree of artificial enrichment of the basin is occurring from the farming areas upstream, and local enrichment is associated with grazing practices. Eutrophication is among the major threats to turlough systems in general. Rahasane Turlough is of major ecological significance as one of only two large turloughs in the country which still function naturally. It is the most important turlough in Ireland for birdlife. In a relatively recent national survey, it was also rated very highly for its vegetation, and supports two rare species listed in the Irish Red Data Book. Turloughs are a rare habitat type and are given priority status under Annex I of the E.U. Habitats Directive.

Lough Corrib SAC [site code: 000297]

Qualifying Interests

- 1029 Freshwater Pearl Mussel *Margaritifera margaritifera*
- 1092 White-clawed Crayfish *Austropotamobius pallipes*
- 1095 Sea Lamprey *Petromyzon marinus*
- 1096 Brook Lamprey *Lampetra planeri*
- 1106 Salmon *Salmo salar*
- 1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*
- 1355 Otter *Lutra lutra*
- 1393 Slender Green Feather-moss *Drepanocladus vernicosus*
- 1833 Slender Naiad *Najas flexilis*
- 3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)
- 3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea*
- 3140 Hard oligo-mesotrophic waters and benthic vegetation of *Chara* species
- 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation

- 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)(*important orchid sites)
- 6410 *Molinia meadowson* calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- 7110 Active raised bogs*
- 7120 Degraded raised bogs still capable of natural regeneration
- 7150 Depressions on peat substrates of the *Rhynchosporion*
- 7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae**
- 7220 Petrifying springs with tufa formation (*Cratoneurion*)*
- 7230 Alkaline fens
- 8240 Limestone Pavements*
- 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- 91D0 Bog woodland*

Conservation Objectives

- 3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)

To restore the favourable conservation condition of Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) in Lough Corrib SAC, which is defined by the list of attributes and targets under the NPWS webpage: www.npws.ie/sites/default/files/protected-sites/synopsis/SY000297.pdf.

This SAC overlaps with Lough Corrib SPA (site code: 004042).

Lough Corrib is situated to the north of Galway city and is the second largest lake in Ireland, with an area of approximately 18,240 hectares (the entire site is 20,556 hectares). The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the south, and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones to the north. The surrounding lands to the south and east are mostly pastoral farmland, while bog and heath predominate to the west and north. A number of rivers are included the designation as they are important for Atlantic Salmon. These rivers include the Clare, Grange, Abbert, Sinking, Dalgan, and Black to the east, as well as the Cong, Bealanabrack, Failmore, Cornamona, Drimneen and Owenriff to the west. In addition to the rivers and lake basin, adjoining areas of conservation interest, including raised bog, woodland, grassland and limestone pavement, have been incorporated into the site.

The shallow, lime-rich waters of the southern basin of Lough Corrib support one of the most extensive beds of stoneworts (*Charophytes*) in Ireland, with species such as *Chara aspera*, *C. hispida*, *C. delicatula*, *C. contraria* and *C. desmacantha* mixed with submerged pondweeds (*Potamogeton*

perfoliatus, *P. gramineus* and *P. lucens*), Shoreweed (*Littorella uniflora*) and Water Lobelia (*Lobelia dortmanna*). These Chara beds are an important source of food for waterfowl. In contrast, the northern basin contains more oligotrophic and acidic waters, without *Chara* species, but with Shoreweed, Water Lobelia, Pipewort (*Eriocaulon aquaticum*), Quillwort (*Isotes lacustris*), Alternate Water-milfoil (*Myriophyllum alternifolium*) and Slender Naiad (*Najas flexilis*). The last-named is listed under the Flora (Protection) Order, 2015, and is an Annex II species under the E.U. Habitats Directive.

Otter and Irish Hare have been recorded regularly within this site. Both of these species are listed in the Red Data Book and legally protected by the Wildlife Act, 1976. Otter is also listed on Annex II of the E.U. Habitats Directive. Lough Corrib is considered one of the best sites in the country for Otter, due to the sheer size of the lake and associated rivers and streams, and also the generally high quality of the habitats. Atlantic Salmon (*Salmo salar*) use the lake and rivers as spawning grounds. Although this species is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the E.U. Habitats Directive. Lough Corrib is also a well-known fishing lake with a very good Trout (*Salmo trutta*) fishery. The lake has a population of Sea Lamprey (*Petromyzon marinus*), a scarce, though probably under-recorded species listed on Annex II of the E.U. Habitats Directive. Brook Lamprey (*Lampetra planeri*), also listed on Annex II, are also known from a number of areas within the site.

A population of Freshwater Pearl Mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs within the site. White-clawed Crayfish (*Austropotamobius pallipes*), also listed on Annex II, is well distributed throughout Lough Corrib and its in-flowing rivers over limestone. A summer roost of Lesser Horseshoe Bat, another Annex II species, occurs within the site – approximately 100 animals were recorded here in 1999.

The main threats to the quality of this site are from water polluting activities resulting from intensification of agricultural activities on the eastern side of the lake, uncontrolled discharge of sewage which is causing localised eutrophication of the lake, and housing and boating development, which is causing the loss of native lakeshore vegetation. The raised bog habitats are susceptible to further degradation and drying out due to drainage and peat cutting and, on occasions, burning. Peat cutting threatens Addergoole Bog and already a substantial area of it has been cut away. Fishing and shooting occur in and around the lake. Introduction of exotic crayfish species or the crayfish fungal plague (*Aphanomyces astaci*) could have a serious impact on the native crayfish population. The bat roost is susceptible to disturbance or development.

Despite these ongoing issues, however, Lough Corrib is one of the best examples of a large lacustrine catchment system in Ireland, with a range of habitats and species still well represented. These include 15 habitats which are listed on Annex I of the E.U. Habitats Directive, six of which are priority habitats, and nine species which are listed on Annex II. The lake is also internationally important for birds and is designated as a Special Protection Area.

Lough Corrib SPA [site code: 004042]

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A051	Gadwall	<i>Anas strepera</i>
A056	Shoveler	<i>Anas clypeata</i>
A059	Pochard	<i>Aythya farina</i>
A061	Tufted Duck	<i>Aythya fuligula</i>
A065	Common Scoter	<i>Melanitta nigra</i>
A082	Hen Harrier	<i>Circus cyaneus</i>
A125	Coot	<i>Fulica atra</i>
A140	Golden Plover	<i>Pluvialis apricaria</i>
A179	Black-headed Gull	<i>Chroicocephalus ridibundus</i>
A182	Common Gull	<i>Larus canus</i>
A193	Common Tern	<i>Sterna hirundo</i>
A194	Arctic Tern	<i>Sterna paradisaea</i>
A395	Greenland White-fronted Goose	<i>Anser albifrons flavirostris</i>

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included as follows: to maintain or restore the favourable conservation condition of the wetland habitat at Lough Corrib SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

