Natura Impact Statement

Kilcoole Proposed Residential and Commercial / Community Development (Phase 1)

Prepared by: Moore Group – Environmental Services

31 July 2025

On behalf of Brookhampton Ltd.

Project Proponent	Brookhampton Ltd.
Project	Kilcoole Proposed Residential and Commercial / Community Development (Phase 1)
Title	Natura Impact Statement Kilcoole Proposed Residential and Commercial / Community Development (Phase 1)

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1. Introduction

1.1. General Introduction

This Natura Impact Statement (NIS) has been prepared by Moore Group – Environmental Services on behalf of Brookhampton Ltd. This NIS report contains information to assist the competent authority in carrying out an Appropriate Assessment (AA) for the purposes of Article 6(3) of the Habitats Directive and section 177V of the Planning and Development Act 2000, as amended, (the "Planning Acts") in respect of the construction of a Proposed Residential and Commercial / Community Development (Phase 1) at Kilcoole, Co. Wicklow on European sites, to ascertain whether or not the Proposed Development would adversely affect site integrity.

This NIS informs the Appropriate Assessment process in the determination of any adverse effects on the integrity of European sites, having regard to their conservations objectives and in light of best scientific knowledge. It is necessary that the Project has complies with Article 6 of the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (referred to as the Habitats Directive). This is transposed into Irish Law by Part XAB of the Planning and Development Act 2000 as amended and the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477) (referred to as the Habitats Regulations). The focus of the assessment is on objectively assessing by reference to the evidence as to whether the Proposed Development will adversely affect the integrity of the European sites in light of their conservation objectives.

1.2. Legislative Background - The Habitats and Birds Directives

Article 6 of the Habitats Directive is transposed into Irish Law inter alia by the Part XAB of the Planning Acts (section 177U and 177V) governing the requirement to carry out appropriate assessment screening and appropriate assessment, where required, per Section 1.1 above.

The Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora) is the main legislative instrument for the protection and conservation of biodiversity in the European Union (EU). Under the Habitats Directive, Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in a EU context.

The Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds), transposed into Irish law by the Habitats Regulations 2011, is concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Birds Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species which are rare, vulnerable, in danger of extinction, or otherwise require special attention.

SACs designated under the Habitats Directive and SPAs, designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs. These sites are also referred to as European sites.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to have a significant effect on Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out an appropriate assessment if required (Appropriate Assessment (AA)). Article 6(4) establishes requirements in cases of imperative reasons of overriding public interest:

> ***Article 6(3):*** *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to an appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

These obligations in relation to Appropriate Assessment have been implemented in Ireland under Part XAB of the Planning and Development Act 2000, as amended, and in particular Section 177T thereof.

Section 177T(1)(b) and (2) state as follows with regard to a Natura Impact Statement:

> *"(b) A Natura impact statement means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own or in combination with other plans or projects, for one or more than one European site, in view of the conservation objectives of the site or sites."*
>
> *"(2) Without prejudice to the generality of subsection (1), a Natura impact report or a Natura impact statement, as the case may be, shall include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for one or more than one European site in view of the conservation objectives of the site or sites."*

1.3. Methodology

The Commission's methodological guidance (EC, 2002, 2018, 2021 see Section 1.4 below) promotes a four-stage process to complete the AA and outlines the issues and tests at each stage. An important

aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1 and 2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant. In order to screen out a project, it must be excluded, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

Stage 2 Appropriate Assessment: This stage considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The proponent of the plan or project will be required to submit a Natura Impact Statement, i.e. the report of a targeted professional scientific examination of the plan or project and the relevant Natura 2000 sites, to identify and characterise any possible implications for the site in view of the site's conservation objectives, taking account of in combination effects.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the sites will be necessary.

1.4. Guidance

The NIS has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.).
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.
- Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate-General, 2001); hereafter referred to as the EC Article 6 Guidance Document.

- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC Environment Directorate-General, 2000); hereafter referred to as MN2000.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC, 2018).
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC, 2021).
- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2021).
- Office of the Planning Regulator (OPR) Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, 2021).

1.5. Data Sources

Sources of information that were used to collect data on the Natura 2000 network of sites, and the environment within which they are located, are listed below:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
    - National Parks & Wildlife (NPWS) protected site boundary data;
    - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
    - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
    - Open Street Maps;
    - Digital Elevation Model over Europe (EU-DEM);
    - Google Earth and Bing aerial photography 1995-2025;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
    - Natura 2000 - Standard Data Form;
    - Conservation Objectives;
    - Site Synopses;
- National Biodiversity Data Centre records;
    - Online database of rare, threatened and protected species;
    - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019); and
- Relevant Development Plans in neighbouring areas:
    - Wicklow County Development Plan 2022-2028
    - Greystones / Delgany and Kilcoole LAP 2013-2019
    - Draft Greystones-Delgany and Kilcoole Local Planning Framework (LPF)

1.6. Statement of Authority

This report was compiled by Ger O'Donohoe (B.Sc. Applied Aquatic Sciences (GMIT, 1993) & M.Sc. Environmental Sciences (TCD, 1999)) who has over 30 years' experience in environmental impact assessment and has completed numerous reports for Appropriate Assessment Screening and Natura Impact Statements in terrestrial and aquatic habitats.

Engineering and technical data was supplied by 2HQ Consulting Engineers for the Proposed Development.

1.7. Description of the Proposed Development

Brookhampton Limited, intend to apply for full planning permission for development on a site at Bullford, Kilcoole, Co. Wicklow. The site is located to the west of Main Street, Kilcoole, Co. Wicklow.

The development will consist of the construction of 99 no. residential units and 2 no. commercial / community units (for Class 1- Shop, Class 2- Office / Professional Services, or Class 10- Community Use or Restaurant / Café use). The 99 no. residential units will consist of 71 no. houses, 20 no. duplex apartments and 8 no. apartments, to be provided as follows:

- 6 no. 2-bed houses
- 59 no. 3-bed houses
- 6 no. 4-bed houses
- 10 no. 2-bed duplex apartments
- 10 no. 3-bed duplex apartments
- 4 no. 1-bed apartments
- 2 no. 2-bed apartments
- 2 no. 3-bed apartments

The 8 no. apartments are provided within 1 no. 3-storey apartment block (Block A). The 20 no. duplex apartments are provided in 2 no. 3-storey duplex apartment buildings (Block B and Block C) and comprise 2 storey duplex apartments over ground floor apartments. Balconies / private terraces are provided for all apartments / duplex apartments. The houses are 2 storeys in height. The commercial / community units are located at the ground floor of Block A with associated signage zones.

A total of 179 no. car parking spaces are proposed. The development includes 104 no. cycle parking spaces (72 no. long term and 32 no. short term visitor spaces) for the apartments, duplex apartments

and commercial / community units. Bin and bicycle storage areas are located within the ground floor of the apartment block, and external bin and bicycle stores are proposed for the duplex apartments and terraced houses. Bin and bicycle storage for the houses is provided on-curtilage.

The proposal includes all associated internal roads, pedestrian and cycle paths, site and infrastructural works including foul and surface water drainage, attenuation tanks, provision of public and communal open space, boundary treatment, lighting, landscaping, green roof and PV panels and plant areas at roof level.

The proposal includes a vehicular entrance from Main Street, Kilcoole, with the associated upgrades / improvements to Main Street to facilitate this access, which requires the carrying out of works on local authority lands, which are external to the application site boundary, and which will be carried out through agreement with the local authority.

Open space will include a linear riverine park along the banks of the scheme which forms the western site boundary. The proposed development is to be connected to the existing municipal sewer network.

The contractor will be required to provide a Construction Environmental Management Plan (CEMP) which will include best practice construction methodology to avoid potential local impacts on water quality in the Kilcoole Stream. The following construction management will be included as a minimum:

General

Prior to any works, all personnel involved will receive an on-site induction relating to operations adjacent to the watercourse.

The project proponent will ensure that the engineer setting out the works is fully aware of the ecological constraints and construction management requirements.

A sufficiently qualified ecologist will be nominated as an Ecological Clerk of Works (ECW) to ensure the implementation of all mitigation both at the construction and the operational stages (e.g. such as checking the working of petrol and oil interceptors etc,) of the proposed development and that all listed mitigation in both the NIS and EclA are fully implemented and monitored.

Any incident or observation of anything that may be considered as causing or likely to cause disturbance or damage to the water course will be reported to the Local Authority immediately. The Local Authority will take immediate action to prevent or limit the impact and will notify the project proponent contact of the incident and the actions taken.

Pollution of watercourses

- The works area will be fenced with Terram or equivalent geo-textile fencing, secured to the ground to prevent the wash-out of suspended solids from the site to adjacent watercourse. Where possible, this will be set back from the riparian corridor of the watercourse to allow the retention of a buffer-zone of riparian vegetation along the drainage channels.
- The Contractor will establish site boundary markings to safeguard features of interest/value.
- Tools and equipment are not to be cleaned in the watercourse.
- Chemicals used will be stored in sealed containers.
- Chemicals shall be applied in such a way as to avoid any spillage or leakage.
- Any and all excavated material is NOT to be temporarily stored adjacent to the watercourse.

Fuel/Lubricant spillage from equipment

- All refuelling, oiling and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and watercourses and away from drains and the adjacent watercourse as far as reasonably practicable. Vehicles will not be left unattended during refuelling.
- Storage areas, machinery depots and site offices will be located at least 10m from any watercourse.
- Spill kits will be made available close to streams and all staff will be properly trained on correct use.
- All fuels, lubricants and hydraulic fluids required to be stored on site will be kept in secure bunded areas at a minimum of 10m from all watercourses. The bunded area will accommodate 110% of the total capacity of the containers within it.
- Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure will be put in place with all staff properly briefed. Any waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of offsite in an appropriate manner.

- All plant shall be well maintained with any fuel or oil drips attended to on an ongoing basis.
- Any minor spillage during this process will be cleaned up immediately.
- Should any incident occur, the situation will be dealt with and coordinated by the nearest supervisor who will be responsible for instructions by the Local Authority.

Concrete

- Wet concrete and cement are very alkaline and corrosive and can cause serious pollution to watercourses.
- Disposal of raw or uncured waste concrete will be controlled to ensure that the adjacent watercourse will not be impacted.
- Best practice in bulk-liquid concrete management addressing pouring and handling, secure shuttering / form-work, adequate curing times.
- Wash water from cleaning ready mix concrete lorries and mixers may be contaminated with cement and is therefore highly alkaline. Due to the size of the site and the proximity of a sensitive watercourse, it is recommended that lorries and mixers are washed out of off-site.

All surface water drainage networks will be designed in accordance with the *Greater Dublin Strategic Drainage Study and the requirements of Wicklow County Council.* SuDS will provide a comprehensive design approach to the management of water on site, to delay run-off and encourage filtration through the use of porous surfaces, rainwater harvesting etc. in ways which enhance amenity and biodiversity and minimise pollution effects. Therefore, the use of SuDS will provide benefits in what is described as the SuDS principles; water quality, water quantity and amenity/biodiversity.

Figure 1 shows the location of the proposed development and Figure 2 shows a detailed view of the existing site on Bing aerial photography with a site layout presented in Figure 3.

Figure 1. Showing the Proposed Development location at Kilcoole, Co. Wicklow.

Figure 2. Showing the Phase 1 site on aerial photography.

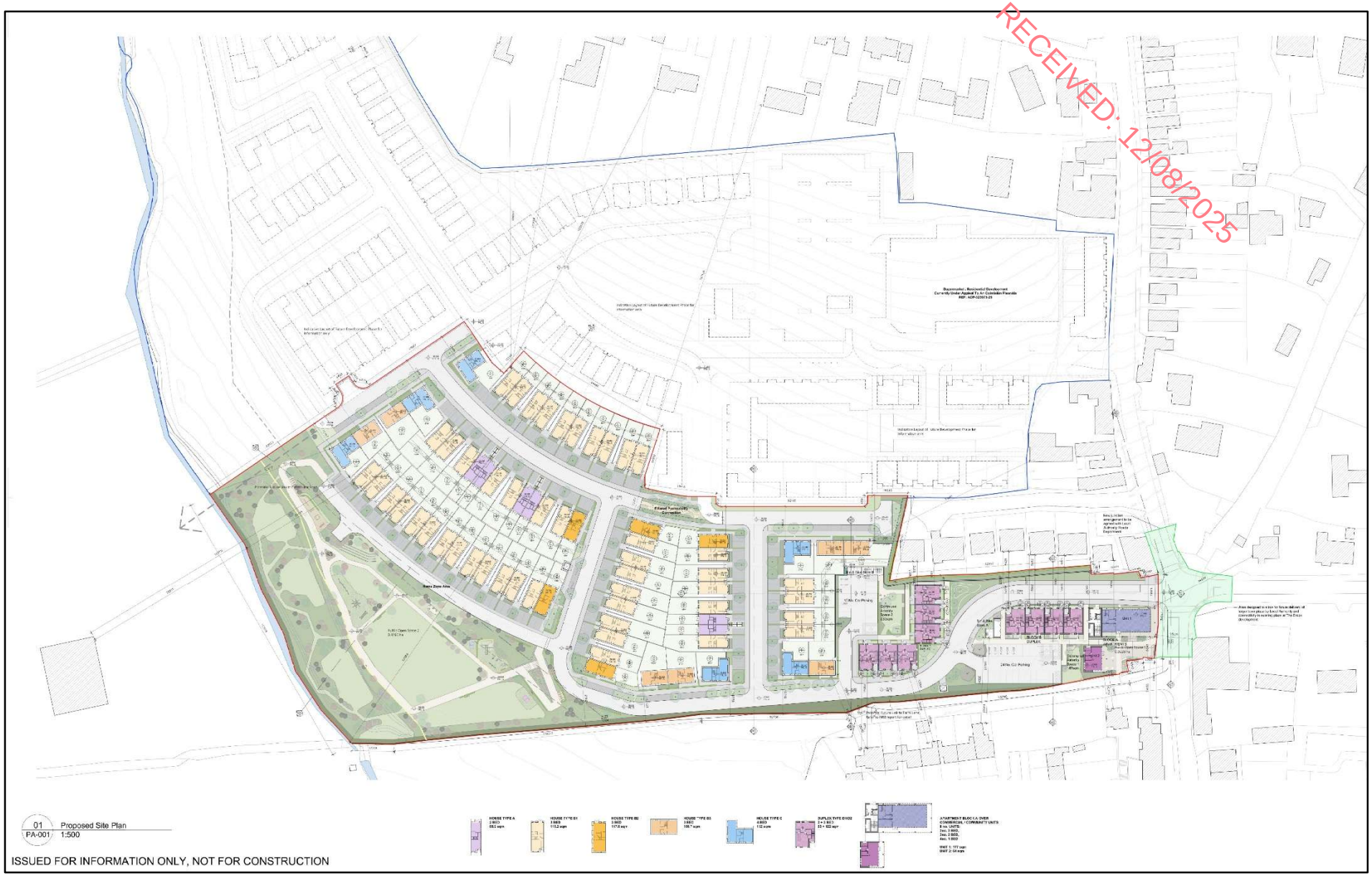

Figure 3. Showing the Phase 1 site layout.

2. Stage 1 – Screening for Appropriate Assessment

2.1. Background to Screening

An AA screening has been carried out and a Report for AA Screening presented as part of the planning application.

The potential for source pathway receptor connectivity was firstly identified through GIS interrogation and detailed information was then provided on sites with connectivity. European sites that are located within a potential Zone of Influence of the Overall Development are listed in Table 1 and presented in Figures 4 and 5, below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on 31 July 2025. This data was interrogated using GIS analysis to provide mapping, distances, locations and pathways to all sites of conservation concern including pNHAs, NHAs and European sites

Table 1 European Sites located within the potential Zone of Influence[1] of the Proposed Development.

Site Code	Site name	Distance (km)[2]
002249	The Murrough Wetlands SAC	1.3
004186	The Murrough SPA	1.34

Wastewater from the proposed development will be directed to the Greystones WWTP which has the capacity to assimilate the additional load, see Annual Environmental Report for Greystones WWTP available online through the EPA.

The Proposed Development site is located approximately 1.3km west of The Murrough SPA (Site Code 004186) and The Murrough Wetlands SAC (Site Code 002249). The site has hydrological connectivity to the Murrough wetlands via the adjacent Kilcoole Stream and so only these two sites are brought forward for detailed assessment.

[1] All European sites potentially connected irrespective of the nature or scale of the Proposed Development.
[2] Distances indicated are the closest geographical distance between the Proposed Development and the European site boundary, as made available by the NPWS. Connectivity along hydrological pathways may be significantly greater.

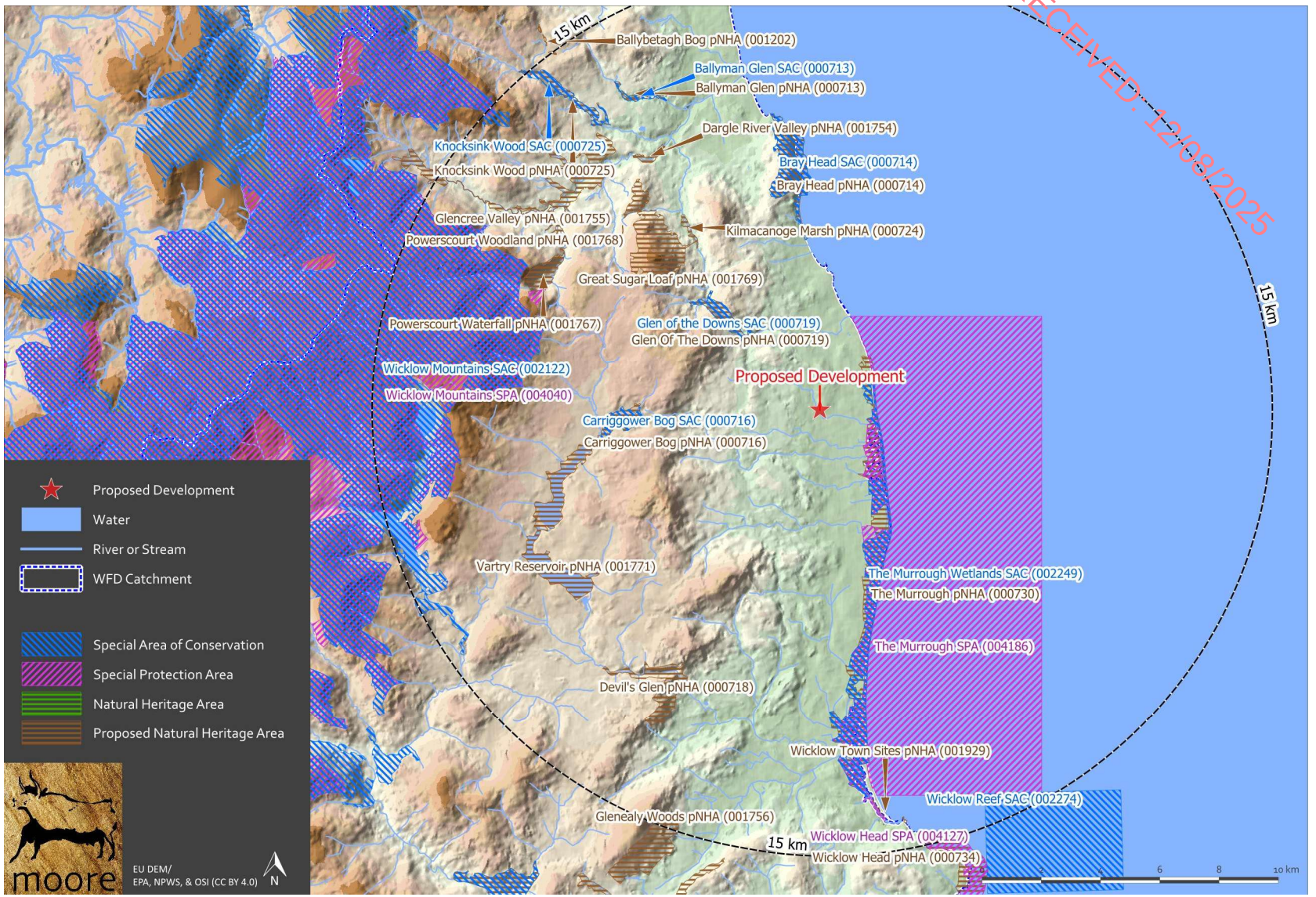

Figure 4. Showing European sites and NHAs/pNHAs in the wider vicinity of the Proposed Development in the vicinity of the Proposed Development.

Figure 5. Detailed view of European sites in the nearer vicinity of the Proposed Development.

*Table 2 Details of the Murrough Wetlands SAC (*indicates priority habitat).*

Site Code	Site Name	Qualifying Interests
002249	The Murrough Wetlands SAC	[1210] Annual vegetation of drift lines [1220] Perennial vegetation of stony banks [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1410] Mediterranean salt meadows (*Juncetalia maritimi*) [7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** [7230] Alkaline fens

Table 3 Details of the Murrough SPA.

Site Code	Site Name	Qualifying Interests
004186	The Murrough SPA	[A001] Red-throated Diver *Gavia stellata* [A043] Greylag Goose *Anser anser* [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A050] Wigeon *Anas penelope* [A052] Teal *Anas crecca* [A179] Black-headed Gull *Chroicocephalus ridibundus* [A184] Herring Gull *Larus argentatus* [A195] Little Tern *Sterna albifrons*

2.2. Screening Determination

The potential for indirect significant adverse effects on the The Murrough SPA (Site Code 004186) and The Murrough Wetlands SAC (Site Code 002249) is uncertain in the absence of control of potential pollution on surface water during construction. The Proposed Development will require a Construction Environmental Management Plan to avoid potential impacts on the Kilcoole Stream and it is concluded that a Natura Impact Statement be prepared for the purpose of Article 6[3] of the Habitats Directive and Part XAB of the Planning and Development Act, 2000, as amended.

Thus, in line with Department of Environment, Heritage and Local Government Guidance (2010 rev.) and having regard to ECJ case law and the 'Precautionary Principle', Stage 2 Appropriate Assessment is required. Adopting the precautionary approach, in line with current guidance, a Stage 2 Appropriate Assessment of the Proposed Development has been prepared as follows.

3. Stage 2 – Appropriate Assessment

This stage considers whether the Project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a European site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The Stage 2 Appropriate Assessment comprises a scientific examination of the plan / project and the relevant European site; to identify and characterise any

possible implications for the site in view of the site's conservation objectives, structure and function; taking account of in combination effects.

3.1. Description of European Sites Potentially Affected

Potential impacts on the following European site have been identified**:**

- ***The Murrough Wetlands SAC (Site code 002249)***

The Murrough is a coastal wetland complex which stretches for 15 km from Ballygannon to north of Wicklow town, and in parts, extends inland for up to 1 km. A shingle ridge stretches the length of the site and carries the mainline Dublin-Wexford railway.

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):

[1210] Annual Vegetation of Drift Lines
[1220] Perennial Vegetation of Stony Banks
[1330] Atlantic Salt Meadows
[1410] Mediterranean Salt Meadows
[7210] *Cladium* Fens*
[7230] Alkaline Fens

On the seaward side of the shingle bank which runs along The Murrough Wetlands SAC site drift line vegetation includes species such as Sea Rocket (*Cakile maritima*), Sea Sandwort (*Honkenya peploides*), Sea-holly (*Eryngium maritimum*) and Yellow Horned-poppy (*Glaucium flavum*). The rare and legally protected Oysterplant (*Mertensia maritima*) (Flora (Protection) Order, 1999) has been recorded on the gravelly shore in the past but is now considered to be extinct from this locality.

Low sand hills occur at Kilcoole, with Marram (*Ammophila arenaria*) and Lyme-grass (*Leymus arenarius*). In other areas and further inland a rich grassy sward, which is most extensive at the south of the site, has developed. Typical species include Sweet Vernal-grass (*Anthoxanthum odoratum*), Crested Dog's-tail (*Cynosurus cristatus*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Burnet Rose (*Rosa pimpinellifolia*) and Pyramidal Orchid (*Anacamptis pyramidalis*). A community dominated by Silverweed (*Potentilla anserina*) and Strawberry Clover (*Trifolium fragiferum*) occurs in some of the wetter, grassy areas. In some places, particularly at the south of the site, a gorse (*Ulex* sp.) heath has developed on the stony ridge.

Saltmarsh is present within the site in two distinct areas. At the southern end of the site is found Broad Lough. This is a brackish, partly tidal lake, and has a well developed saltmarsh community which

includes Saltmarsh Rush (*Juncus gerardi*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Sea Purslane (*Halimione portulacoides*) and Common Scurvygrass (*Cochlearia officinalis*).

Common Reed (*Phragmites australis*) is abundant along the western shore, along with some Sea Club-rush (*Scirpus maritimus*). Saltmarsh is also present in the northern end of the site in the vicinity of The Breaches. Though this has been greatly affected by drainage in the late 1980s and early 1990s, localised Sea Couch (*Elymus pycnanthus*) still occurs. The grassland which was created and improved as a result of the drainage is now influenced by seepage and flooding of saline waters.

Fen vegetation is well developed in the Murrough wetlands, with both alkaline and calcareous fen with Great Fen-sedge (*Cladium mariscus*) represented. The fens occur mostly between Five Mile Point and Six Mile Point, especially in the townland of Blackditch and also in the Leamore and Grange areas. The alkaline fen is dominated by Black Bog-rush (*Schoenus nigricans*), with Marsh Pennywort (*Hydrocotyle vulgaris*), Purple Moor-grass (*Molinia caerulea*), Devil's-bit Scabious (*Succisa pratensis*), Heather (*Calluna vulgaris*), Cross-leaved heath (*Erica tetralix*), and a wide variety of orchids also present. The rare, Narrow-leaved Marsh-orchid (*Dactylorhiza traunsteineri*) has also been recorded here. Great Fen-sedge occurs in mosaic with several vegetational elements but chiefly with alkaline fen. Its many forms can range from pure stands of Great Fen-sedge, through to occurring as a dominant with Greater Tussock-sedge (*Carex paniculata*) and Blunt-flowered Rush (*Juncus subnodulosus*). *Cladium* fen also occurs at Blackditch within stretches of swamp woodland or fen carr dominated by Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Downy Birch (*Betula pubescens*).

A fine wet woodland occurs at Blackditch. Downy Birch is the dominant species, with some Alder (*Alnus glutinosa*), willows (*Salix* spp.) and Ash (*Fraxinus excelsior*) also present. The ground flora of this wooded area is often quite dense. This wood also contains a rich invertebrate community with at least eight rare or notable species of fly (Order Diptera) occurring, including *Syntormon setosus,* a species unknown elsewhere in Britain or Ireland.

A wide range of freshwater and brackish marsh habitats occur within the site. These vary from reed-marsh dominated by reeds and rushes (*Juncus* spp.), to those of sedges (*Carex* spp.), with other areas supporting a mixture of sedges and Yellow Iris (*Iris pseudacorus*). A wide variety of grasses and herbs are also found. These include Meadowsweet (*Filipendula ulmaria*), Silverweed and Common Spike-rush (*Eleocharis palustris*). The scarce Red Data Book species Marsh Pea (*Lathyrus palustris*) occurs in one area. The marshes merge into wet grassland in many areas. Where grazing pressure is low, a herb-rich sward occurs with species such as Ragged-Robin (*Lychnis flos-cuculi*), Cuckooflower (*Cardamine pratensis*), Meadowsweet and Heath Spotted-orchid (*Dactylorhiza maculata*) occurring. Sedges are abundant in the wetter areas. Where drains have been cut, there are many other species such as

Greater Spearwort (*Ranunculus lingua*), Bogbean (*Menyanthes trifoliata*) and the scarce Reed Sweet-grass (*Glyceria maxima*).

The Murrough is an important site for wintering waterfowl and breeding birds. Species listed on Annex I of the E.U. Birds Directive include Little Egret, Whooper Swan, Greenland White-fronted Goose, Golden Plover, Kingfisher and Little Tern. Average peak winter counts from 1994/95 - 1997/98 showed the site to have an internationally important population of Brent Goose (1,318, higher than in the early 1990s), nationally important populations of Wigeon (1,518), Teal (772) and Lapwing (3,140), and regionally or locally important populations of Whooper Swan (80), Little Grebe (22), Shelduck (95), Gadwall (9), Mallard (391), Shoveler (22), Golden Plover (615), Curlew (605) and Redshank (181). Greylag Goose numbers were nationally important in the early 1990s but these numbers have dropped off. The average peak is now 213.

Little Tern breed on the shingle beach near The Breaches and this is the largest colony on the east coast (approx. 50 pairs in 1993, an average of 37 pairs over the ten year period 1988-1998). Redshank, Oystercatcher, Ringed Plover and Water Rail also breed. The reedbeds at Broad Lough provide habitat for Reed Warbler and the rare Bearded Tit has bred here.
Otter has been reported regularly from the Murrough. This is a Red Data Book Species, and is also listed on Annex II of the Habitats Directive.

Recent farming and drainage practices and afforestation have greatly reduced the area and quality of the wetlands habitats - the area between Kilcoole and Newcastle is particularly affected. In 1997 there was some levelling of the sand hills below Killoughter station. Pollution, reclamation and further drainage would adversely affect this site. A section of the wetlands at Blackditch, which includes alkaline and *Cladium* fen, has been acquired by BirdWatch Ireland and is being managed for nature conservation.

This site is of importance as it is the largest coastal wetland complex on the east coast of Ireland. Although much affected by drainage, it still contains a wide range of coastal and freshwater habitats, including six listed on Annex I of the E.U. Habitats Directive, some of which contain threatened plants. Areas on the site contain a rich invertebrate fauna, including several rarities. It is an important site for both wintering and breeding birds and supports a variety of species listed on Annex I of the E.U. Birds Directive.

- ***The Murrough SPA (Site code 004186)***

The Murrough SPA comprises a coastal wetland complex that stretches for 13 km from Kilcoole Station, east of Kilcoole village in the north to Wicklow town in the south, and extends inland for up to 1 km in places. The site includes an area of marine water to a distance of 200m from the low water mark. A shingle ridge runs along the length of the site and carries the Dublin-Wexford railway line.

Beside the shingle shore is a stony ridge supporting perennial vegetation. Driftline vegetation on the seaward side includes species such as Sea Rocket (*Cakile maritima*), Sea Sandwort (*Honkenya peploides*), Sea Holly (*Eryngium maritimum*) and Yellow-horned Poppy (*Glaucium flavum*). Low sand hills occur at Kilcoole, with Marram (*Ammophila arenaria*) and Lyme-grass (*Leymus arenarius*). In other areas and further inland a rich grassy sward, which is most extensive in the south end of the site, has developed. A community dominated by Silverweed (*Potentilla anserina*) and Strawberry Clover (*Trifolium fragiferum*) occurs in some of the wetter, grassy areas. In some places, particularly at the south of the site, a Gorse (*Ulex*) heath has developed on the stony ridge.

At the southern end of the site, Broad Lough, a brackish, partly tidal lake, has a well-developed saltmarsh community. Common Reed (*Phragmites australis*) is abundant along the western shore, along with some Sea Club-rush (*Scirpus maritimus*). Saltmarsh is also present in the northern end of the site in the vicinity of the Breaches. An area of fen occurs at Five Mile Point. Here, Black Bog-rush (*Schoenus nigricans*) is dominant. Fen Sedge (*Cladium mariscus*) is present where the ground is wetter. This merges into areas dominated by Common Reed. A wide range of freshwater and brackish marsh habitats occur within the site. These vary from reed-marsh dominated by reeds and rushes (*Juncus* spp.), to those of sedges (*Carex* spp.) with other areas supporting a mixture of sedges and Yellow Iris (*Iris pseudacorus*) also occurring. The marshes merge into wet grassland in many areas and where grazing pressure is low, a herb-rich sward occurs. Sedges are abundant in the wetter areas. Where drains have been cut, there are many other species such as Greater Spearwort (*Ranunculus lingua*), Bogbean (*Menyanthes trifoliata*) and Reed Sweet-grass (*Glyceria maxima*).

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Red-throated Diver, Greylag Goose, Light-bellied Brent Goose, Wigeon, Teal, Black-headed Gull, Herring Gull and Little 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.

The shingle ridge at Kilcoole is a traditional nesting area for Little Tern, and the site now supports one of the largest colonies in the country. Numbers vary between years, with 36 pairs recorded in 1995 and 106 pairs in 2006. A tern protection scheme and research programme, co-ordinated by BirdWatch Ireland and the National Parks and Wildlife Service, has been in operation since 1985. Breeding success varies from year to year, largely due to predation by foxes, crows and other species.

During the winter this site is important for a number of waterbirds - all population sizes are the mean of peak counts for the 5 years, 1995/96 – 1999/2000. Light-bellied Brent Goose occurs here in internationally important numbers (859). Other species that visit here in nationally important numbers are Red-throated Diver (32), Greylag Goose (300), Wigeon (1,209), Teal (644), Black-headed Gull (997) and Herring Gull (506). Other species that are known to occur here are Little Grebe, Grey Heron, Cormorant, Mute Swan, Whooper Swan, Greenland White-fronted Goose, Shelduck, Gadwall, Shoveler, Mallard, Golden Plover, Ringed Plover, Lapwing, Dunlin, Curlew, Greenshank and Redshank.

Short-eared Owl is recorded here during the winter. Little Egret has bred locally in recent years and this site is a main feeding area, with several birds present regularly. While formerly a rare bird in Ireland, Little Egret is now well-established with most birds occurring in the south-east and south (Counties Wexford, Waterford and Cork). The Murrough is presently at the edge of the species' range. This site is one of the few sites in Ireland where Reed Warbler breeds regularly. It is considered that 1-4 pairs bred each year during the 1980s and early 1990s, with a minimum of 6 birds in song in 1993. An absence of records since 1996 may be due to under-recording. Kingfisher regularly uses the site. Sandwich Tern are recorded from the site during the autumn.

The Murrough SPA is an important site for wintering waterbirds, being internationally important for Light-bellied Brent Goose and nationally important for Red-throated Diver, Greylag Goose, Wigeon, Teal, Black-headed Gull and Herring Gull. It is probably the most important site in the country for nesting Little Tern. The regular occurrence of Red-throated Diver, Little Egret, Whooper Swan, Greenland White-fronted Goose, Golden Plover, Little Tern, Sandwich Tern, Short-eared Owl and Kingfisher is of note as these species are listed on Annex I of the E.U. Birds Directive. Part of the Murrough SPA is a Wildfowl Sanctuary.

3.2. Conservation Objectives of European Sites

3.2.1. The Murrough Wetlands SAC (002249)

Specific Conservation Objectives are set by the NPWS (Version 1; 8 October 2024) for The Murrough Wetlands SAC (002249) as follows.

1210 Annual vegetation of drift lines

To restore the favourable conservation condition of Annual vegetation of drift lines in The Murrough Wetlands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Annual vegetation of drift lines was surveyed and mapped in The Murrough Wetlands SAC by Martin (2019) to give a total estimated area of c.5.2ha. See map 3. The habitat is very difficult to measure in view of its dynamic nature which means that it can appear and disappear within a site from year to year. See The Murrough Wetlands SAC conservation objectives supporting document for coastal habitats for further details. It is important to note that due to natural coastal processes, area and distribution are dynamic and subject to change from year to year
Habitat distribution	Occurrence	No decline, subject to natural processes, including erosion and succession. See map 3 for the habitat recorded by Martin (2019)	Distribution based on data from Martin (2019). See the coastal habitats supporting document for further details. It is important to note that due to natural coastal processes, area and distribution are dynamic and subject to change from year to year
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Restore the natural circulation of sediment and organic matter, without any physical obstructions	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. Physical barriers will affect sediment supply at these sites. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Attribute and target based on Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and orache (*Atriplex* spp.)	Attribute and target based on Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: native negative indicator species	Percentage	Native negative indicator species cover in any individual monitoring stop should not be more than 25%; no negative indicator species should be present in more than 60% of monitoring stops; cover of negative indicator species across the whole site should not be more than 5%	Attribute and target based on Delaney et al. (2013), where the list of native negative indicator species is listed. Negative indicators include species indicative of changes in nutrient status and species not considered characteristic of the habitat. See the coastal habitats supporting document for further details
Vegetation composition: non-native species	Percentage	Non-native species should not be present in more than 20% of monitoring stops	Attribute and target based on Delaney et al. (2013). See the coastal habitats supporting document for further details

1220	Perennial vegetation of stony banks

To restore the favourable conservation condition of Perennial vegetation of stony banks in The Murrough Wetlands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Perennial vegetation of stony banks was surveyed and mapped in The Murrough Wetlands SAC by Martin (2019) to give a total estimated area of c.13ha. See map 3. See The Murrough Wetlands SAC conservation objectives supporting document for coastal habitats for further details. It is important to note that due to natural coastal processes, area and distribution are dynamic and subject to change from year to year
Habitat distribution	Occurrence	No decline in habitat distribution, subject to natural processes, including erosion and succession. See map 3 for the habitat recorded by Martin (2019)	Distribution based on data from Martin (2019). See the coastal habitats supporting document for further details. It is important to note that due to natural coastal processes, area and distribution are dynamic and subject to change from year to year
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Restore the natural circulation of sediment and organic matter, without any physical obstructions	Attribute and target based on Martin et al. (2017). See the coastal habitats supporting document for further details
Physical structure: disturbance	Percentage	No more than 20% of the habitat affected by disturbance	Attribute and target based on Martin et al. (2017). Disturbance can include damage from heavy trampling, vehicle damage and removal of substrate. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats, including transitional zones, subject to natural processes, including erosion and succession	Attribute and target based on Martin et al. (2017). See the coastal habitats supporting document for further details
Vegetation composition: communities and typical species	Percentage	Maintain the typical species within the range of vegetated shingle communities	Attribute and target based on Martin et al. (2017) where information on the vegetated shingle communities and associated typical species lists are presented. See the coastal habitats supporting document for details on the pioneer, grassland and scrub communities of the habitat recorded by Martin (2019) in The Murrough Wetlands SAC
Vegetation composition: native negative indicator species	Percentage	Native negative indicator species cover in any individual monitoring stop should not be more than 25%; no negative indicator species should be present in more than 60% of monitoring stops	Attribute and target based on Martin et al. (2017) where the list of negative indicator species for the habitat is also presented. Negative indicators include species indicative of changes in nutrient status and species not considered characteristic of the habitat. See the coastal habitats supporting document for further details
Vegetation composition: non-native species	Percentage	Non-native species cover in any individual monitoring stop should not be more than 1%; non-native species should not be present in more than 20% of monitoring stops; cover of non-native species across the whole site should not be more than 1%	Attribute and target based on Martin et al. (2017). See the coastal habitats supporting document for further details

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

To restore the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in The Murrough Wetlands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	As part of the Saltmarsh Monitoring Project 2017-2018 (Brophy et al., 2019), the sub-site Broad Lough (site code SMP0135) within The Murrough Wetlands SAC was surveyed and mapped, with an area of 16.57ha of Atlantic salt meadows (ASM) habitat recorded. As part of the baseline Saltmarsh Monitoring Project 2006-2008 (McCorry, 2007; McCorry and Ryle, 2009), an area of 0.07ha of ASM was recorded within the northern boundary of the SAC at the sub-site Kilcoole (SMP0036) by McCorry and Ryle (2009). Thus, the total area of the habitat in the SAC is estimated to be 16.64ha. See map 4. Habitat loss was noted by Brophy et al. (2019) due to construction of a track associated with drainage works at the Broad Lough sub-site. See The Murrough Wetlands SAC conservation objectives supporting document for coastal habitats for further details. It is important to note that due to natural coastal processes, area and distribution are dynamic and subject to change from year to year
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 4	Distribution based on data from Brophy et al. (2019) and McCorry and Ryle (2009). See the coastal habitats supporting document for further details. It is important to note that due to natural coastal processes, area and distribution are dynamic and subject to change from year to year
Physical structure: hydrology	Occurrence of human disturbance to hydrology (including impacts on creeks and pans)	No human disturbance	Attribute and target based on Brophy et al. (2019). In this SAC, drainage works were noted in the habitat in the sub-site Broad Lough (site code SMP0135) by Brophy et al. (2019). See the coastal habitats supporting document for further details
Vegetation structure: plant height	Standard deviation of median of maximum leaf height from four quadrants of a representative number of 2m x 2m monitoring plots	Standard deviation of median plant height more than 5	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details
Vegetation structure: disturbed ground	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of disturbed ground less than 5%	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details
Vegetation structure: zonation	Number of zones covering 1% or more of the habitat	Adequate number of zones present, depending on geographical type of saltmarsh	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details
Vegetation structure: transitions	Occurrence of natural transitions to semi-natural terrestrial habitats on landward margin	No loss of natural transitions	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details
Vegetation composition: typical species	Frequency of typical species within a representative number of 2m x 2m monitoring plots	Minimum of twelve typical species recorded across all plots	Attribute and target based on Brophy et al. (2019), where the list of typical species for this habitat is presented. See the coastal habitats supporting document for further details

Vegetation composition: negative species	Occurrence in habitat; percentage cover of *Spartina* spp. within 5m radius of the centre of a representative number of monitoring stops	*Spartina* spp. have not been recorded in the habitat in this SAC and establishment should be prevented	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details
Other negative indicators	Occurrence at a representative number of 2m x 2m monitoring plots	No signs of infilling, reclamation, turf-cutting or pollution or other negative indicators	Attribute and target based on Brophy et al. (2019). In the habitat in the sub-site Broad Lough (site code SMP0135), disturbance due to use of a mechanical digger and deposition of dredged materials was recorded by Brophy et al. (2019). See the coastal habitats supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Attribute and target based on Brophy et al. (2019). The locally distinctive sea couch (*Elytrigia atherica*) was recorded in the habitat in the Broad Lough sub-site (SMP0135) by Brophy et al. (2019). See the coastal habitats supporting document for further details

1410 Mediterranean salt meadows (Juncetalia maritimi)

To restore the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in The Murrough Wetlands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession	As part of the Saltmarsh Monitoring Project 2017-2018 (Brophy et al., 2019), the sub-site Broad Lough (site code SMP0135) within The Murrough Wetlands SAC was surveyed and mapped, with an area of 5.17ha of Mediterranean salt meadows (MSM) habitat recorded. See map 5. See The Murrough Wetlands SAC conservation objectives supporting document for coastal habitats for further details. It is important to note that due to natural coastal processes, range and area are dynamic and subject to change from year to year
Habitat distribution	Occurrence	No decline, subject to natural processes	Based on data from Brophy et al. (2019). See the coastal habitats supporting document for further details. It is important to note that due to natural coastal processes, range and area are dynamic and subject to change from year to year
Physical structure: hydrology	Occurrence of human disturbance to hydrology (including impacts on creeks and pans)	No human disturbance	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details
Vegetation structure: disturbed ground	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of disturbed ground less than 5%	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details
Vegetation structure: transitions	Distribution of natural transitions to semi-natural terrestrial habitats on landward margin	No loss of natural transitions	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details
Vegetation composition: typical species	Frequency of typical species within a representative number of 2m x 2m monitoring plots	Minimum of six typical species recorded across all plots; minimum two typical species in more than 25% of plots (excluding *Juncus maritimus*)	Attribute and target based on Brophy et al. (2019), where the list of typical species for this habitat is presented. See the coastal habitats supporting document for further details
Vegetation composition: negative species	Occurrence in habitat; percentage cover of *Spartina* spp. within 5m radius of the centre of a representative number of monitoring stops	*Spartina* spp. have not been recorded in the habitat in this SAC and establishment should be prevented	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details
Other negative indicators	Occurrence at a representative number of 2m x 2m monitoring plots	No signs of infilling, reclamation, turf-cutting or pollution or other negative indicators	Attribute and target based on Brophy et al. (2019). Infilling of the habitat in the sub-site Broad Lough (site code SMP0135) was recorded by Brophy et al. (2019). See the coastal habitats supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Attribute and target based on Brophy et al. (2019). See the coastal habitats supporting document for further details

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

To restore the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae* in The Murrough Wetlands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	As part of the Wicklow Wetlands Survey (Wilson et al., 2012), Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae* was mapped with an area of c.10.2ha, with a further 21.3ha mapped in mosaic with Alkaline fens (Annex I habitat code 7230). See map 6. This a minimum area estimate for the habitat in The Murrough Wetlands SAC. It is important to note that further unsurveyed areas may be present in the SAC. Although the area of fen was more extensive in the past, the SAC still contains one of the best examples of coastal fen in the country (NPWS internal files). See also the conservation objective for Alkaline fens (7230) in this volume
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6	Distribution based on Wilson et al. (2012). It is important to note that further unsurveyed areas may be present in the SAC. In this SAC, fens occur mostly between Five Mile Point and Six Mile Point, particularly in the townland of Blackditch, and have also been reported from the Leamore, Grange, Castlegrange and Killoughter areas in the SAC (Wilson et al., 2012; NPWS internal files)
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	Relevant nutrients and their natural ranges are yet to be defined. Increased nutrients can lead to changes in plant and invertebrate species through competition and subsequent structural changes to micro-habitats. These nutrients favour growth of grasses rather than forbs and mosses and leads to a higher and denser sward
Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	Maintain active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time
Ecosystem function: hydrology - groundwater levels	Water levels (centimetres); duration of levels; hydraulic gradients; water supply	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Fen habitats require high groundwater levels (i.e. water levels at or above the ground surface) for a large proportion of the calendar year (i.e. duration of mean groundwater level). Fen groundwater levels are controlled by regional groundwater levels in the contributing catchment area (which sustain the hydraulic gradients of the fen groundwater table). Regional abstraction of groundwater may affect fen groundwater levels
Ecosystem function: hydrology - surface water flow	Drain density and form	Maintain, or where necessary restore, as close as possible to natural or semi-natural, drainage conditions	Drainage, either within or surrounding the fen habitat, can result in the drawdown of the groundwater table. The depth, geometry and density of drainage (hydromorphology) will indicate the scale and impact on fen hydrology. Drainage can result in loss of characteristic species and transition to drier habitats. In this SAC, some of the habitat has been damaged by drainage in the past (NPWS internal files)
Ecosystem function: water quality	Various	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus, with the latter tending to be the limiting nutrient under natural conditions. Water supply should be also relatively calcium-rich
Vegetation composition: cover of *Cladium mariscus*	Percentage cover at a representative number monitoring stops	Cover of *Cladium mariscus* at least 25%	Attribute and target based on O'Neill et al. (in prep.)

Vegetation composition: typical vascular plants	Percentage cover at a representative number monitoring stops	Maintain adequate cover of typical vascular plant species	For lists of typical vascular plant species, including high quality indicators, see O'Neill et al. (in prep.)
Vegetation composition: native negative indicator species	Percentage cover at a representative number of monitoring stops	Cover of native negative indicator species at insignificant levels	Negative indicators include species not characteristic of the habitat and species indicative of undesirable activities such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. Native negative indicators may include *Anthoxanthum odoratum, Epilobium hirsutum, Holcus lanatus, Juncus effusus, Phragmites australis, Ranunculus repens* and *Typha latifolia*. See O'Neill et al. (in prep.)
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Cover of non-native species less than 1%	Attribute and target based on O'Neill et al. (in prep.). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on O'Neill et al. (in prep.). Scrub and trees will tend to invade if fen conditions become drier
Vegetation composition: algal cover	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of algae less than 2%	Attribute and target based on O'Neill et al. (in prep.). Algal cover is indicative of nutrient enrichment from multiple sources (McBride et al., 2011)
Vegetation structure: vegetation height	Percentage cover at a representative number of monitoring stops	At least 10% of live shoots more than 1m high	Attribute and target based on O'Neill et al. (in prep.)
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of disturbed bare ground not more than 10%	Attribute and target based on O'Neill et al. (in prep.). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes. Disturbance can include hoof marks, wallows, human footprints, vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	Attribute and target based on O'Neill et al. (in prep.)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes	This includes species on the Flora (Protection) Order, 2015 and species of flora and fauna on Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). The Annex II listed and Endangered (Byrne et al., 2009) Desmoulin's whorl snail (*Vertigo moulinsiana*) has been recorded in *Cladium* fen and associated habitats in the SAC (Moorkens and Killeen, 2011; Long and Brophy, 2019; Brophy and Long, 2019)
Transitional areas between fen and adjacent habitats	Hectares; distribution	Maintain/restore adequate transitional areas to support/protect the *Cladium* fen habitat and the services it provides	In many cases, fens transition to other wetland habitats. It is important that the transitional areas between *Cladium* fen and other habitats are maintained in as natural condition as possible in order to protect the functioning of the fen. The habitat occurs in association with alkaline fens in this SAC (see the conservation objective for habitat 7320 in this volume) as well as common reed (*Phragmites australis*) beds and other swamp vegetation types, and wet woodland

7230 Alkaline fens

To restore the favourable conservation condition of Alkaline fens in The Murrough Wetlands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	As part of the Wicklow Wetlands Survey (Wilson et al., 2012), Alkaline fen was mapped in mosaic with Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae* with a minimum area of c.21.3ha in The Murrough Wetlands SAC (see map 6). It is important to note that further unsurveyed areas may be present in the SAC. See also the conservation objective for Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae* (habitat code 7210) in this volume. Although the area of fen was more extensive in the past, the SAC still contains one of the best examples of coastal fen in the country (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6	Distribution based on Wilson et al. (2012). It is important to note that further unsurveyed areas may be present in the SAC. In this SAC, fens occur mostly between Five Mile Point and Six Mile Point, particularly in the townland of Blackditch, and have also been reported from the Leamore, Grange, Castlegrange and Killoughter areas in the SAC (Wilson et al., 2012; NPWS internal files)
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat in NPWS (2013). See also Bobbink and Hettelingh (2011). Increased nutrients can lead to changes in plant and invertebrate species through competition and subsequent structural changes to micro-habitats. These nutrients favour growth of grasses rather than forbs and mosses and leads to a higher and denser sward
Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	Maintain active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time
Ecosystem function: hydrology - groundwater levels	Water levels (centimetres); duration of levels; hydraulic gradients; water supply	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Fen habitats require high groundwater levels (i.e. water levels at or above the ground surface) for a large proportion of the calendar year (i.e. duration of mean groundwater level). Fen groundwater levels are controlled by regional groundwater levels in the contributing catchment area (which sustain the hydraulic gradients of the fen groundwater table). Regional abstraction of groundwater may affect fen groundwater levels
Ecosystem function: hydrology - surface water flow	Drain density and form	Maintain, or where necessary restore, as close as possible to natural or semi-natural, drainage conditions	Drainage, either within or surrounding the fen habitat, can result in the drawdown of the groundwater table. The depth, geometry and density of drainage (hydromorphology) will indicate the scale and impact on fen hydrology. Drainage can result in loss of characteristic species and transition to drier habitats. In this SAC, some of the habitat has been damaged by drainage in the past (NPWS internal files)
Ecosystem function: water quality	Various	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus, with the latter tending to be the limiting nutrient under natural conditions. Water supply should be also relatively calcium-rich

Vegetation composition: community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The entire diversity of alkaline fen vegetation communities present in the SAC is currently unknown. Information on the vegetation communities associated with alkaline fens is provided by O'Neill et al. (in prep.). See also the Irish Vegetation Classification (Perrin, 2018; www.biodiversityireland.ie/projects/ivc-classification-explorer)
Vegetation composition: typical brown mosses	Percentage cover at a representative number of monitoring stops	Maintain adequate cover of typical brown moss species	For lists of typical bryophyte species, including high quality indicator species, see O'Neill et al. (in prep.)
Vegetation composition: typical vascular plants	Percentage cover at a representative number of monitoring stops	Maintain adequate cover of typical vascular plant species	For lists of typical vascular plant species for the different vegetation communities, including high quality indicators, see O'Neill et al. (in prep.)
Vegetation composition: native negative indicator species	Percentage cover at a representative number of monitoring stops	Cover of native negative indicator species at insignificant levels	Negative indicators include species not characteristic of the habitat and species indicative of undesirable activities such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. Native negative indicators may include *Anthoxanthum odoratum, Epilobium hirsutum, Holcus lanatus, Juncus effusus, Phragmites australis* and *Ranunculus repens*. See O'Neill et al. (in prep.)
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Cover of non-native species less than 1%	Attribute and target based on O'Neill et al. (in prep.). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on O'Neill et al. (in prep.). Scrub and trees will tend to invade if fen conditions become drier
Vegetation composition: algal cover	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of algae less than 2%	Attribute and target based on O'Neill et al. (in prep.). Algal cover is indicative of nutrient enrichment from multiple sources (McBride et al., 2011)
Vegetation structure: vegetation height	Percentage cover at a representative number of monitoring stops	At least 50% of the live leaves/flowering shoots are more than either 5cm or 15cm above ground surface depending on community type	Attribute and target based on O'Neill et al. (in prep.). While grazing may be appropriate in this habitat, excessive grazing can reduce the ability of plant species to regenerate reproductively and maintain species diversity, especially if flowering shoots are cropped during the growing season
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of disturbed bare ground not more than 10%	Attribute and target based on O'Neill et al. (in prep.). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes. Disturbance can include hoof marks, wallows, human footprints, vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for peatlands
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	Attribute and target based on O'Neill et al. (in prep.).
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes	This includes species on the Flora (Protection) Order, 2015 and species of flora and fauna on Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). A number of rare and threatened invertebrates have been recorded in the alkaline fen and associated habitats in the SAC, including the Annex II listed and Endangered (Byrne et al., 2009) Desmoulin's whorl snail (*Vertigo moulinsiana*) (Moorkens and Killeen, 2011; Long and Brophy, 2019; Brophy and Long, 2019)

Transitional areas between fen and adjacent habitats	Hectares; distribution	Maintain/restore adequate transitional areas to support/protect the alkaline fen habitat and the services it provides	In many cases, fens transition to other wetland habitats. It is important that the transitional areas between fens and other habitats are maintained in as natural condition as possible in order to protect the functioning of the fen. Alkaline fen occurs in association with *Cladium* fen (see the conservation objective for the priority habitat 7120 in this volume), swamp vegetation types and wet woodland in the SAC

3.2.2. The Murrough SPA (004186)

Conservation Objectives are set by the NPWS (Version 1; 8 October 2024) for The Murrough SPA (004186) as follows.

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:
• its natural range, and area it covers within that range, are stable or increasing, and
• the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
• the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:
• population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
• the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
• there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

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

A001 Red-throated Diver *Gavia stellata* (maintain)

A043 Greylag Goose *Anser answer* (restore)

A046 Light-bellied Brent Goose *Branta bernicla hrota* (restore)

A050 Wigeon *Anas penelope* (maintain)

A052 Teal *Anas crecca* (maintain)

A179 Black-headed Gull *Chroicocephalus ridibundus* (maintain)

A184 Herring Gull *Larus argentatus* (maintain)

A195 Little Tern *Sterna albifrons* (maintain)

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, the following objective is included:

Objective: To maintain the Favourable conservation condition of Wetland habitats in The Murrough SPA as a resource for the regularly-occurring migratory waterbirds that utilise these areas.

3.3. Consideration of Impacts on European Sites

3.3.1. Habitats Directive Annex 1 Habitats

The Proposed Development site is located adjacent to the Kilcoole Stream which flows through Kilcoole discharging to the Murrough Wetlands and the Irish Sea c. 2.6 river km downstream.

The potential impacts on The Murrough Wetlands SAC (002249) and The Murrough SPA (004186) are considered in terms of hydrological connectivity with the Kilcoole Stream which discharges to the Murrough Wetlands.

There would be no direct impacts on the Murrough Wetlands European sites and there would be no habitat loss or fragmentation as a result of the proposed development in the Murrough Wetlands.

Having considered direct impacts and ruling them out, indirect impacts are then considered in terms of source pathway vectors.

Considering a worst-case scenario whereby the Proposed Development may result in a significant detrimental change in water quality in the Murrough Wetlands either alone or in combination with other projects or plans as a result of indirect pollution, the effect would have to be considered in terms of changes in water quality which would significantly affect the habitats or food sources for which the Murrough Wetlands European sites are designated, particularly on the fen and saltmarsh habitats which provide food sources and habitats for protected birds.

3.3.2. Habitats Directive Annex II Species

While not a Qualifying Interest of the Murrough Wetlands European sites, otters have been reported regularly from the Murrough. The otter (*Lutra lutra*) is listed under Annex II of the EU Habitats Directive and under Annex II of the Berne Convention; it is also a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000). Otters are found throughout Ireland and tend to occupy linear territories along watercourses and are rarely found far away from water. There would be no direct impacts on Otters and so the main concern is with regard to water quality and indirect impacts on water quality and prey species.

3.3.3. Birds Directive Annex I Species

The shingle ridge at Kilcoole is a traditional nesting area for Little Tern, and the site now supports one of the largest colonies in the country. Numbers vary between years, with 36 pairs recorded in 1995 and 106 pairs in 2006. A tern protection scheme and research programme, co-ordinated by BirdWatch Ireland and the National Parks and Wildlife Service, has been in operation since 1985. Breeding success varies from year to year, largely due to predation by foxes, crows and other species.

During the winter this site is important for a number of waterbirds - all population sizes are the mean of peak counts for the 5 years, 1995/96 – 1999/2000. Light-bellied Brent Goose occurs here in internationally important numbers (859). Other species that visit here in nationally important numbers are Red-throated Diver (32), Greylag Goose (300), Wigeon (1,209), Teal (644), Black-headed Gull (997) and Herring Gull (506). Other species that are known to occur here are Little Grebe, Grey Heron, Cormorant, Mute Swan, Whooper Swan, Greenland White-fronted Goose, Shelduck, Gadwall, Shoveler, Mallard, Golden Plover, Ringed Plover, Lapwing, Dunlin, Curlew, Greenshank and Redshank.

Short-eared Owl is recorded here during the winter. Little Egret has bred locally in recent years and this site is a main feeding area, with several birds present regularly. While formerly a rare bird in Ireland, Little Egret is now well-established with most birds occurring in the south-east and south (Counties

Wexford, Waterford and Cork). The Murrough is presently at the edge of the species' range. This site is one of the few sites in Ireland where Reed Warbler breeds regularly. It is considered that 1-4 pairs bred each year during the 1980s and early 1990s, with a minimum of 6 birds in song in 1993. An absence of records since 1996 may be due to under-recording. Kingfisher regularly uses the site. Sandwich Tern are recorded from the site during the autumn.

The main concern for Wintering birds and their supporting wetland habitats is with regard to water quality and indirect impacts on water quality and prey species which inhabit the fen and saltmarsh habitats.

3.3.4. Ecological Network Supporting Natura 2000 Sites

A concurrent GIS analysis of the proposed Natural Heritage Areas and designated Natural Heritage Areas in terms of their role in supporting the species using Natura 2000 sites was undertaken. These supporting roles mainly relate to mobile fauna such as mammals and birds which may use pNHAs and NHAs as "stepping stones" between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were taken into account during the AA process.

The nearest site designated for nature conservation, The Murrough pNHA (Site Code 000730), intersects both The Murrough Wetlands SAC (Site Code 002249) and The Murrough SPA (Site Code 004186) (see Figures 4 and 5) and is therefore also protected under the higher conservation status that applies to these sites, and is dealt with as such in this report.

3.3.5. Potential Impacts on European Sites

The Proposed Development is not directly connected with or necessary to the management of the European sites considered in the assessment and therefore potential downstream impacts must be identified and considered.

There will be no direct impacts on the SAC or SPA designated habitats as a result of the proposed development. Direct impact refers to physical impacts defined in the Departmental Guidance as 'Loss of habitat area' and/or 'Habitat Fragmentation'. Having established this, the assessment emphasis is placed on potential indirect and cumulative impacts.

The potential for impact is considered whereby the Proposed Development would result in a significant detrimental change in water quality either alone or in combination with other projects or plans as a result of indirect pollution of surface water. The effect would have to be considered in terms of changes in water quality or changes in hydrology which would affect the habitats or species for which the Murrough Wetlands European sites are designated. This is assessed by firstly establishing the pathways by which impacts could occur and then reviewing the design measures included which will avoid these impacts and then by also looking at the potential in-combination effects which will be assessed in Section 3.6 later in this report.

3.4. Description of the Existing Environment

This proposed development site is comprised of agricultural land which is used for arable crops (BC1). It is surrounded by a mature Treeline (WL2) on the western and southern boundary. The treeline is an overgrown hedgerow and is comprised predominantly of Ash (*Fraxinus excelsior*), Aspen (*Populus tremula*) and Horse chestnut (*Aesculus hippocastanum*) with Hawthorn (*Crataegus monogyna*) and Elder (*Sambucus nigra*) and abundant Bramble (*Rubus fruticosus* agg.) and Ivy (*Hedera helix*). The understorey is sparsely populated with grass (*Dactylis glomerata*), Cleavers (*Galium aparine*) and Cow parsley (*Anthriscus sylvestris*).

The eastern boundary comprised of scattered Elm and Hawthorn also contained Bush vetch (*Vicia sepium*), Lesser celandine (*Ranunculus ficaria*), Hart's-tongue fern (*Phyllitis scolopendrium*) and Broad Buckler-fern (*Dryopteris dilatata*).

There is an upland eroding stream on the outside of the site boundary and western treeline referred to as Kilcoole Stream. The stream is located on a lower bank below the treeline boundary.

The lands in which the proposed development is located have no formal designations. The nearest European sites are located at the Murrough Wetlands.

There are no rare or protected habitats recorded in the study area inside the site boundary. The site may be considered of Low to Moderate Ecological Value at a Local level.

3.5. Impacts on the Qualifying Interests of European Sites

3.5.1. Direct Impacts

There will be no direct impacts on the Murrough Wetlands SAC or SPA as a result of the implementation of the Proposed Development. Direct impact refers to physical impacts defined in the Departmental Guidance as 'Loss of habitat area' and/or 'Habitat Fragmentation'. There are no direct impacts identified which may affect the Annexed habitats or species of the SAC or SPA. The proposed

development will have **no impacts** upon the integrity or the site structure of the Murrough Wetlands SAC or SPA. There is an adequate distance between the proposed development site and designated areas to ensure that no direct impacts will occur.

Having established this, the assessment emphasis is placed on potential indirect and cumulative impacts.

The primary consideration in terms of source-vector-pathways for indirect impacts relates to surface water and potential indirect impacts on hydrologically linked habitats and aquatic species.

3.5.2. Indirect Impacts

The potential for impact is considered whereby the Proposed Development would result in a significant detrimental change in water quality either alone or in combination with other projects or plans as a result of indirect pollution of surface water. The effect would have to be considered in terms of changes in water quality which would affect the habitats or species for which the Murrough Wetlands SAC and SPA are designated.

Consideration of impacts on Surface Water

The potential for such an impact event to occur is unlikely, given that the project design includes a buffer zone of no development adjacent to the Kilcoole Stream. This can be read in the context of the existing site being ploughed each year with no significant impact on the Kilcoole Stream.

The contractor will be required to provide a Construction Environmental Management Plan (CEMP) which will outline best practice construction methodology to avoid potential local impacts on the adjacent Kilcoole Stream which will include the construction management measures listed in Section 3.6 as a minimum

Accidental spillages and contaminated runoff and will be avoided by construction management measures which will be set out in a Constriction Environmental Management Plan (CEMP). Management measures will include appropriate site-specific measures from the CIRIA Report C532 Control of Water Pollution from Construction Sites.

The CEMP will include a reference to the EcIA Report for the Proposed Development which establishes the connectivity of the Kilcoole Stream and the Murrough Wetlands and the requirement for avoidance in terms of both direct and indirect construction activity, e.g. machinery will not enter the stream and construction management will avoid indirect pollution of the water course.

Consideration of impacts from Wastewater

Wastewater from the proposed development will be directed to the Greystones WWTP which has the capacity to assimilate the additional load, see Annual Environmental Report for Greystones WWTP (2017) available online through the EPA.

3.6. Mitigation Measures

As a precaution, Best Practice Construction Management will be outlined in a Construction Environmental Management Plan (CEMP) and implemented during the construction phase. Management measures will include appropriate site-specific measures from the CIRIA Report C532 Control of Water Pollution from Construction Sites.

The CEMP will include a reference to the EcIA Report for the Proposed Development which establishes the connectivity of the Kilcoole Stream and Murrough Wetlands and the requirement for avoidance in terms of both direct and indirect construction activity, e.g. machinery will not enter the water course and construction management will avoid indirect pollution of the water course.

The contractor will be required to update the Construction Environmental Management Plan (CEMP) which will include best practice construction methodology to avoid potential local impacts on water quality in the Kilcoole Stream.

A sufficiently qualified ecologist will be nominated as an Ecological Clerk of Works (ECW) to ensure the implementation of all mitigation both at the construction and the operational stages (e.g. such as checking the working of petrol and oil interceptors etc,) of the proposed development and that all listed mitigation in both the NIS and EclAR are fully implemented and monitored.

The following construction management will be included as a minimum:

General

Prior to any works, all personnel involved will receive an on-site induction relating to operations adjacent to the watercourse.

The project proponent will ensure that the engineer setting out the works is fully aware of the ecological constraints and construction management requirements.

Any incident or observation of anything that may be considered as causing or likely to cause disturbance or damage to the water course will be reported to the Local Authority immediately. The Local Authority

will take immediate action to prevent or limit the impact and will notify the project proponent contact of the incident and the actions taken.

Pollution of watercourses

- The works area will be fenced with Terram or equivalent geo-textile fencing, secured to the ground to prevent the wash-out of suspended solids from the site to adjacent watercourse. Where possible, this will be set back from the riparian corridor of the watercourse to allow the retention of a buffer-zone of riparian vegetation along the drainage channels.
- The Contractor will establish site boundary markings to safeguard features of interest/value.
- Tools and equipment are not to be cleaned in the watercourse.
- Chemicals used will be stored in sealed containers.
- Chemicals shall be applied in such a way as to avoid any spillage or leakage.
- Any and all excavated material is NOT to be temporarily stored adjacent to the watercourse.

Fuel/Lubricant spillage from equipment

- All refuelling, oiling and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and watercourses and away from drains and the adjacent watercourse as far as reasonably practicable. Vehicles will not be left unattended during refuelling.
- Storage areas, machinery depots and site offices will be located at least 10m from any watercourse.
- Spill kits will be made available close to streams and all staff will be properly trained on correct use.
- All fuels, lubricants and hydraulic fluids required to be stored on site will be kept in secure bunded areas at a minimum of 10m from all watercourses. The bunded area will accommodate 110% of the total capacity of the containers within it.
- Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure will be put in place with all staff properly briefed. Any waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of offsite in an appropriate manner.
- All plant shall be well maintained with any fuel or oil drips attended to on an ongoing basis.
- Any minor spillage during this process will be cleaned up immediately.
- Should any incident occur, the situation will be dealt with and coordinated by the nearest supervisor who will be responsible for instructions by the Local Authority.

Concrete

- Wet concrete and cement are very alkaline and corrosive and can cause serious pollution to watercourses.
- Disposal of raw or uncured waste concrete will be controlled to ensure that the adjacent watercourse will not be impacted.
- Best practice in bulk-liquid concrete management addressing pouring and handling, secure shuttering / form-work, adequate curing times.
- Wash water from cleaning ready mix concrete lorries and mixers may be contaminated with cement and is therefore highly alkaline. Due to the size of the site and the proximity of a sensitive watercourse, it is recommended that lorries and mixers are washed out of off-site.

All surface water drainage networks will be designed in accordance with the *Greater Dublin Strategic Drainage Study and the requirements of Wicklow County Council.* SuDS will provide a comprehensive design approach to the management of water on site, to delay run-off and encourage filtration through the use of porous surfaces, rainwater harvesting etc. in ways which enhance amenity and biodiversity and minimise pollution effects. Therefore, the use of SuDS will provide benefits in what is described as the SuDS principles; water quality, water quantity and amenity/biodiversity.

3.7. Assessment of In-Combination Effects

Cumulative effects are described by the EPA as *the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects*. In combination effects are considered in the appropriate assessment process as an assessment of the potential adverse effects of a plan or project in combination with other plans or projects. The underlying intention of the in-combination provision is to take account of cumulative effects.

As part of the Screening for an Appropriate Assessment, in addition to the Proposed Development, other relevant plans and projects in the area must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination effects of the Proposed Development with other such plans and projects on European sites.

A review of the National Planning Application Database was undertaken. The database was then queried for developments granted planning permission within 500m of the Proposed Development within the last three years, these are presented in Table 4 below.

Table 4. Planning applications granted permission in the vicinity of the Proposed Development.

Planning Ref.	Description of development	Comments
211484	construction of a new single storey extension to side of the existing dwelling. Use of the proposed extension to provide an accessible, semi-independent living unit, designed to accommodate an immediate family member. Realignment of forecourt & driveway & all required ancillary site works, including paths, perimeter boundaries, planting and landscaping	No potential for in-combination effects given the inclusion of a CEMP.
221113	change of use from institutional residential to single-family residential and permission for the following; localised changes to external fenestration; localised replacement of windows with new replica windows; demolition of modern extensions; widening of gateway to yard; new gate to walled garden; blocking of gate to walled garden; construction of a new terrace to side of house; localised changes to plan form; removal of a floor in annexe; renewal of all heating, plumbing and electrical services and associated repairs; and erection of photovoltaic/solar panels on shed and old school house	No potential for in-combination effects given the inclusion of a CEMP.
221114	3 no. new dwellings, connection to all services and all associated site works	No potential for in-combination effects given the inclusion of a CEMP.
221128	alterations to previously approved application Ref: 16/477 extended under application Ref: 21/595, the proposed alterations consist of 4 No. two storey extensions to the rear of the 4 No. granted two storey terraced townhouses, revised window/door positions and revised material/finishes, and all associated site works	No potential for in-combination effects given the inclusion of a CEMP.
22114	shed to side and front of existing house and boundary wall on east side of house average height 1650m	No potential for in-combination effects given the inclusion of a CEMP.
221259	attic conversion to non-habitable storage space with a metal clad dormer to rear roof. Proposal for a roof window to front roof and all associated ancillary works	No potential for in-combination effects given the inclusion of a CEMP.
22266	conversion of existing attic area to non-habitable home office/gym/storage, with velux rooflights to front and rear roof profile, new window to gable wall, with internal modifications and associated site works	No potential for in-combination effects given the inclusion of a CEMP.
22466	convert roof space to living accommodation replacing existing hipped roof with gable and with new gable window and with rooflights to rear and with connection to all services and associated site works	No potential for in-combination effects given the inclusion of a CEMP.
22472	ground floor extension to front of house to include entrance porch and shower room and a ground floor extension to back to widen existing sunroom	No potential for in-combination effects given the inclusion of a CEMP.
22807	proposed development will consist of (1) the decommissioning and removal of existing temporary school accommodation units, (2) the construction of a new 2-storey school building extension with a total gross internal floor area of 5779.4sqm, incorporating classrooms and associated support teaching and tech spaces, offices and meeting rooms, a multi-use hall, and other ancillary accommodation, and to include photovoltaic panels at roof level, (3) minor works and modifications to the layout of existing school building (4) The school grounds, expanded eastward, will provide 4 no. hard surface ball courts, a grass sports pitch, outdoor seating and breakout areas, a sensory garden, a covered tech yard, 92sqm external storage along with refuse store, LPG and ASHP compounds, hard and soft landscaping with footpaths, public lighting and landscaping and all associated boundary treatments (5) The development will also include modifications to the existing site entrance arrangements with new pedestrian accesses and including the construction of a new separate vehicle egress (6) Parking and access arrangements are to include modifications to the car pick -up and bus set down areas, parking provision for 96no. cars, inclusive of 5no. disabled spaces and 10no. electric	No potential for in-combination effects given the inclusion of a CEMP.

Planning Ref.	Description of development	Comments
	vehicle charge points, 105no. sheltered cycle stands providing 210no. parking spaces, and 24no. non-sheltered cycle stands providing 48no. parking spaces. (7) Permission is also sought for new foul and surface water drainage system works incorporating SUDS measures, attenuation, rainwater harvesting, culverts to parts of existing drainage ditch and all other associated site and development works.	
22830	amendments to previously granted dwelling (PI Ref. 15/322 & 20/162). The development will consist of a new two storey dwelling house, with single storey visible to west / front and two storey to the east / rear and all ancillary site works	No potential for in-combination effects given the inclusion of a CEMP.
23197	construction of a single storey distribution warehouse, incorporating two storey offices, ancillary showroom, related signage, car and cycle parking, connection to existing services, boundary treatments, landscaping and associated site works, to include all necessary infrastructure to serve the proposed development	No potential for in-combination effects given the inclusion of a CEMP.
23431	construction of a new side and rear single storey flat roof extension along with front porch together with all associated ancillary site works and services	No potential for in-combination effects given the inclusion of a CEMP.
23462	(i) construction of a residential development comprising 12 No. Houses (2 No. House Type A- two-storey, with attic level accommodation, three-bedroom semi-detached dwelling with rear garden and 2 no. rooflights: 4 No. House Type B - two-storey, with attic level accommodation, three-bedroom terraced dwelling with rear garden and 2 no. rooflights: 2 No. House Type C - two-storey, with attic level accommodation, three-bedroom terraced dwelling with rear garden and 2 no. rooflights: 1 No. House Type D - two-storey, with attic level accommodation, three-bedroom detached dwelling with rear garden and 2 no. rooflights: and 3 No. House type E - two-storey, with attic level accommodation, three-bedroom terraced dwelling with rear garden and 2 no. rooflights) and, (ii) all ancillary works inclusive of new vehicular entrance off existing road to the south of the site, internal access road/footpaths, landscaping, boundary treatments and SuDS drainage, necessary to facilitate the development. Each house will be provided with 2 no. on-curtilage vehicular parking spaces and will have shared access to 847sq.m of communal amenity space.	No potential for in-combination effects given the inclusion of a CEMP.
2360071	for the following 1. Demolition of single storey Porch (1m²) to side and single storey extension (2.3m²)to rear of existing dwelling. 2. Construction of 2 storey 74.7m² extension to side and rear of existing 2 bed dwelling consisting of: New Sitting Room, WC & Utility at ground floor and New Masterbed, Ensuite and Storage area to First floor with 4 no. rooflights over 3. New Ground floor single storey Porch to side Together with all ancillary site works necessary to complete this development	No potential for in-combination effects given the inclusion of a CEMP.
2360120	the construction of single storey store outbuildings in rear garden.	No potential for in-combination effects given the inclusion of a CEMP.
2360171	a single storey flat roof extension to front elevation (west). Flat roof to extend over and replace existing porch roof and all associated site work	No potential for in-combination effects given the inclusion of a CEMP.
23866	(1) construction of a 32 sq.m. single storey extension to the rear and side of existing two storey house. (2) Associated works	No potential for in-combination effects given the inclusion of a CEMP.
23901	domestic store in the rear garden of a dwelling and associated works	No potential for in-combination effects given the inclusion of a CEMP.

Planning Ref.	Description of development	Comments
2415	convert roof space to living accommodation with rear dormer window and rooflight, replacing existing hipped roof with gable and "dutch" hip and with new gable window and with connection to all services and associated site works	No potential for in-combination effects given the inclusion of a CEMP.
24292	(1) Demolish existing single storey extension to rear of dwelling. (2) Construct new two storey extension to rear of existing dwelling. (3) Provide new window at first floor level to existing side elevation. (4) All above with associated siteworks. This house forms part of a terrace of Protected Structures (Ref. No. 13-07)	No potential for in-combination effects given the inclusion of a CEMP.
24369	the construction of two new bay windows with "apex" style roofs to font of the existing detached dwelling, existing external brick finish to be replaced with new external insulation with rendered wall finish. Existing front door to be removed and slightly relocated, replaced with new front door and side glazed screens, construction of new single storey en-suite rear extension to match existing single storey rear extension, minor external side elevation alterations, incorporating minor internal alterations on existing ground floor level. New attic flat roof dormer style conversion to rear of existing detached dwelling incorporating new toilet and extended bedroom areas to existing dormer attic level. Retention permission is sought for existing single storey sloped roof building (38sqm) to existing rear garden and associated site works	No potential for in-combination effects given the inclusion of a CEMP.
2458	an existing 402 m.m. wide x 977 m.m high obscured glazed window located on the gable end at first floor level	No potential for in-combination effects given the inclusion of a CEMP.
2460052	the construction of a single storey distribution warehouse incorporating two storey offices, ancillary showroom, related signage, car and cycle parking, connection to existing services, boundary treatments, landscaping and associated siteworks, to include all necessary infrastructure to serve the proposed development	No potential for in-combination effects given the inclusion of a CEMP.
2460088	the demolition of an existing derelict bungalow and shed, and construction of five two-storey 2-bedroom terraced dwellings, off-street carparking and all ancillary works within the 0.097hA site	No potential for in-combination effects given the inclusion of a CEMP.
2460111	Change of Use of Unit G1 granted planning in planning application 21/1271 from manufacturing unit to office building including an increased floor area from 508m2 to 764m2 provided by extending the first floor area and alterations to car parking on site to accommodate additional spaces	No potential for in-combination effects given the inclusion of a CEMP.
2460120	two storey extension to side of existing dwelling along with conversion of existing attic space	No potential for in-combination effects given the inclusion of a CEMP.
2460379	the inclusion of window to existing first floor bedroom on gable wall for escape purposes. Planning permission is also sought for the inclusion of 3 No. ground floor windows on side wall to provide natural light to existing large rooms	No potential for in-combination effects given the inclusion of a CEMP.
2460479	change of use from a manufacturing unit to a Food Intolerance Research Facility. The proposal includes changes to the internal layout, the addition of a mezzanine floor, two additional car parking spaces, minor alterations to external elevations, and all associated site development works	No potential for in-combination effects given the inclusion of a CEMP.
2460586	proposed new housing development consisting of 45 residential units. The development will comprise of 5 no. detached dwellings (Area 1) and 40 no. duplex /apartments (Area 2). 4. A new main vehicular/pedestrian accesses to the site will be sought to service the proposed development from Sea Road with another new vehicular entrance to service Sites 1-4 from Lott Lane, Site no. 5 will have a private new vehicular access from Sea Road; the development will be served by a new public foul sewer which connects to existing sewerage in Sea Rd; surface water from the development will be	No potential for in-combination effects given the inclusion of a CEMP.

Planning Ref.	Description of development	Comments
	attenuated in an on-site attenuation tank, with outfall connecting to a public surface water sewer on Sea Road; the development also includes connections to all utility services, mains water and public lighting as well as all soft and hard landscaping and boundary treatments including hedging, walls, fences and all site works	

The Wicklow County Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same potential Zone of Influence of the Proposed Development site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, in-combination impacts with Plans or Projects for the proposed development area and surrounding townlands in which the proposed development site is located, would be avoided.

The listed developments have been granted permission in most cases with conditions relating to sustainable development by the consenting authority in compliance with the relevant Local Authority Development Plan and in compliance with the Local Authority requirement with regard to the Habitats Directive. The development cannot have received planning permission without having met the consenting authority requirement in this regard.

Any new applications for the Proposed Development area will be assessed on a case by case basis *initially* by Wicklow County Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

4. Natura Impact Statement & Conclusion

This NIS has reviewed the predicted impacts arising from the Proposed Development and found that with the implementation of appropriate design and mitigation measures specifically with regard to surface control during construction and water wastewater management during operation, significant effects on the integrity of the Murrough Wetlands SAC and the Murrough SPA can be ruled out.

It is the conclusion of this NIS, on the basis of the best scientific knowledge available, and with the implementation of the mitigation and restriction measures set out under Section 3.6, that the possibility of any adverse effects on the integrity of the European Sites considered in this NIS (having regard to their conservation objectives), arising from the Project, either alone or in combination with other plans or projects, can be excluded beyond reasonable scientific doubt.

A final determination will be made by the competent authority in this regard.

5. References

Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of plans and projects in Ireland (as amended February 2010).

European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission Environment DG (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43EEC. European Commission, Brussels.

European Commission (2007) Guidance document on Article 6(4) of the 'Habitats Directive '92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.

European Commission (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Brussels 28.9.21.

European Commission (2021) Guidance document on the strict protection of animal species of Community interest under the Habitats Directive, Brussels 12.10.21.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2021) Conservation Objectives: The Murrough Wetlands SAC 002249.Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

NPWS (2024) Conservation Objectives: The Murrough SPA 004186. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

NPWS (2025) National Parks and Wildlife Service Metadata available online at https://www.npws.ie/maps-and-data

Office-of-the-Planning-Regulator (2021) Appropriate Assessment Screening for Development Management OPR Practice Note PN01. March 2021