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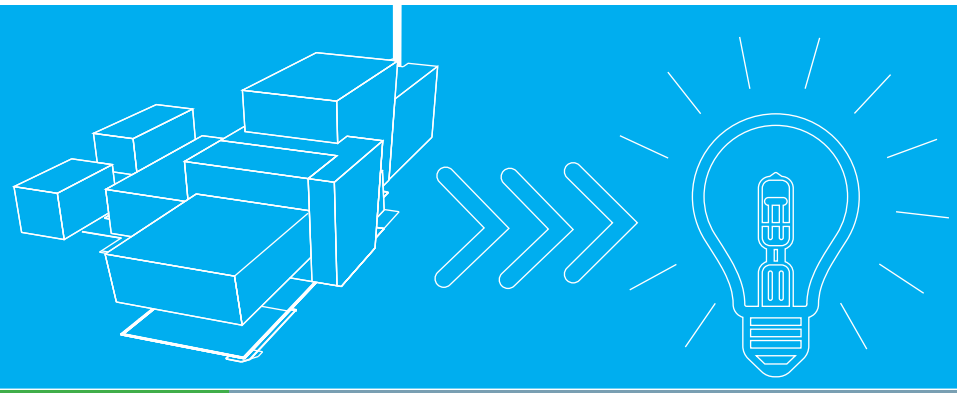
RINGASKIDDY RESOURCE RECOVERY CENTRE

Issue 2 | 2025



Natura Impact Statement

ARUP

DixonBrosnan
environmental consultants

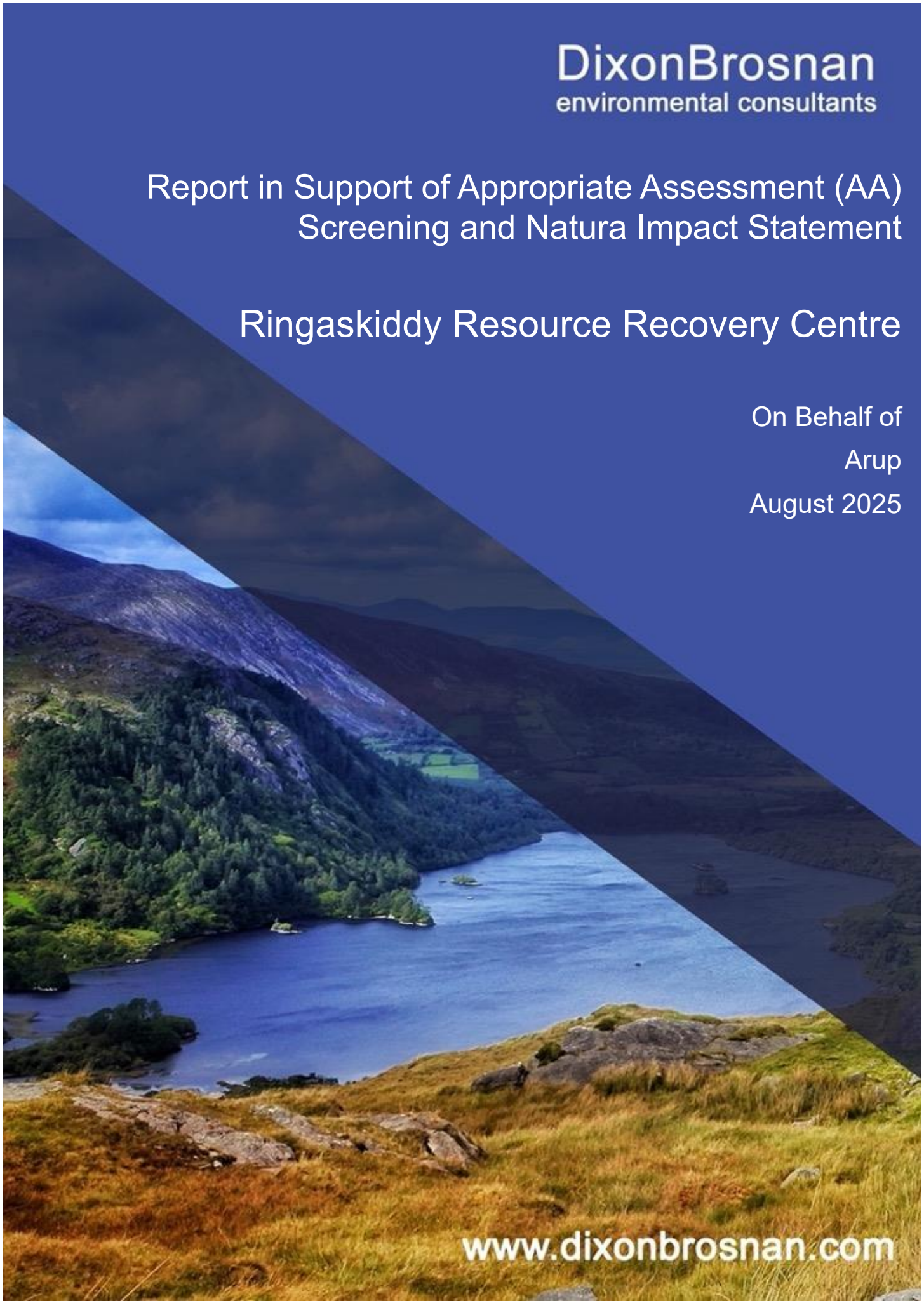
Report in Support of Appropriate Assessment (AA) Screening and Natura Impact Statement

Ringaskiddy Resource Recovery Centre

On Behalf of

Arup

August 2025



DixonBrosnan

environmental consultants

Project	Report in Support of Appropriate Assessment (AA) Screening and Natura Impact Statement (NIS) for the Ringaskiddy Resource Recovery Centre, Ringaskiddy, Co. Cork	
Client	Arup	
Project Ref.	25081	
Report No.	25081.01	
Client Ref.		
Date	**Revision**	**Prepared By**
30/07/25	First Draft	Sorcha Sheehy BSc PhD
12/08/25	Second Draft	Carl Dixon BSc MSc
22/08/25	Issue to client	

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1. Introduction

1.1 Background

The information in this report has been compiled by DixonBrosnan Environmental Consultants, on behalf of the applicant. It provides information on and assesses the potential for the proposed Ringaskiddy Resource Recovery Centre, Ringaskiddy, Co. Cork (hereafter referred to as the '*proposed development*') to impact on any Natura 2000 sites within its likely zone of impact. The information in this report forms part of and should be read in conjunction with the planning documentation being submitted to An Coimisiún Pleanála (ACP) in connection with the proposed development.

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) put an obligation on EU Member States to establish the Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SACs, including candidate SACs) and Special Protection Areas (SPAs, including proposed SPAs). SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests of the sites and from these the conservation objectives of the site are derived. The Birds and Habitats Directives set out various procedures and obligations in relation to nature conservation management in Member States in general, and of the Natura 2000 sites and their habitats and species in particular. A key protection mechanism is the requirement to consider the possible nature conservation implications of any plan or project on the Natura 2000 site network before any decision is made to allow that plan or project to proceed. Not only is every new plan or project captured by this requirement but each plan or project, when being considered for approval at any stage, must take into consideration the possible effects it may have in combination with other plans and projects when going through the process known as Appropriate Assessment (AA).

The obligation to undertake Appropriate Assessment (AA) derives from Article 6(3) and 6(4) of the Habitats Directive, and both involve a number of steps and tests that need to be applied in sequential order. Article 6(3) is concerned with the strict protection of sites, while Article 6(4) is the procedure for allowing derogation from this strict protection in certain restricted circumstances. As set out in Section 177U of the Planning and Development Act 2000 as amended, a screening for appropriate assessment of an application for consent for the proposed development must be carried out by the competent authority to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effect on any European site. Each step in the assessment process precedes and provides a basis for other steps. The results at each step must be documented and recorded carefully so there is full traceability and transparency of the decisions made.

1.2 Aim of Report

The purpose of this report is to inform the AA process as required under the Habitats Directive (92/43/EEC) in instances where a plan or project may give rise to significant impacts on a

Natura 2000 site. This report aims to inform the Appropriate Assessment process in determining whether the proposed development, both alone and in combination with other plans or projects, are likely to have a significant impact on the Natura 2000 sites in the study area, in the context of their conservation objectives and specifically on the habitats and species for which the sites have been designated.

This report has been prepared with regard to the following guidance documents, where relevant.

- *Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC (European Commission (EC), 2018);*
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodical Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission (EC), 2021);*
- *Guidance Document on Article 6(4) of the Habitats Directive 92/43/EEC (European Commission, (EC) 2007);*
- *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010 revision);*
- *Appropriate Assessment under Article 6 of the Habitats Directive; Guidance for Planning Authorities. Circular NPW 1/10 and PSSP 2/10 (Department of Environment, Heritage and Local Government, 2010);*
- *Guidelines for Good Practice Appropriate Assessment of Plans under Article 6(3) Habitats Directive (International Workshop on Assessment of Plans under the Habitats Directive, 2011);*
- *Commission notice Guidance document on wind energy developments and EU nature legislation, (EC 2020);*
- *Communication from the Commission on the precautionary principle. European Commission (2000)*
- *Assessment of plans & projects in relation to N2K sites – Methodological Guidance (EC 2021)*
- *Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC 2021)*
- *EC Commission Notice 2021/C 437/01 'Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'.*
- *People Over Wind and Peter Sweetman v. Coillte Teoranta (People Over Wind) [2018] C-323/17 and*
- *Kelly -v- An Bord Pleanála & anor [2019] IEHC 84*

1.3 Authors of Report

This report and survey work was completed by Carl Dixon MSc (Ecological Monitoring) and Dr. Sorcha Sheehy PhD (Ecology/ornithology). A survey of the intertidal area in proximity to the proposed development was carried out by Dr. Stiofan Creaven.

Carl Dixon holds an Honours Degree (BSc) in Ecology and a Masters (MSc) in Ecological Monitoring from UCC. He is a senior ecologist who has over 25 years' experience in ecological assessment. Prior to setting up DixonBrosnan Environmental Consultants in 2000, Carl set up and ran Core Environmental Services which included REPS (Rural Environmental Planning Scheme) planning for landowners and ecological assessments. Carl has particular experience in freshwater ecology, including electrofishing fish stock assessments and water quality assessments. He also has considerable experience in habitat mapping and mammal ecology including survey work and reporting in relation to Badgers and bats. Other competencies include surveys for invasive species and bird surveys. Carl has extensive experience with regards to EIAR and NIS mitigation and impact assessment. He has experience in large-scale industrial developments with extensive experience in complex assessments as part of multi-disciplinary teams. Such projects include gas pipelines, incinerators, electrical cable routes, oil refineries and quarries.

Sorcha Sheehy PhD (Ecology/ornithology) is an ecologist and ornithologist who has worked for 15 years in environmental consultancy. She has worked on Screening/NISs for a range of small and large-scale projects with expertise in assessing impacts on birds. Sorcha's PhD research focused on bird behaviour at airports, where she studied bird avoidance behaviour and collision risk to aircraft. Her research involved field observations, post-mortem analysis and radar surveys. Sorcha has worked on bird collision risk assessments at airports throughout Ireland including Dublin airport, Cork airport, Shannon airport and Kerry airport. During her consultancy work Sorcha carried out field-based surveys and environmental reports including NIS, AA screening and EIARs. Notable projects include the Arklow Bank Wind Park, Indaver Ireland Waste Management Facility at Ringaskiddy, Irving Oil Whitegate Refinery (IOWR), Shannon LNG and Greenlink Interconnector.

Stiofán Creaven PhD has a background in marine community ecology and taxonomy and the application of various environmental survey/data gathering methodologies and imaging technologies to habitat mapping and the assessment of impacts to aquatic environments. His experience in the field of underwater survey has included the use of sediment sampling devices in support of geotechnics (grabs, corers, etc.), water samplers, current meters (direct reading flow meters, AWAC, ADCP, AquaDopp, Sondes/CTDs), diver-deployed imaging and sampling systems (amphibious cameras, housed SLRs & ROV-mounted video systems) and numerous remote systems (laser stripe illumination/SIT systems, drop-down/sled-mounted/ROV-mounted video and stills and sediment profile imagery SPI) in Irish waters and internationally. He also have experience in the use of a number of acoustic survey technologies.

2. Regulatory Context and Appropriate Assessment Procedure

2.1 Regulatory Context

The Habitats Directive (Council Directive 92/43/EEC on the *Conservation of Natural Habitats and of Wild Fauna and Flora*) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe. The requirements of these directives are transposed into Irish law through the European Communities (Birds and Natural Habitats Regulations 2012-2021).

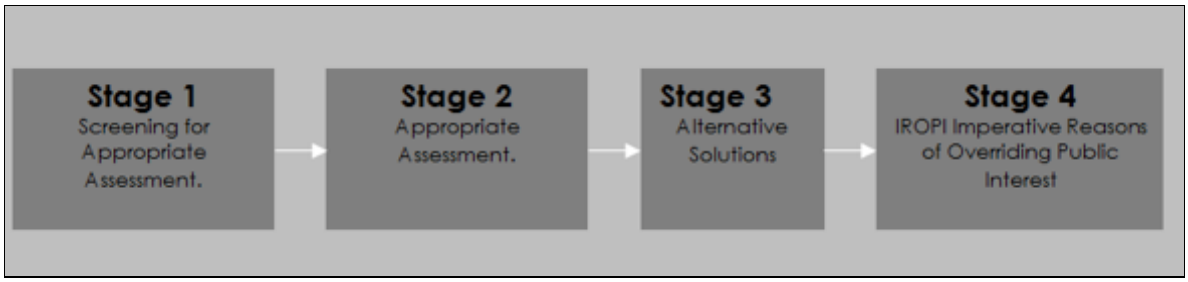
Under the Directive a network of sites of nature conservation importance have been identified by each Member State as containing specified habitats or species requiring to be maintained or returned to favourable conservation status. In Ireland the network consists of SACs and SPAs, and also candidate sites, which form the Natura 2000 network.

Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the *Conservation of Natural Habitats and of Wild Fauna and Flora* (as amended) (hereafter 'the Habitats Directive') requires that, any plan or project not directly connected with or necessary to the management of a designated site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. A competent authority (e.g. the EPA or Local Authority) can only agree to a plan or project after having determined that it will not adversely affect the integrity of the site concerned.

The possibility of a significant effect on a designated or "European" site has generated the need for an appropriate assessment to be carried out by the competent authority for the purposes of Article 6(3). A Stage Two Appropriate Assessment is required if it cannot 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. The first (Screening) Stage for appropriate assessment operates merely to determine whether a (Stage Two) Appropriate Assessment must be undertaken on the implications of the plan or project for the conservation objectives of relevant European sites.

2.2 Appropriate Assessment Procedure

The assessment requirements of Article 6(3) establish a stage-by-stage approach. This assessment follows the stages outlined in the 2001 European Commission publications "*Assessment of plans and projects significantly affecting Natura 2000 sites: methodological guidance on the provisions of Articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC*" (2001) and Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC Office for Official Publications of the European Communities, Luxembourg (EC, 2019);



The stages are as follows:

Stage One: Screening — the process which identifies any appreciable impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;

Stage Two: Appropriate assessment — the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts;

Stage Three: Assessment of alternative solutions: The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site. It is confirmed that no reliance is placed by the developer on Stage Three in the context of this application for development consent;

Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain — an assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed (it is important to note that this guidance does not deal with the assessment of imperative reasons of overriding public interest). Again, for the avoidance of doubt, it is confirmed that no reliance is placed by the developer on Stage Four in the context of this application for development consent.

It is the responsibility of the competent authority, in this instance ACP, to make a decision on whether or not the proposed development should be approved, taking into consideration any potential impact upon any Natura 2000 site within its likely zone of impact.

3. Receiving Environment

3.1 Existing site

The proposed development site covers an area of c.13.55ha and is located approximately 15km to the south-east of Cork City. The site is located at Ringaskiddy on the Ringaskiddy Peninsula in the lower part of Cork Harbour (**Figure 1**). The L2545, the main road from Ringaskiddy village to Haulbowline Island forms the northern boundary of the site. The eastern boundary of the site extends to the foreshore of Cork Harbour along Gobby Beach. The lands to the immediate south are in agricultural use. The single carriageway from Barnahely to Ringaskiddy element of the M28 Cork to Ringaskiddy project (known as the 'Protected Road Scheme') is currently being constructed within the northwestern boundary of the proposed development site.

The site surrounds the Hammond Lane Metal Recycling Co Ltd facility.

The site is situated on a north-facing slope. The lowest elevation is approximately 2.05-3.0m Ordnance Datum (OD) along the northern boundary with the local road. The highest point is approximately 41.0mOD along the southern site boundary in the vicinity of the Martello Tower, which is in the adjoining field to the south.

3.2 Proposed Development Overview

Indaver proposes to develop a Resource Recovery Centre in Ringaskiddy in County Cork. The proposed development will consist principally of a waste-to-energy facility (waste incinerator) for the treatment of up to 240,000 tonnes per annum of residual household, commercial and industrial non-hazardous and hazardous waste and the recovery of energy. Of the 240,000 tonnes of waste, up to 24,000 tonnes per annum of suitable hazardous waste will be treated at the facility. The proposed development will maximise the extraction and recovery of valuable material (in the form of ferrous and non-ferrous metals) and energy (in the form of 21 megawatts of electricity) resources from residual waste.

In addition to the provision of the waste-to-energy facility, the proposed development will include an upgrade of a section of the L2545 road, a connection to the national electrical grid, an increase in ground levels in part of the site, coastal protection measures above the foreshore on Gobby Beach and an amenity walkway towards the Ringaskiddy Martello tower.

It is proposed that the waste-to-energy facility will operated 24 hours per day, seven days a week and for an estimated 8,147 hours per annum based on 93% plant availability. There will be planned shut downs for maintenance. Waste acceptance will be limited to the hours 06.00 to 20.00 on week days and 09.00 to 14.00 on Saturdays.

The location of the site is shown in **Figure 1,** and an overview of the proposed development is provided in **Figure 2.** For full details of the application see **Appendix 7** and **Appendix 8** of this report.

Figure 1. Location of proposed development site | Source Arup | Not to scale

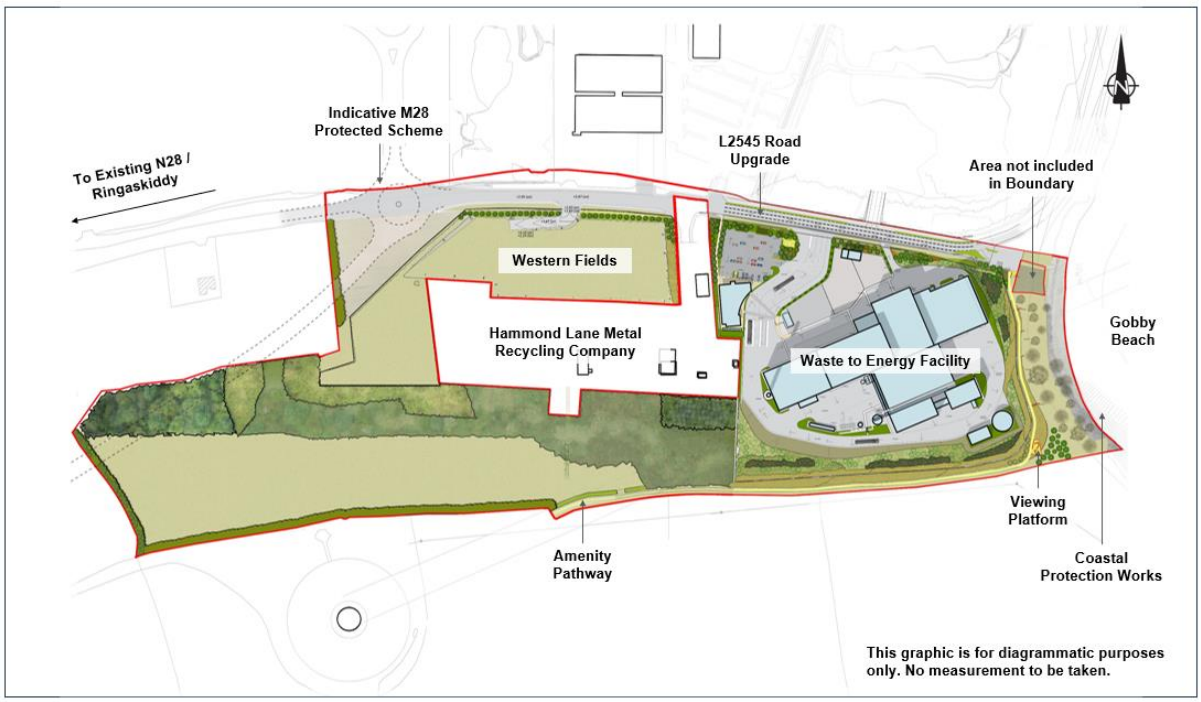


Figure 2. Overview of the proposed development site | Source Arup | Not to scale

3.2.1 Overview of waste-to-energy facility

The waste-to-energy facility will have the following elements:

- Main process building: this building will be circa 176m x 81m, in plan. The building height will be up to 50.7 metres above Ordnance Datum, with a stack extending to 75m above OD. This building will accommodate the main waste-to-energy plant and equipment including the bunker, the furnace, the boiler and the flue gas cleaning equipment and ancillary equipment. The warehouse, for spare parts storage, an administration area containing facilities and offices for the waste-to-energy operations staff and a laboratory, and a workshop will be located in this building.

- Turbine hall: this building will be located to the south of the main process building and will be circa 25m x 15m in plan and 16m in height. This building will house the steam turbine. The aero-condenser structure will be located adjacent to the turbine hall and will support the air cooled condenser fans.

- Security building/gate house: this will be a small, single storey area which forms part of the administration building. The site security personnel will be based in this building, from which they will control access to the site.

- Administration building; this building will be a two-storey building located to the west of the main entrance. The building will primarily contain office space and meeting rooms for staff but will also have a visitors' centre.

- Firewater storage tank and pump house: The storage tank for the water to be used in fighting a fire and a building to house the fire water pumps will be located in the south-eastern corner of the site.

- Surface water attenuation tank and firewater retention tank: tanks for the storage of surface water and potentially contaminated water, following use in fighting a fire, will be located underneath the administration building car park in the northern part of the site.
- Weighbridges: these will be located in the main entrance, adjacent to the gate house.
- Light fuel oil storage tank, ammonia storage tank: a tank for the storage of light fuel oil and a tank for the storage of ammonia will be located in the southern part of the site.
- Aqueous waste tank: aqueous waste will be stored in a take, which will be located adjacent to the aero-condenser structure.
- The electricity import/export substation and compound within the proposed development site will be located east of the main entrance to the waste-to-energy facility.
- Site Lighting will include a mixture of 8m high pole mounted and building mounted lights to light up entrances and roads with full cut off LED light head fixtures to reduce any light pollution into the surrounding area. There will be three, low intensity obstacle lights at the top of the stack
- Emergency access: a second site access will be provided, for use in emergencies. This will be located to the east of the main access road and will be reserved for use by the emergency services.
- A public amenity footpath and viewing gallery, located outside the facility's security fence, will be provided along part of the southern and eastern site boundaries.

3.2.2 Overview of site processes

The design of the proposed development has been optimised to include the most up to date emissions control and flue gas cleaning technology. The waste-to-energy process will consist of a number of main process elements as follows:

- waste acceptance
- waste intake and storage
- combustion process
- energy recovery process
- flue gas cleaning.

3.2.2.1 Waste acceptance

Solid hazardous and non-hazardous waste will arrive at the site in a number of different type of waste vehicles such as compactor trucks, skip trucks ejector trailers and walking floor trailers, with all contents appropriately covered. All waste trucks entering the waste-to-energy facility will pass through a radiation detection system to detect the presence of any radioactive elements. The site will work to an operating protocol, that is produced in consultation with an

appropriately qualified person such as a Radiological Protection Adviser. This protocol will determine appropriate actions should the detector trigger a radioactive reading. This protocol can be agreed with the Office of Radiation Protection and Environmental Monitoring prior to operation, as needed. If a truck is found to be carrying radioactive waste, the protocol will dictate the next steps which may include the waste not being accepted for treatment.

Waste trucks will drive onto the weighbridge, located at the entrance. All trucks carrying waste, which enter and leave the facility, will be weighed.

Drivers will present their documentation, relating to the waste load, to the staff in the security gatehouse. Some trucks, on long-term contracts, carrying non-hazardous waste, will access the facility using a swipe card, which will record their details. The drivers of these trucks will not have to report to the security offices.

Following completion of the waste acceptance procedures, the trucks carrying waste will proceed via the site road to the enclosed tipping hall.

Tankers of aqueous waste will be sampled and analysed prior to offloading into the aqueous waste storage tank or direct injection. This sampling may be done before or after arrival on site. If sampled and analysed on site, the sampling will be done in the aqueous waste unloading area adjacent to the aqueous waste storage tank. Key parameters will be analysed to ensure conformity with the specified waste acceptance criteria and with the parameters agreed with the customers. As a minimum, water content, pH, chlorine and calorific value will be checked for each aqueous waste load. In the event that the specification for the aqueous waste load is not met, then arrangements will be made for the dispatch of the tanker to the most suitable facility either in Ireland or abroad.

Access for sampling the tankers on site will be provided by an overhead gantry. This gantry will also facilitate operations associated with offloading the tanker.

3.2.2.2 Waste Handling

The waste handling and storage facilities for solid waste will consist of:

- the waste tipping hall
- the waste bunker with semi-automatic grab cranes
- waste hopper
- waste handling and storage facilities for aqueous waste will consist of a tanker offloading area and the aqueous waste storage tank.

3.2.2.3 Combustion Process

A moving grate furnace is proposed for the waste-to-energy facility. Grate furnaces are used for the destruction of a wide variety of waste streams and are a well-recognised, robust and established technology for these purposes. Waste is burned on the grate for a period of 1 hour approximately, and the resultant flue gases must maintain a temperature of 850°C for a minimum of 2 seconds after the last injection of air to ensure complete combustion of any volatiles and unburned flue gas components. In reality the flue gas temperatures range from 850°C to 1,200°C in the combustion zone above the grate. These temperatures ensure

destruction of organics and other flue gas components. This means that a hazardous substance that is fed into the furnace does not come out unchanged as the same hazardous substance, either in the residues or in the exhaust gases. In the furnace the hazardous substance is oxidised which means it under goes a chemical reaction and is converted into one or more different substances with different properties. These different substances are removed in the ash or flue gas cleaning residues and a very small quantity is discharged to the air in the exhaust gases. Compounds such as dioxins which form after combustion is complete (and at lower temperature windows in the boiler of around 450°C) are removed by the injection of activated carbon/clay.

The moving grate furnace will operate in a similar fashion to an escalator, pushing waste from the top of the furnace to the bottom to ensure complete combustion. The moving grate furnace is considered to be a 'Best Available Technique' for the treatment of the types of waste proposed.

A moving grate furnace is proposed for the facility. The moving grate furnace will operate in a similar fashion to an escalator, pushing waste from the top of the furnace to the bottom to ensure complete combustion. An excess quantity of air will be drawn in through the furnace to ensure sufficient cooling of grate bars. The chosen technology is considered BAT.

The moving grate mechanism will transport the waste slowly from the feed point at the top of the furnace to the ash discharge at the bottom of the furnace. The rate at which the waste will travel through the furnace will be controlled to optimise the combustion. The residence time for waste in the furnace will be approximately one hour.

As the waste enters the hot furnace, the material will be heated due to contact with the pre-heated primary air, hot flue gases and radiated heat from the walls of the incinerator. The initial heat (temperature range of 50˚C to 100˚C), will drive off the moisture from the waste.

The next stage in the combustion process will be volatilisation, where the combustible gases and vapours will be driven off. The volatilisation stage will take place within the temperature range of 200˚C to 750˚C.

The volatile components of the organic material of municipal solid waste typically account for 70 to 90% of the flue gases, and are produced in the form of hydrogen, carbon monoxide, methane and ethane. The combustion of these volatiles will take place immediately above the surface of the waste and in the combustion chamber above the grate.

The volatile gases and vapours released will immediately ignite in the furnace due to the temperature of the furnace gas, which will be within the range 850˚C and 1,000˚C. Typical mean residence times of the gases and vapours in the combustion chamber will be 2 to 4 seconds.

The final section of the grate will be the burnout section where the ash will be held for long enough to ensure sufficient burnout.

The grate will discharge the resultant bottom ash into a water bath/ wet de-slaggers, and then via a conveyor to an ash hall.

3.2.2.4 Energy Recovery

The hot flue gases from the moving grate furnace will be directed through a steam boiler. In the boiler heat will be transferred from the hot flue gases to water to generate steam. The steam from the boiler will drive a turbine, which will drive an electricity generator.

Technology has improved in recent years and energy recovery has become very efficient for waste to energy facilities. The aim of this facility is to generate 21MW of electricity (of which approximately 2.5 MW is required for electrical demand within the facility and 18.5MW will be exported to the National Grid). The electricity produced by the waste-to-energy facility will be enough to supply the power needs of approximately 30,000 households.

3.2.2.5 Emission Reduction

Dioxins and Furans

Dioxins and furans are complex chlorinated hydrocarbon molecules, which are formed as a consequence of any combustion process. As described previously the facility is designed to minimise the reformation of dioxins and furans (the term 'dioxin' is taken to include dioxins and furans), by maintaining the flue gases at a high temperature of over 850˚C for over 2 seconds in the furnace and by rapidly cooling the gases from 450˚C to 250˚C. These measures will reduce the dioxin concentration in the flue gases to a low level. The flue gas cleaning equipment will reduce dioxin concentrations in the flue gas to levels well below the limit set in the Industrial Emissions Directive. Typical emissions from a facility with this equipment are 0.01ng TEQ/m3 (0.000,000,000,01g TEQ/m3).

A fixed amount of activated carbon or a carbon/clay mixture will be injected in two places. The first will be into the flue gases in the cooling stage and the second into the flue gas either in the dry reactor or just after it.

Activated carbon consists of small, porous carbon particles, which due to their porosity have a very large surface area. The large surface area will adsorb heavy metals and trace levels of organics present in the flue gas, such as dioxins, furans, Polycyclic Aromatic Hydrocarbons (PAHs) and hydrocarbons. These carbon granules and other particulates, such as dust, will then be removed by filtration as the flue gases pass through the baghouse filter. The activated carbon/clay mixture will work in a similar manner to activated carbon and the activated carbon/clay mixture will contain a minimum of 10 % activated carbon. This is to ensure the adsorption of heavy metals and mercury.

The dosing of the activated carbon or carbon/clay mixture will have redundancy built in, starting from the bottom extraction point of the storage silo and ending at the injection point in the flue gas flow. This means that each of the two injection points will have two lines running towards it so that one is always available. It will be possible to run both lines simultaneously and the control of the dosing flow will be doubled.

The baghouse filter will contain multiple filter bags in separate compartments. The separate compartments will allow for maintenance and changing of filter bags whilst the filter is on-line. The dust laden flue gases will be sucked from the outside (foul side) to the inside (clean side) of the filter bags leaving a dust cake on the outside of the bags.

The pressure drop over the bags will increase as more dust accumulates. A reverse pulse of clean compressed air will be blown inside the bag as soon as a pre-set pressure drop set-point is reached. The airwave will inflate the bag and make the carbon and particulates on the outside crack and fall into collection hoppers below.

The dust cake will consist primarily of fly ash carried over from the boiler, reaction salt from the flue gas pollutants with lime, excess lime and activated carbon or clay.

Oxides of Nitrogen

All combustion processes lead to the formation of oxides of nitrogen. These will be controlled in two ways. The combustion process in the furnace will be optimised to minimise the oxidation of nitrogen in the combustion air and the furnace materials will be selected to ensure optimal flue gas temperature. Ammonia solution or urea will be injected into the flue gases into the first section of each boiler. This process uses the chemical reaction of ammonia and nitrogen oxides at high temperature to convert nitrogen oxides to nitrogen and water vapour.

3.2.2.6 Flue Gas Cleaning

The flue gas cleaning equipment will reduce dioxin concentrations in the flue gas to levels well below the limit set in the EU Industrial Emissions Directive 2010/75/EC. Typical dioxin emissions from a facility with this equipment are one tenth of the concentration limit in the EU Industrial Emissions Directive.

The flue gas leaving the boiler will still be relatively hot at approximately 160˚C and will be further cooled in the cooling section to a temperature of about 145˚C. The lower temperature is required for the optimal operation of the lime and activated carbon or clay injection downstream.

A fixed amount of activated carbon or a carbon/clay mixture will be injected into the flue gases in the cooling stage and also into the flue gas either in the dry reactor or just after it. Activated carbon consists of small, porous carbon particles, which due to their porosity have a very large surface area. Dioxins, furans, other trace organic compounds and heavy metals in the flue gases will be adsorbed onto the activated carbon particles. The flue gases will then pass through a baghouse filter which will remove the dust, salts and the carbon particles from the gases. The dust cake forming in the baghouse filter will be removed and collected in hoppers located below.

The flue gases will then be discharged through the stack, the top of which will be at a level of 75mOD.

The Industrial Emissions Directive 2010/75/EC requires continuous monitoring of specific parameters and regular sampling of dioxins present in the flue gases prior to discharge from the stack to ensure compliance with emission limit values.

The facility will be licensed by the EPA, which will specify the environmental monitoring that must be performed. Sample points will be accessible to EPA personnel for their independent inspection and monitoring programme.

3.2.2.7 Ash and Solid Residues

Three types of ash and residues will be produced in the waste-to-energy plant. The average annual ash tonnages, assuming the plant is operating for 8147 hours based on 93% plant availability, are given below:

- Bottom ash, 53,630 tonnes (15% moist)
- Boiler ash, 2,037 tonnes
- Flue gas cleaning residues, 9,271 tonnes

The bottom ash will be a non-hazardous material and may be suitable for use in road construction. It is expected that the flue gas cleaning residues will be classified as requiring disposal in a hazardous waste landfill. It will be exported abroad for recovery in a salt mine or for disposal to a hazardous waste landfill, until a suitable landfill for hazardous waste is developed in Ireland. The boiler ash will be treated the same way as the flue gas cleaning residues. An annual average of 2,444 tonnes of ferrous metals, such as steel and 244 tonnes non-ferrous metals will be recovered from the bottom ash for recycling.

3.2.2.8 Process Inputs

The average consumption of water in the proposed waste-to-energy facility will be 5.4 cubic metres per hour. Circa 240 tonnes of light fuel oil will be used per annum to raise the temperature of the furnace at start up and to maintain the temperature as required. Other inputs included sodium hydroxide (NaOH) 50% solution, and hydrogen chloride (HCl) 30% solution in the demineralisation facility, ammonium hydroxide (NH4OH) and sodium phosphate Na3PO4 for the boiler feed water, lime, activated carbon and clay in the flue gas cleaning and urea/ammonia in the de-NOx stage.

3.2.3 L2545 Road Upgrade

Upgrade works are proposed to a section of the L2545 local road, which is the road that adjoins the northern boundary of the site. The proposed works will consist of raising the level of a section of the road and improving the surface water drainage so that the road does not flood after prolonged rainfall and to raise the level of the road above the 1 in 200 year tidal event with an allowance for climate change.

The proposed L2545 upgrade works will include raising a 190m section of the road to a maximum height of 3.495mOD between the car park and the eastern end of the Hammond Lane Metal Company. This is approximately 0.9m above the existing road level.

This will elevate the road to above the 1 in 200-year design tidal water level. This will offer a high level of protection to the road from tidal flooding. The road will be raised over a length of approximately 190m in order to ensure a smooth transition down to existing road levels, in accordance with road design standards. The recently constructed shared-use path on the northern side of the road will also be raised to the new road level.

The proposed road drainage network upgrade will extend along the entire northern boundary of the Indaver site. It has been designed to cater for the 7 hours when the storm water outfall

is tide locked by a 1 in 200 year design high tide, 2.87m top water level (TWL), combined with a 1 in 30 year rainfall event.

A 260 metre length of new linear concrete surface water channel will extend from the western boundary (of the western field area) of the Indaver site, running along the southern edge of the L2545 until it meets the entrance to the Hammond Lane Metal Company. This section of the L2545 is currently super-elevated – i.e. the camber on the road falls from north to south, therefore surface water drains to the south.

This section of the L2545 will not be raised. The new surface water channel will be drained at regular intervals by gullies which will outfall to the existing 450mm diameter surface water sewer beneath the road.

The raised section of the L2545 between the car park and the eastern end of the Hammond Lane Metal Company will be drained by a kerb and gully sealed drainage system which will be connected to two new surface water pipes underneath the road. The two 1500mm diameter pipes will be approximately 190m in length and will provide 660m^3 of surface water storage. There will be three large concrete chambers constructed on the line of the twin surface water pipes at the start middle and end of the run. The first two chambers will be situated in the road and the terminal chamber will be constructed at the entrance to the car park by Gobby Beach. The surface water drainage system on the Haulbowline road will be diverted into the terminal chamber. This chamber will be connected to the existing 450mm diameter surface water sewer via a short length of new 450mm diameter pipe, a new Class 1 bypass hydrocarbon interceptor and a new manhole constructed on the line of the existing pipe. This will allow the upgraded surface water drainage system to discharge to sea via the existing 450mm surface water outfall at Gobby Beach.

3.2.3.4 Increase in levels of the Indaver site

The ground levels of the Indaver site vary considerably in both the north-south direction and the east-west direction. Along the southern boundary of the site the levels vary from circa 10mOD to circa 41mOD. Along the northern boundary of the site the ground levels vary from circa 2.05mOD to circa 4.0mOD. As discussed above, the 1 in 200-year design tidal level has been estimated as 2.87mOD.

The levels of the low-lying parts of the site will be raised to 4.55mOD. The ground levels in the western fields area of the site consisting of a 10,000m^3 area will be raised by a maximum height of 2.5m above ground level. A small area of land within the waste-to-energy side of the site adjacent to the L2545 road will also be raised to 4.55mOD. This level will offer a very high standard of flood protection to the site. This high standard may be beneficial during the construction phase where the main site accommodation complex will be situated. It also establishes the site level for flood protection for any future uses of this part of the site.

3.2.3.5 Coastal Protection Measures

Coastal protection measures in the form of shingle above the foreshore on Gobby Beach are proposed along the eastern boundary of the Indaver site.

The coastline along the eastern boundary of the Indaver site consists of a glacial till face adjoining Gobby Beach. The glacial till face is very shallow near the public car park to the

north and steepens to the south to a maximum of 10-12m high. Issues in relation to coastal erosion were raised by An Bord Pleanála during the course of the 2008 planning application process. In response to the issues raised by the Board, a coastal study was carried out by Arup in order to better understand the coastal processes in the vicinity of the site, the rate of erosion of the glacial till face and the specific coastal protection measures required. The coastal erosion study undertaken included an evaluation of the retreat rate of glacial till face based on historical information and surveys. Numerical wave modelling, a wave run-up assessment and beach sediment transport assessment were carried out. This study was expanded in 2025 with the addition of the 2025 topographic survey which confirmed previous conclusions.

The study found that the proposed development would not increase the current rate of erosion of the glacial till face.

As part of the study, a conservative rate of erosion was applied to the site in order to assess whether the proposed development could be impacted over the 30-year design life of the facility. The study found that the waste to energy facility section of the proposed development has been located far enough away from the edge of the cliff to ensure that the waste to energy facility will not be impacted by the predicted retreat rates over the design life of the planning permission. However, the study found that there could be a risk of an impact on a small section of the proposed development after 40 years but this would be confined to the amenity walkway and viewing platform outside of the security fence line.

Coastal protection mitigation measures are not required for the waste-to-energy facility element of the development. However, given the concerns raised by An Bord Pleanála and given the low risk that the amenity walkway could be impacted in 40 years' time, coastal protection measures have been included in the proposed development as a precautionary measure so as to reduce the rate of erosion of the glacial till face.

The protection measures will consist of the placement of approximately 1,150m^3 of shingle of appropriate size and shape (rounded) above the foreshore on Gobby Beach along the eastern boundary of the Indaver site. This will be a 'soft' solution which will reduce erosion rates by increasing beach levels i.e. reducing near shore water depth and wave heights and will protect the glacial till face from breaking waves.

The addition of sacrificial material such as shingle, is well-recognised worldwide as a coastal engineering solution. The net coastal sediment transport will go from south to north according to wind conditions and swell, therefore the material is likely to move towards the north in the medium and long term. It is noted that the Cork Harbour Special Protection Area (SPA) is located c.405m from the site at its closest point and therefore the sacrificial material will not impact directly on the SPA.

3.2.4 Grid Connection

The waste-to-energy facility will be connected to the national electrical grid either via the 38kV electrical substation (known as Loughbeg substation) adjacent to the eastern boundary of the Hammond Lane facility or via the 110kV pylon directly south of the site. Both options require connection to ESBN infrastructure at the 38kV voltage level.

Loughbeg Substation Option

This potential connection method via the Loughbeg substation was determined by a feasibility study carried out by ESBN. Based on discussions with ESBN, the connection, if selected, will simply be an extension of the 38kV line into the ESB side of the proposed Indaver electricity compound as this line currently terminates at the existing Loughbeg substation. ESBN have confirmed that the extension of the 38kV line into the Indaver site can be over ground or underground. Indaver have selected the underground option and the proposed routing for the underground lines has been identified on the referenced drawing. The routing has been designed in compliance with ESB guidelines and standards. The grid connection will be made by running underground cables from the ESB side of the Indaver electricity compound to the Loughbeg substation.

The cable will then exit the Loughbeg substation via a second trench that will be excavated between the Loughbeg substation building and the mast that carries the existing 38kV power line from the Barnahely substation. This trench will be approximately 5m in length and will be within the ESBN Loughbeg substation lands. The underground cable will then emerge next to the existing mast and will be connected directly to the existing 38kV line via a standard T connection, this form of connection is possible on an end mast like the one situated in the Loughbeg substation.

Due to the layout of the facility, there will be no requirement to divert the existing 38 kV lines which traverse the site.

110kV Pylon Option

An alternative option of connecting to the 110 kV pylon became apparent following a grid connection application (made to ESBN in November 2015) and subsequent offer in 2016.

This option is a viable alternative for ESBN due to the fact that that the 110kV line has capacity and can be re-used to support a 38kV connection over the existing 110kV infrastructure. To facilitate this option, additional trenching (along the route of the existing 10kV overhead cables, which are to be diverted underground) as far as the existing 10 kV overhead pole would be provided to extend the 38kV cable route underground to the pylon.

The works required to connect the cable from the Indaver site to the overhead power lines would be carried out by ESBN and also for the subsequent works at the Barnahely substation to facilitate a 38kV connection there. Both grid connection options can be seen on revised planning drawing 1434-104.

3.2.5 Best Available Techniques

In the Industrial Emissions Directive, Directive 2010/75/EC, best available techniques (BAT) are required to be used in pollution prevention and control. Implementation of Best Available Techniques in the Waste-To-Energy Facility Best Available Techniques are techniques recommended by the EU for use in designing industrial facilities to minimise pollution.

Best Available Techniques have been included in the design of the proposed Ringaskiddy Resource Recovery Centre and will be applied in its ongoing operation, management and control. These include:

- plant management systems,

- plant safety systems,
- waste inspection, checking, testing and acceptance,
- waste handling and storage,
- choice of furnaces and flue gas cleaning systems,
- design, operation and control of the furnaces and flue gas cleaning systems,
- energy recovery and energy efficiency,
- optimisation of resource use, and
- handling of residues

4. Stage 1- Screening for Appropriate Assessment

4.1 Introduction

This section contains the information required for the competent authority to undertake screening for AA for the proposed development.

The aims of this section are to:

- Determine whether the proposed development is directly connected with, or necessary to, the conservation management of any Natura 2000 sites;
- Provide information on, and assess the potential for the proposed development to significantly effect on Natura 2000 Sites (also known as European sites); and
- Determine whether the proposed development, alone or in combination with other projects, is likely to have significant effects on Natura 2000 sites in view of their conservation objectives.

The proposed development is not directly connected with, or necessary to the conservation management of any Natura 2000 sites.

4.2 Zone of Impact

The likely zone of impact (ZoI) comprises the area within which the proposed development may potentially affect the conservation objectives or qualifying interests (QI) of a Natura 2000 site. There is no recommended likely zone of impact, and guidance from the National Parks and Wildlife Service (NPWS) recommends that the distance should be evaluated on a case-by- case basis with reference to the nature, size and location of the project, the sensitivities of the ecological receptors, and the potential for in-combination effects (cumulative).

In ecological and environmental impact assessment, for an effect to occur there must be a risk enabled by having a source (e.g., construction works at a proposed development site), a ‘receptor’ (e.g. SAC or other ecologically sensitive feature), and a pathway between the source and the receptor (e.g. a watercourse which connects the proposed development site to the SAC). A ‘receptor’ is defined as the Special Conservation Interest (SCI) of SPAs or Qualifying

Interest (QI) of SACs for which conservation objectives have been set for the European sites being screened.

Consideration is therefore given to the source-pathway-receptor linkage and associated risks between the proposed development and Natura 2000 sites. For a significant effect to occur there needs to be an identified risk whereby a source (e.g., contaminant or pollutant arising from construction activities) affects a particular receptor (i.e. Natura 2000 site) through a particular pathway (e.g. a watercourse which connects the proposed development with the Natura 2000 site).

The identification of risk does not automatically mean that an effect will occur, nor that it will be significant. The identification of these risks means that there is a possibility of environmental or ecological damage occurring. The level and significance of the effect depends upon the nature of the consequence, likelihood of the risk and characteristics of the receptor.

The precautionary principle is applied for the purposes of screening to ensure that consideration and pre-emptive action is undertaken where there is a lack of scientific evidence. It is noted that mitigation measures are not taken into account in the AA screening assessment process.

In line with the precautionary principle, the study area for the preparation of this Stage One Screening Report extended to a radius of 20km from the applicant's site boundary. Thus, any appreciable direct, indirect or in-combination impacts which could arise from the proposed development in relation to the designated sites within this zone were considered. No potential ecological risks to designated sites outside this 20km radius were identified.

4.3 Desktop Review

A desktop review facilitates the identification of the baseline ecological conditions and key ecological issues relating to Natura 2000 sites and facilitates an evaluation assessment of potential in-combination impacts. Sources of information used for this report include reports prepared for the Ringaskiddy area and information from statutory and non-statutory bodies in the Cork Harbour area. The following sources of information and relevant documentation were utilised:

Information on the Indaver Site

- Indaver Ringaskiddy Resource Recovery Centre Environmental Impact Assessment Report (EIAR) 2019
- Indaver Ringaskiddy Resource Recovery Centre Environmental Impact Statement (EIS), 2016
- Indaver Ringaskiddy Waste–to-Energy Facility Environmental Impact Statement (EIS), November 2008
- Appropriate Assessment of the Potential Impacts of the Ringaskiddy Waste-To-Energy facility on the Cork Harbour SPA, ARUP 2009

- Indaver Ireland Ringaskiddy Waste–to-Energy Facility Addendum to 2008 Environmental Impact Statement (EIS), August 2010
- Appropriate Assessment screening report for proposed modifications to a Waste to Energy Facility and Transfer station, road upgrade works and coastal protection works at Ringaskiddy, Co. Cork, DixonBrosnan, 2010.

Information from statutory and non-statutory bodies

- National Parks & Wildlife Service (NPWS) - www.npws.ie including qualifying interests and conservation objectives for Natura 2000 sites.
- Environmental Protection Agency (EPA) – www.epa.ie
- National Biodiversity Data Centre (NBDC) – www.biodiversityireland.ie
- Birdwatch Ireland - http://www.birdwatchireland.ie/
- Invasive Species Ireland - http://www.invasivespeciesireland.com/
- EPA Catchments https://www.catchments.ie
- Cork County Biodiversity Action Plan 2009;
- Cork County Development Plan 2022-2028;
- OPW (2009) The Planning system and flood risk management: Guidelines for Planning Authorities.

Other plans and projects

- Ringaskiddy Port Redevelopment EIAR (Ayesa 2025)
- IMERC Masterplan A. Masterplan for the Irish Maritime and Energy Resource Cluster Spike Island Masterplan Spike Island
- Port of Cork Monkstown Marina Proposals
- East Tip Remediation Project, Haulbowline Island
- Hammond Lane Metal Cork
- Cork Lower Harbour Energy Group Wind Turbines
- M28 Cork to Ringaskiddy Project Environmental Impact Statement
- N28 Road Upgrade
- Cork Lower Harbour Main Drainage Scheme sewage treatment plant, Shanbally

Further detail on other plans/projects is included in **Section 4.7.1.3** of this report.

4.4 Consultation

Prior to the submission of the 2016 NIS for permission to the An Board Pleanála (ABP), meetings were held with Dr. Jervis Good and Danny O'Keefe (National Parks and Wildlife Service) on May 27, 2015, and September 9, 2015 (It its noted that the DAU was contacted in late 2024/early 2025. No response was received). At the meetings, the issues to be addressed in the NIS were discussed. A letter from the Development Applications Unit (DAU) of the Department of Arts, Heritage and the Gaeltacht, dated 11 September 2015, set out the heritage related observations/recommendations of the Department (**Appendix 2**). This information is provided in various sections within the NIS as follows:

- Effects of air emissions (Point 1 of DAU letter) and dioxins and furans (Point 2 of DAU letter) are primarily addressed by assessing the available data as presented by a literature review on the potential ecological effects of mercury, dioxins, thallium and cadmium on bird receptors and otter (**Appendix 3**)
- Bird collision risk (Point 6 of DAU letter). This is addressed by a literature review on the risk of bird collisions with the proposed stack taking into account recent developments in Cork Harbour. (**Appendix 4**)
- Assessment of potential bio-monitoring programme (Requested at the NPWS meeting, May 2015). (**Appendix 5**)
- Flue gas treatment residue and filter ash transport in Cork Harbour (Point 4 of DAU letter and flue gas treatment residue and filter transport in the Elbe Estuary (Point 5 of DAU letter). This is addressed by **Section 4.7.9** of this report.
- Increased predator attraction (Point 7 of DAU letter). This is addressed by **Section 4.7.11** of this report.
- Further information on the potential for accidental releases, both onsite and offsite, with a particular emphasis on risks associated with shipping of residues overseas for recovery or disposal. (**Section 4.7.7).**
- Trans-boundary effects, including flue gas cleaning residues disposal in salt mines or landfill, in Europe. (**Section 4.7.10**)
- Information on air emission monitoring data from Indaver's plant at Carranstown, Co Meath. (Requested at the NPWS meeting, May 2015). (**Appendix 6**).
- Comparative data from similar waste-to-energy incinerator facilities (Point 3 of DAU letter). This information is provided in (**Appendix 6**).
- Effects of hazardous compounds (Point 8 of DAU letter). This is addressed in **Appendix 6.**
- Information on plant start-up and shut-down procedures including frequency of startup and shut-down, and emergency response procedures (Requested at the NPWS meeting, May 2015). (**Appendix 6**).

4.5 Relevant information

Information on the proposed development which was used to assess potential impacts is included in the appendices as follows. This information, where relevant, is summarised in the text of this report.

Introduction to the project (Appendix 7) and Proposed site and project description (Appendix 8).

These provide an overview of the proposed development and a description of the proposed site and the Ringaskiddy Resource Recovery Centre development.

Construction Activities (Appendix 9)

This appendix describes the construction operations and phasing for the proposed Ringaskiddy Resource Recovery Centre and outlines the measures to be taken to ensure the impact of the construction activities on the environment is minimised.

Biodiversity (Appendix 10)

Provides a comprehensive assessment of the impacts on ecology based on desktop studies and field surveys. In addition to surveys previously carried out at the site, the following surveys were also carried out in 2014/2015: habitat mapping , surveys of wintering birds, breeding birds surveys, common tern breeding survey, mammals, with a particular emphasis on badger, otter and bats and intertidal survey.

Air (Appendix 11)

Provides a detailed appraisal of potential impacts on air which could arise from emissions generated during construction works or from emissions during operation. The scope of the study consists of the following components:

- Review of maximum emission levels and other relevant information needed for the modelling study;
- Identification of the significant substances which are released from the facility; ○ Review of background ambient air quality in the vicinity of the facility; ○ Air dispersion modelling of significant substances released from the facility;
- Particulate deposition modelling of Dioxins & Furans, Polycyclic Aromatic Hydrocarbons (PAHs) and heavy metals released from the facility;
- Identification of predicted ground level concentrations of released substances at the facility boundary and at sensitive receptors in the immediate environment;
- Evaluation of the significance of these predicted concentrations, including consideration of whether these ground level concentrations are likely to exceed the most stringent ambient air quality standards and guidelines.

Noise and Vibration (Appendix 12)

Provides an assessment of the potential noise and vibration impacts on the surrounding environment associated with the construction and operation of the proposed facility. As the proposed development is located c.405m from the closest Natura 2000 site (Cork Harbour SPA) the risk of significant impacts is considered very unlikely. However as there could potentially be impacts on birds listed as qualifying interests for this SPA, where they occur outside the site boundary, noise and vibration is considered relevant. The conclusions of this appendix are included in text of this report.

Appendix 13

- Hazard Identification and Risk Assessment Report

Appendix 14

- Sampling And Analysis Of Soil And Sediment Samples For PCDDs, PCDFs And PCBs At Various Locations Around Cork Harbour.

Appendix 15

- Ecological Risk Assessment for PCDD/F for Indaver Ringaskiddy Resource Recovery Centre.

4.6 European Sites within ZoI

In accordance with the European Commission Methodological Guidance (EC 2018), a list of Natura 2000 sites that can be potentially affected by the proposed development has been compiled.

The proposed development does not form part of a Natura 2000 site. All SACs, candidate SAC's (cSAC) and SPAs sites within the likely zone of impact (ZoI) of the proposed development have been identified in **Table 1** and are shown in **Figure 3 and Figure 4**. Natura 2000 sites within a 20km radius of the proposed development site were assessed. It is noted that use of a 20km radius is a precautionary measure, as impacts at this distance from the proposed development are highly unlikely in the absence of significant aqueous emissions to the marine environment. Air emissions will not be significant at 20km from the site as detailed in **Appendix 11**.

Further information on these Natura 2000 sites is provided below and a full site synopsis included **Appendix 1**.

Given the distances involved and the lack of hydrological or other connections, no pathway for impact has been identified between the proposed development site and any other Natura 2000 site.

Table 1. Natura 2000 sites and their location relative to the proposed development site

Natura 2000 site	Site Code	Qualifying Interests/Special Conservation Interests	Distance at closest point and potential source-pathway-receptor link
Special Area of Conservation (SAC)			
Great Island Channel SAC	001058	Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]	c.5.6km north
Special Protection Area (SPA)			
Cork Harbour SPA	004030	Little Grebe (*Tachybaptus ruficollis*) [A004] Great Crested Grebe (*Podiceps cristatus*) [A005] Cormorant (*Phalacrocorax carbo*) [A017] Grey Heron (*Ardea cinerea*) [A028] Shelduck (*Tadorna tadorna*) [A048] Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Red-breasted Merganser (*Mergus serrator*) [A069] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141]	405m south

Natura 2000 site	Site Code	Qualifying Interests/Special Conservation Interests	Distance at closest point and potential source-pathway-receptor link
		Lapwing (*Vanellus vanellus*) [A142] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160 Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus* ridibundus) [A179] Common Gull (*Larus canus*) [A182] Lesser Black-backed Gull (*Larus fuscus*) [A183] Common Tern (*Sterna hirundo*) [A193] Wetland and Waterbirds [A999]	
Ballycotton Bay SPA	004022	Teal (*Anas crecca*) [A052] Ringed plover (*Charadrius hiaticula*) [A137] Golden plover (*Pluvialis apricaria*) [A140] Grey plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Black-tailed godwit (*Limosa limosa*) [A156] Bar-tailed godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Turnstone (*Arenaria interpres*) [A169]	c. 18.4km east

Natura 2000 site	Site Code	Qualifying Interests/Special Conservation Interests	Distance at closest point and potential source-pathway-receptor link
		Common gull (*Larus canus*) [A182] Lesser black-backed gull (*Larus fuscus*) [A183] Wetland and waterbirds [A999]	
Sovereign Islands SPA	004124	Cormorant (*Phalacrocorax carbo*) [A017]	19.7km southwest.

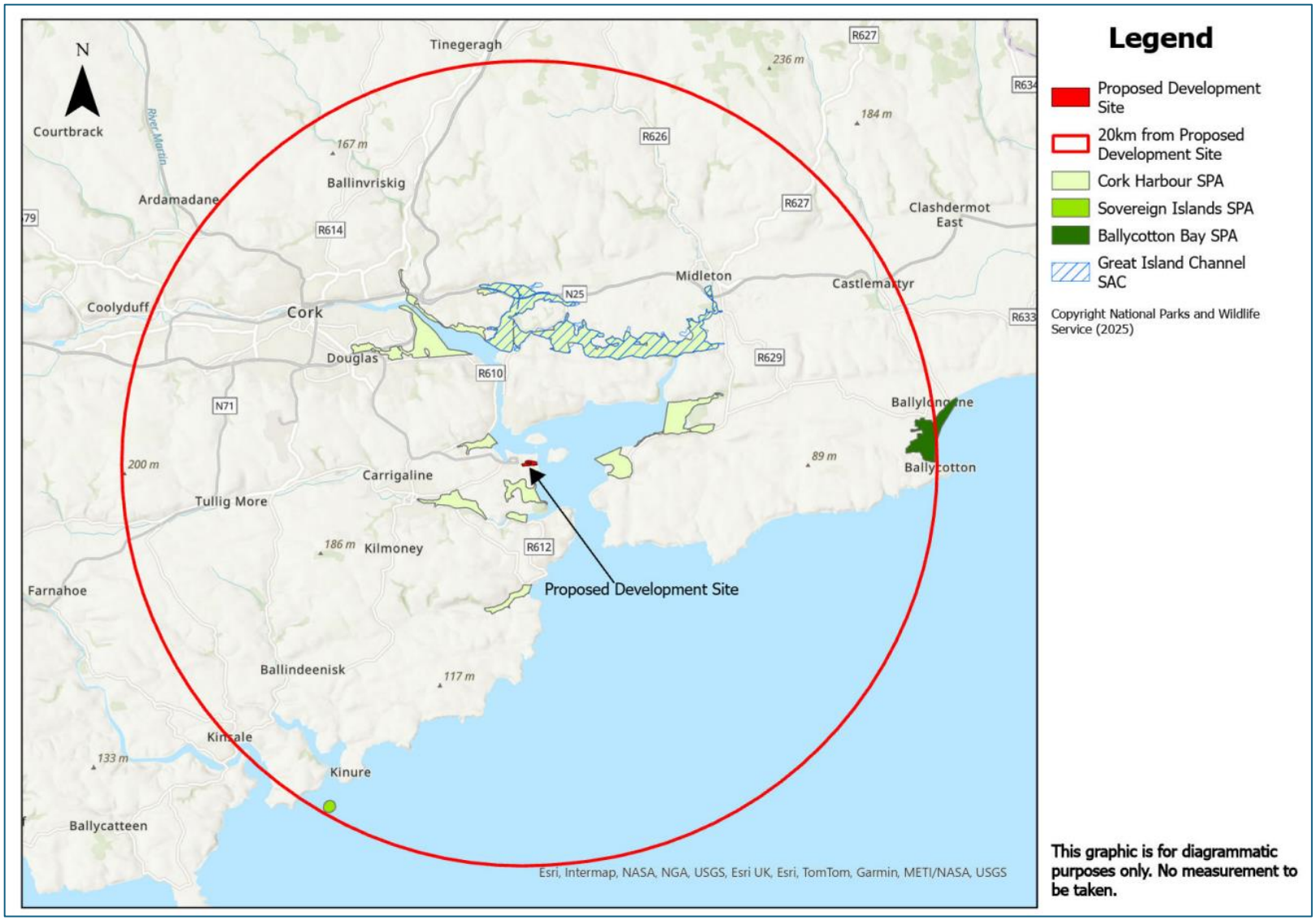


Figure 3. Natura 2000 sites within likely zone of impact of the proposed development site | Source EPA Envision Mapping | Not to scale

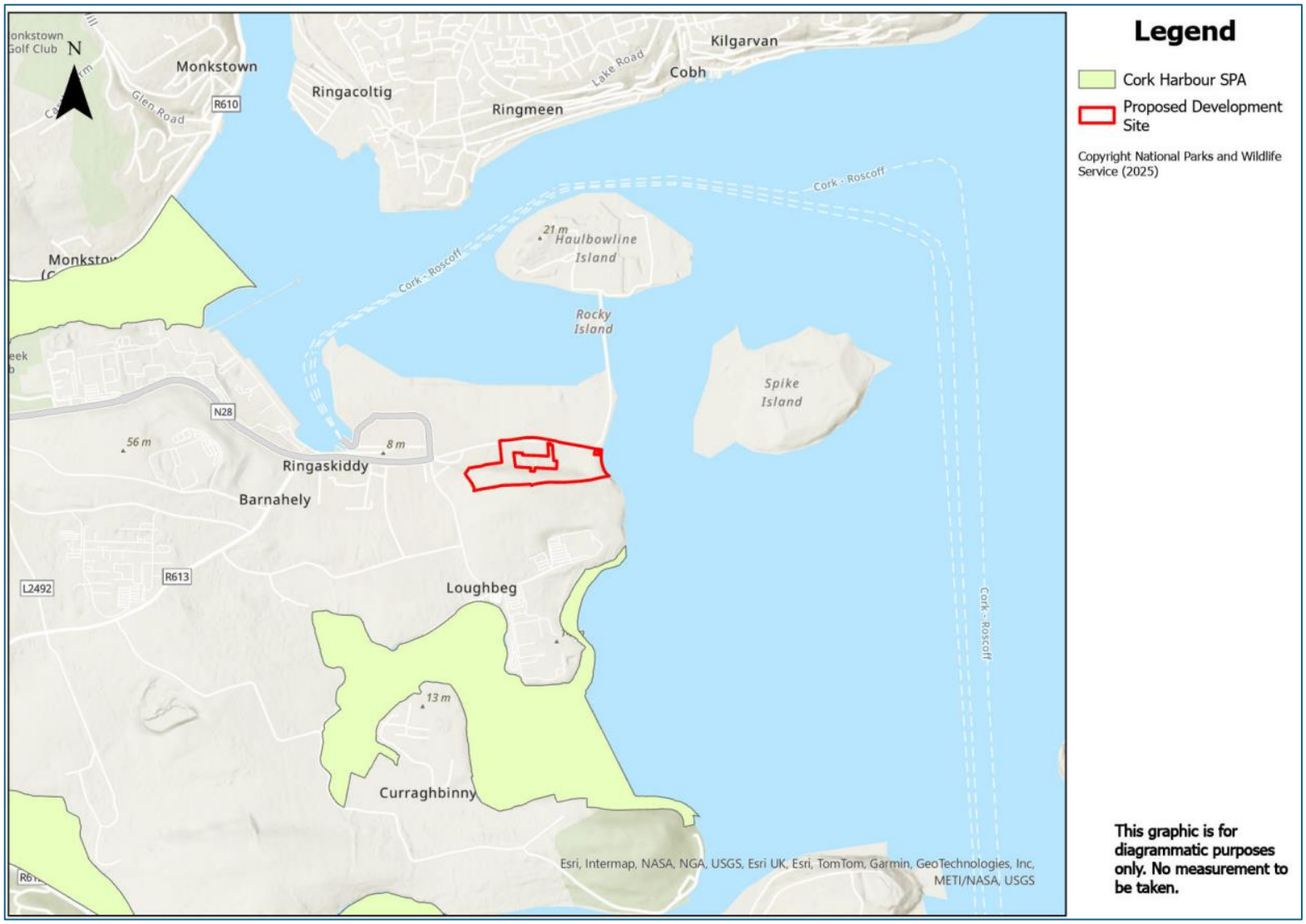


Figure 4. Location of Cork Harbour SPA in proximity to the proposed development site (approximate site boundary) | Source EPA Envision Mapping | Not to scale

4.6.1 Cork Harbour SPA (site code 004030)

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay, Ringabella Creek and the Rostellan and Poulnabibe inlets.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Little Grebe, Great Crested Grebe, Cormorant, Grey Heron, Shelduck, Wigeon, Teal, Mallard, Pintail, Shoveler, Redbreasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank, Blackheaded Gull, Common Gull, Lesser Black-backed Gull and Common Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. 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.

Cork Harbour has a nationally important breeding colony of Common Tern (102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed.

A full site synopsis for the Cork Harbour SPA is included as **Appendix 1** of this report.

4.6.2 Great Island Channel SAC (Site Code 001058)

This site comprises the north-eastern part of Cork Harbour. It includes all of the Great Island Channel, the intertidal areas between Fota Island and Little Island, and also the estuary of the Dungourney and Owennacurra Rivers as far as Midleton. The North Channel is on average 1km wide but extends for about 9km from east to west. The area is well sheltered, and the intertidal sediments are predominantly fine muds. In addition to the estuarine habitats, the site includes some wet grassland areas which are used by roosting birds, as well as some broad-leaved woodland at Fota Island. Compared to the rest of Cork Harbour, the Great Island Channel is relatively undisturbed, with aquaculture the main activity. The site is of ecological importance for its examples of intertidal mud and sand flats and Atlantic salt meadows of the estuarine type. Both habitats are fairly extensive in area and of moderate to good quality.

A full site synopsis for the Great Island Channel SAC is included as **Appendix 1** of this report.

4.6.3 Ballycotton Bay SPA (Site code 004022)

Ballycotton Bay SPA is situated on the south coast of Co. Cork. Ballycotton Bay is an east-facing coastal complex, which stretches northwards from Ballycotton to Ballynamona, a distance of c. 2 km. The site comprises two sheltered inlets which receive the flows of several small rivers. The principal habitat within the site is inter-tidal sand and mudflats. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Teal, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Turnstone, Common Gull and Lesser Black-backed Gull. 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.

A full site synopsis for the Ballycotton Bay SPA is included as **Appendix 1** of this report.

4.6.4 Sovereign Islands SPA (Site code 004124)

The Sovereign Islands are two very small marine islands located approximately 1 km off the coastline at the entrance to Oysterhaven Bay in Co. Cork. The islands are rocky stacks separated by a narrow sound of about 20 m width. The eastern island is flat-topped and rises to 24 m above sea level; the western one is more peaked and rises to 30 m. The geology is Lower Carboniferous limestones and shales. Both islands are largely devoid of soil apart from small amounts of organic matter trapped in cracks. Vegetation is sparse, with plants such as Sea Beet (*Beta vulgaris*), Spurrey (*Spergularia* spp.) and Orache (*Atriplex* spp.) recorded. The surrounding sea, to a distance of 200m, is included. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant.

The islands are important for breeding seabirds, with most occurring on the eastern stack. A Cormorant colony has been known since the late 1960s and 156 pairs were recorded here in 1999. A more recent survey in 2008 recorded 89 pairs. Herring Gull and Great Black-backed Gull also breed, with 10 and 75 pairs respectively in 1999.

Sovereign Islands SPA is of ornithological importance mainly for the breeding colony of Cormorant, which is both the largest in Co. Cork and of national importance. The non-migratory population of Great Black-backed Gull is also of national importance.

A full site synopsis for the Sovereign Islands SPA is included as **Appendix 1** of this report.

4.7 Natura 2000 sites – Features of interests and conservation objectives.

The EU Habitats Directive contains a list of habitats (Annex I) and species (Annex II) for which SACs must be established by Member States. Similarly, the EU Birds Directive contains lists of important bird species (Annex I) and other migratory bird species for which SPAs must be established. Those that are known to occur at a site are referred to as ‘qualifying interests’ and are listed in the Natura 2000 forms which are lodged with the EU Commission by each Member State. A ‘qualifying interest (QI)’ (or ‘special conservation interest (SCI)’ in the case of SPAs) is one of the factors (such as the species or habitat that is present) for which the site merits designation. The National Parks and Wildlife Service (NPWS) are responsible for the designation of SACs and SPAs in Ireland.

The current conservation objectives for the Great Island Channel SAC, Cork Harbour SPA, Ballycotton Bay SAP and Sovereign Islands SPA are detailed in following publications:

- *NPWS (2014) Conservation Objectives: Great Island Channel SAC 001058. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.*
- *NPWS (2014) Conservation Objectives: Cork Harbour SPA 004030. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.*

- *NPWS (2014) Conservation Objectives: Ballycotton Bay SPA 004022. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.*
- *NPWS (2025) Conservation Objectives: Sovereign Islands SPA 004124. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.*

The NPWS state that the conservation objectives for Great Island Channel SAC should be used in conjunction with those for Cork Harbour SPA as appropriate.

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 SACs and SPAs 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 at favourable conservation status sites designated as SACs and SPAs. 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, is stable or increasing, and the ecological factors that 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 species and habitats listed as QIs/SCIs for the Great Island Channel SAC, Cork Harbour SPA, Ballycotton Bay SPA and Sovereign Islands SPA and specific conservation objectives are included in **Tables 2 to 6**.

Table 2 Qualifying Interests (QIs) for the Great Island Channel SAC

Habitat Code	Habitat	Conservation objective
1140	*Mudflats and sandflats not covered by seawater at low tide*	Maintain
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Restore

Restore = Restore favourable conservation condition, Maintain = Maintain favourable conservation condition

Table 3. Special Conservation Interests (SCIs) for the Cork Harbour SPA

Species code	Species	Scientific name	Conservation objective
A004	Little Grebe	*Tachybaptus ruficollis*	Maintain
A005	Great Crested Grebe	*Podiceps cristatus*	Maintain
A017	Cormorant	*Phalacrocorax carbo*	Maintain
A028	Grey Heron	*Ardea cinereal*	Maintain
A048	Shelduck	*Tadorna tadorna*	Maintain
A050	Wigeon	*Anas Penelope*	Maintain
A052	Teal	*Anas crecca*	Maintain
A054	Pintail	*Anas acuta*	Maintain
A056	Shoveler	*Anas clypeata*	Maintain
A069	Red-breasted Merganser	*Mergus serrator*	Maintain
A130	Oystercatcher	*Haematopus ostralegus*	Maintain
A140	Golden Plover	*Pluvialis apricaria*	Maintain
A141	Grey Plover	*Pluvialis squatarola*	Maintain
A142	Lapwing	*Vanellus vanellus*	Maintain
A149	Dunlin	*Calidris alpina*	Maintain
A156	Black-tailed Godwit	*Limosa limosa*	Maintain
A157	Bar-tailed Godwit	*Limosa lapponica*	Maintain
A160	Curlew	*Numenius arquata*	Maintain
A162	Redshank	*Tringa totanus*	Maintain
A179	Black-headed Gull	*Chroicocephalus ridibundus*	Maintain
A182	Common Gull	*Larus canus*	Maintain
A183	Lesser Black-backed Gull	*Larus fuscus*	Maintain

Species code	Species	Scientific name	Conservation objective
A193	Common Tern	*Sterna hirundo*	Maintain
A999	Wetland and Waterbirds		Maintain

Restore = Restore favourable conservation condition, Maintain = Maintain favourable conservation condition

Table 4. Special Conservation Interests (SCIs) for the Ballycotton Bay SPA

Species code	Species	Scientific name	Conservation objective
A052	Teal	*Anas crecca*	Maintain
A137	Ringed Plover	*Charadrius hiaticula*	Maintain
A140	Golden Plover	*Pluvialis apricaria*	Maintain
A141	Grey Plover	*Pluvialis squatarola*	Maintain
A142	Lapwing	*Vanellus vanellus*	Maintain
A156	Black-tailed Godwit	*Limosa limosa*	Maintain
A157	Bar-tailed Godwit	*Limosa lapponica*	Maintain
A160	Curlew	*Numenius arquata*	Maintain
A169	Turnstone	*Arenaria interpres*	Maintain
A182	Common Gull	*Larus canus*	Maintain
A183	Lesser Black-backed Gull	*Larus fuscus*	Maintain
A999	Wetland and Waterbirds		Maintain

Restore = Restore favourable conservation condition, Maintain = Maintain favourable conservation condition

Table 5. Qualifying Interests of Sovereign Islands SPA

Code	Species	Conservation objective
A017	Cormorant *Phalacrocorax carbo*	Restore

Restore = Restore favourable conservation condition, Maintain = Maintain favourable conservation condition

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, “Wetland and Waterbirds” may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a further objective is to maintain or restore the favourable conservation condition of the wetland habitat within the Cork Harbour SPA and Ballycotton Bay SPA as a resource for the regularly occurring migratory waterbirds that utilise it.

4.8 Baseline Conditions

Appendix 10 of this report details the ecological baseline of the proposed development site based on direct surveys of the entire proposed development site and surrounding area and a review of desktop data. The surveys assessed the potential for all Qualifying Interests (QIs)/ Special Conservation Interests (SCIs) of European sites and third schedule invasive species to occur within the proposed development site.

It is noted that studies have been carried out at the proposed development site since 2001 but up to date surveys were carried out in 2024 and 2025 as part of the updated EIS and NIS. Dixon Brosnan previously prepared the Flora and Fauna (Biodiversity) chapters for EISs submitted in 2008 and 2016 and an addendum to the EIS prepared in 2010. These reports were consulted during the preparation of this report.

4.8.1 Terrestrial Habitats

Terrestrial habitat mapping was carried out within the proposed development site boundary on the 29th September 2022, 22nd October 2024, 29th May 2025 and 23rd July 2025 in line with the methodology outlined in the Heritage Council publication *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). All habitats within the study area were classified to level 3 of the classification scheme outlined in *A Guide to Habitats in Ireland* (Fossit, 2000) and cross-referenced with habitats listed under Annex I of the Habitats Directive.

A current habitat map is included in **Figure 5** and the habitats recorded on site are described below in **Table 6**.

Table 6. Terrestrial habitats recorded within the proposed development site boundary

Habitat	Description/ Habitats Directive Annex I Status
Scrub WS1/Immature woodland WS2	The proposed development will be concentrated in the eastern part of the study area. This area which previously supported grassland communities (in 2001 and 2008), is now almost entirely dominated by a scrub/immature woodland mosaic. Over the past 10 years, trees within the scrub have become more established leading the classification of as a woodland mosaic. This habitat has development through natural succession in the absence of grazing or other forms of agricultural management. Willow is dominant, with White Willow, Grey Willow and Goat Willow. Other species noted include Gorse, Bramble, Bracken, Hawthorn, Blackthorn, Crack Willow, Pedunculate Oak, Ash, Beech Sycamore and Elder. The encroachment of scrub has resulted in the loss of most of the grassland within this area although some tracks remain within this habitat. Areas previously classified as dry meadows and grassy verge have become overgrown with herbaceous species. Herbaceous species include Rush sp., Knapweed sp., Yellow-wort, Cat's Ear, Meadow, Vetchling. Birds-foot, Ribwort plantain, Woody nightshade, Cocksfoot, Yorkshire fog, False Oat Grass, Common Bent, Sow thistle, Silverweed and Pheasant bush.
Scrub WS1	Scrub has continued to develop in areas of the proposed development site previously managed for agricultural with an area of scrub on the lower field at the north of the site

Habitat	Description/ Habitats Directive Annex I Status
	near the L2545 Ringaskiddy road. This areas of scrub is dominated by immature Willow, with Buddleia and Wild clematis also recorded. At the centre of the site, to the south and west of the Hammond Lane Facility, scrub dominated the sloped ground, although this is lower growing than the scrub/immature woodland at the east of the site. Gorse, Bracken and Bramble dominate within this area.
Dry meadow and grassy verge GS2	Previously (2014/2015) classified as improved agricultural grassland, this area has developed into dry meadow and grassy verge habitat in the absence of agricultural management. This is a more diverse grassland than was previously recorded with species including Red fescue, Cocksfoot, Yorkshire fog, False oat grass, Common bent, Creeping buttercup, Curled dock, Broadleaved dock, Hogweed, Nettle, Bracken, Meadow vetchling, Suckling clover, Buttercup, Sorrel, Ragweed, Knapweed, Clover, Hawkweed and Sow thistle. Some encroachment of scrub is evident along the boundary, largely Bramble, Bracken and immature Elm. A field on the lower ground along the L2545 Ringaskiddy road has also developed into this semi-natural grassland habitat in the absence of agricultural management. The development of this grassland on formerly fertile ground means that this is of relatively low diversity. Dry meadow and grassy verge GS2 corresponds to the Habitats Directive Annex I habitat: 'lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) (6510)'. However, the dry meadow and grassy verge habitat within the proposed development site is very common locally and does not represent a valuable example of this Annex I habitat type.
Conifer woodland WD3	A small area of planted conifers was recorded, which consists of Sitka Spruce and Monterey Cypress. The trees are approximately 25-30 years old. This area is now completely surrounded by scrub habitats and the boundary of this habitat is ill-defined.
Spoil and bare ground ED2	An area of land at the west of the proposed development site has been acquired as part of the M28 motorway construction. This area is currently under construction.
Earth bank BL1	The western side of the northern boundary is bordered by an area of vegetated earth bank dominated by immature Willow, Red fescue, Cocksfoot, Wild strawberry, Ribwort plantain, Common Bent, Broadleaved dock, Hogweed, Red clover, Knapweed, Wild clematis, Rye grass and Creeping bent.
Treelines WL2	The north-eastern boundary of the proposed development site consists of treeline dominated by Sycamore and Beech. Hawthorn, Blackthorn, Gorse and Bramble also noted. The short section of treeline along the western boundary is more sheltered.
Hedgerow WL1/Scrub WS1	A hedgerow runs along the southern boundary. This boundary is denser at the centre, with typical native hedgerow with a Blackthorn and Hawthorn dominant with occasional Gorse. However, other areas are more scrub like with occasional trees/scrub species

Habitat	Description/ Habitats Directive Annex I Status
	such as Gorse and Crab apple dominated by herbaceous species including Bramble, Bracken, Wood sage, False oat grass, Male fern, Harts togue fern, immature Sycamore and immature Elder.
Scrub WS1/Immature woodland WS2	The proposed development will be concentrated in the eastern part of the study area. This area which previously supported grassland communities (in 2001 and 2008), is now almost entirely dominated by a scrub/immature woodland mosaic. Over the past 10 years, trees within the scrub have become more established leading the classification of as a woodland mosaic. This habitat has development through natural succession in the absence of grazing or other forms of agricultural management. Willow is dominant, with White Willow, Grey Willow and Goat Willow. Other species noted include Gorse, Bramble, Bracken, Hawthorn, Blackthorn, Crack Willow, Pedunculate Oak, Ash, Beech Sycamore and Elder. The encroachment of scrub has resulted in the loss of most of the grassland within this area although some tracks remain within this habitat. Areas previously classified as dry meadows and grassy verge have become overgrown with herbaceous species. Herb species include Rush, Knapweed, Yellow-wort, Cat's Ear, Meadow, Goat Vetchling. Birds-foot, Ribwork plantain, Woody nightshade, Cocksfoot, Yorkshire fog, False Oat Grass, Common Bent, Sow thistle, Silverweed and Pheasant bush.
Scrub WS1	Scrub has continued to develop in areas of the site previously managed for agricultural with an area of scrub on the lower field at the south of the site near the L2545 Ringaskiddy road. This areas of scrub is dominated by immature Willow, with Buddleia and Wild clematis also recorded. At the centre of the site, to the north and west of the Hammond Lane Facility, scrub dominated the sloped ground, although this is lower growing that the scrub/immature woodland at the east of the site. Gorse, Bracken and Bramble dominate within this area.
Dry meadow and grassy verge GS2	Previously (2014/2015) classified as improved agricultural grassland, this area has developed into dry meadow and grassy verge habitat in the absence of agricultural management. This is a more diverse grassland than was previously recorded with species including Red fescue, Cocksfoot, Yorkshire fog, False oat grass, Common bent, Creeping buttercup, Curled dock, Broadleaved dock, Hogweed, Nettle, Bracken, Meadow vetchling, Suckling clover, Buttercup, Sorrel, Ragweed, Knapweed, Clover, Hawkweed and Sow thistle. Some encroachment of scrub is evident along the boundary, largely Bramble, Bracken and immature Elm. A field on the lower ground along the L2545 Ringaskiddy road has also developed into this semi-natural grassland habitat in the absence of agricultural management. The development of this grassland on formerly fertile ground means that this is of relatively low diversity. Dry meadow and grassy verge GS2 corresponds to the Habitats Directive Annex I habitat: 'lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510)'. However the dry meadow and grassy verge habitat within the site is very common locally and does not represent a valuable example of this Annex I habitat type.
Conifer woodland WD3	A small area of planted conifers was recorded, which consists of Sitka Spruce and Monterey Cypress. The trees are approximately 25-30 years old. This area is now completely surrounded by scrub habitats and the boundary of this habitat is ill-defined.

Habitat	Description/ Habitats Directive Annex I Status
Spoil and bare ground ED2	An area of land at the west of the site has been acquired as part of the M28 motorway construction. This area is currently under construction.
Earth bank BL1	The western side of the southern boundary is bordered by an area of vegetated earth bank dominated by immature Willow, Red fescue, Cocksfoot, Wild strawberry, Ribwort plantain, Common Bent, Broadleaved dock, Hogweed, Red clover, Knapweed, Wild clematis, Rye grass and Creeping bent.
Treelines WL2	The south-eastern boundary of the site consists of treeline dominated by Sycamore and Beech. Hawthorn, Blackthorn, Gorse and Bramble also noted. The short section of treeline along the western boundary, which is more sheltered, consists primarily of semi-mature Ash.
Hedgerow WL1/Scrub WS1	A hedgerow runs along the southern boundary. This boundary is denser at the centre, with typical native hedgerow with a Blackthorn and Hawthorn dominant with occasional Gorse. However, other areas are more scrub like with occasional trees/scrub species such as Gorse and Crab apple dominated by herbaceous species including Bramble, Bracken, Wood sage, False oat grass, Male fern, Harts togue fern, immature Sycamore and immature Elder.

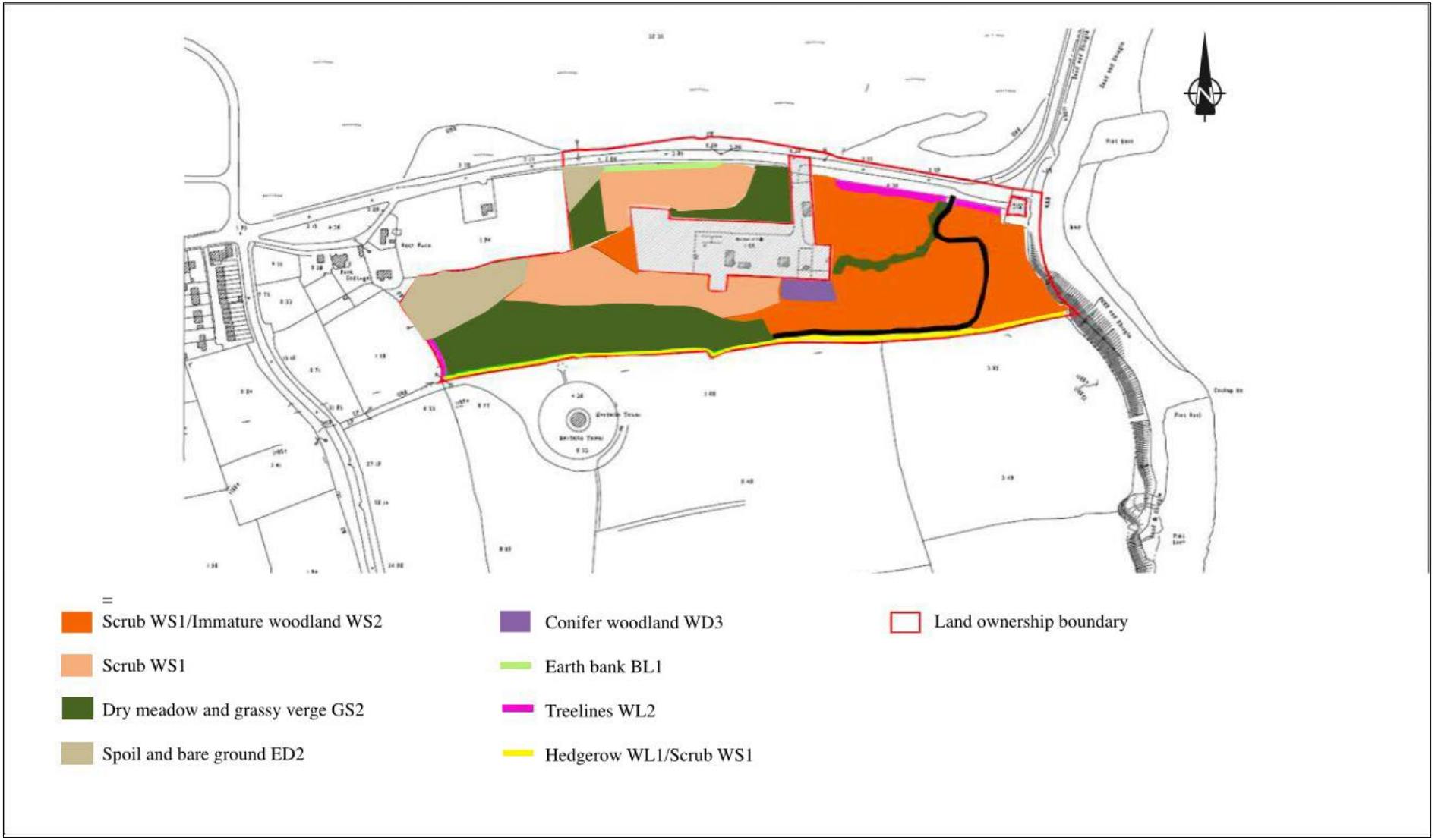


Figure 5. Habitats recorded within the proposed development site boundary | not to scale

4.8.2 Marine Habitats

A survey of the intertidal area in proximity to the proposed development was carried out by Dr. Stiofan Creaven in June, 2015. There has been no development/significant changes on Gobby Beach in the years since the last survey and therefore, no update to this survey was deemed necessary. The survey report is included in **Appendix 17** to the NIS. The marine flora and fauna was examined with survey effort timed to correspond with low water on a Spring tide when as much of the shore as possible is exposed. The survey classified the habitats encountered during the survey as follows:

- The upper shore here can be classed as Barren Littoral Shingle (EUNIS habitat code A2.111).
- Bedrock and boulders were found scattered throughout the mid and lower shore. Vertical surfaces on these were characterised by a barnacle-limpet community (EUNIS habitat code A1.1131).
- Boulder tops, dominated by *Fucus spiralis*, can be classified as *Fucus spiralis* on sheltered upper eulittoral rock (EUNIS habitat code A1.312). In summer, the green alga *Ulva intestinalis* can become very common – as seen on the shore at Ringaskiddy. Vertical surfaces often lack the fucoid cover and are characterised by the barnacle-limpet community (EUNIS habitat code A1.1131) also seen on this beach.

The presence of a substantial deposit of decaying algal matter in the mid shore complicates the allocation of a habitat type to this zone though the floral and faunal community encountered closely resembles *Fucus vesiculosus* on variable salinity mid eulittoral boulders and stable mixed substrata (EUNIS habitat code A1.323). The presence of ephemeral seaweeds (green algae here) occupying available space and patches of sediment found between the hard substrata containing the lugworm *Arenicola marina* and the sand mason *Lanice conchilega*, support this classification. The exposure level of this shore probably changes seasonally from sheltered to moderately exposed/exposed during storm events.

The lower shore is characterised by littoral muddy sands with the habitat falling into a Polychaete/Bivalve-dominated muddy sand shore (EUNIS habitat code A2.24). Based on analysis of infaunal samples taken during the transects, this most closely resembles a *Macoma balthica* and *Arenicola marina* in muddy sand shores biotope (EUNIS habitat code A2.241) though with *Abra* present instead of *Macoma*. It also has elements of *Lanice conchilega* in littoral sand (EUNIS habitat code A2.245).

An attempt was made to obtain faunal samples at all stations visited. This effort was successful at two stations. The assemblage recorded is close to the EUNIS LS.LSa.MuSa.Lan Lanice conchilega in littoral sand grouping but instead of *Macoma balthica*, *Abra* is present. (EUNIS code A2.24 – Polychaete/bivalve dominated muddy sand shores). The common cockle (*Cerastoderma edule*) was also present here.

The report concluded that these habitats are all commonly encountered in an Irish context. Samples were faunally poor with only ten taxa present. All species found are typical of fine grained sediments of the North East Atlantic. No rare or uncommon species were recorded.

4.8.4 Birds

A detailed bird survey report is included as **Appendix 18**. Information on birds is summarised below.

Breeding Birds

Breeding bird surveys were carried out by DixonBrosnan 1st April 2025, 1st May 2025 and 22nd June 2025, using transect and point count methods (Gilbert *et al.* 1998 and Bibby *et al.* 2000). A total of 32 bird species were recorded during site visits. The mosaic of semi-natural grassland, scrub and dense scrub/immature woodland was noted as particularly beneficial for warblers, with Blackcap, Whitethroat, Willow Warbler and Chiffchaff recorded. Typical woodland edge and/or urban species were also recorded including Blackbird, Song thrush, Robin etc. It is noted that Skylark and Meadow Pipit were recorded in fields to the north of the proposed development (during winter bird surveys), but these species were not recorded during the breeding bird surveys.

A number of BOCCI species (Gilbert *et al.* 2023) were recorded including the Red List species Kestrel. This species was recorded foraging at the proposed development site, but no signs of breeding were recorded. Other Red List species i.e. Oystercatcher, was recorded foraging along the shoreline of Gobby Beach. A number of Amber listed species were recorded within the proposed development site including Goldcrest, Greenfinch, House Martin, Swallow and Willow Warbler. A number of waterbirds were recorded overflying the proposed development site including Herring Gull, Common Gull, Oystercatcher and Common Tern, but there is no suitable breeding or foraging habitat for these species within the proposed development site boundary.

Of the species recorded during the survey, six species (Oystercatcher, Cormorant, Common Tern, Grey Heron, Black-headed Gull and Common Gull) are listed as birds of special conservation interest for the Cork Harbour SPA. As noted above, there is no breeding or foraging habitat for these species within the proposed development site boundary.

A list of the bird species recorded during breeding surveys in 2025 is provided in **Table 7.**

Table 7. Breeding bird survey results (2025)

Bird species	Breeding status	Estimated No. of Pairs	Conservation status (Birds Directive and BOCCI)
Blackbird	Br-FF	2	
Blackcap	Po-S	1	
Black-headed gull	N-F	0	Amber List
Blue tit	Br-FL	3	
Bullfinch	Pr- A	1	
Chaffinch	Br-FL	2	
Chiffchaff	Pr-D	2-3	
Common gull	N-F	0	Amber List
Common tern	N-F	0	Amber List/Annex I

Bird species	Breeding status	Estimated No. of Pairs	Conservation status (Birds Directive and BOCCI)
Common Whitethroat	Pr-A	1	
Dunnock	Po- S	1	
Goldcrest	Pr-D	1	Amber List
Goldfinch	PR-N	1	
Great tit	Br-DD	1	
Greenfinch	Pr-P	1	Amber list
Grey Heron	N-F	0	
Herring gull	N-F	0	Amber list
Hooded crow	N-F	0	
House martin	N-F	0	Amber List
Kestrel	N-F	0	Red list
Long tailed tit	Pr-P	1	
Oystercatcher	N-F	0	Red List
Robin	Br-UN	1	
Rook	N-F	0	
Song thrush	Pr-N	1	
Starling	N-F	0	Amber List
Swallow	N-F	0	Amber List
Willow warbler	Po-S	2	Amber List
Woodpigeon	Pr-D	2-3	
Wren	Br-ff	2	

Common tern Breeding

Common Terns are known to breed at the dolphins in the Port of Cork deepwater quay, and a pontoon offshore from the Port of Cork, located c.750m and 1.5km respectively from the proposed development site. The Port of Cork pontoon was installed as part of mitigation for the development of the deepwater quay with the intention of moving birds away from the dolphins. Other sites within the Lower Harbour area which have been occupied in some recent years are the rocky island in Lough Beg, Ballybricken Point ADM jetty, the island within the Pfizer Golf Course Lagoon and Raffeen Creek (O'Mahony and Smiddy, 2017).

Common Terns were recorded overflying the proposed development site during the 2025 breeding bird surveys. While Common Tern are likely to forage in the waters of Cork Harbour to the east of the proposed development site, there are no breeding areas for Common Tern located in the vicinity of the proposed development site.

Winter bird surveys

The winter bird surveys were undertaken on six dates between October 2025 and March 2025 (22nd October 2024, 12th November 2024, 29th November 2024, 18th December 2024, 16th January 2025, 7th February 2025, 11th March 2025). The survey methodology was based on

that used by the British Trust for Ornithology's (BTO) Wetland Bird Survey (WeBS) and also that for the Irish Wetland Bird Survey (I-WeBS), as outlined in Gilbert *et al.* (1998). **Table 8** lists the bird species observed and the total number of birds recorded.

These surveys focused on grassland habitats within the proposed development site as well as grassland habitats to the south and coastal habitats to the east which could provide potential foraging or roosting habitats for wintering waterbirds and waders. A total of 27 bird species were recorded during the 2024/2025 winter bird surveys. It is noted that many of these birds were recorded overflying the coastal waters adjoining the proposed development site and that the survey covered a radius of approximately 300m from each vantage point. The conservation status/designation of birds recorded during winter bird counts is also shown in **Table 8**.

Bird species listed in Annex I of the Birds Directive are considered a conservation priority. Three species (Dunlin, Little Egret and Great Northern Diver) are listed on Annex I of the Birds Directive. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Eight red listed species were recorded namely Curlew, Dunlin, Kestrel, Meadow pipit, Oystercatcher, Redshank, Redwing and Snipe. Eleven species are Amber listed Black-headed Gull, Brent Goose, Common Gull, Cormorant, Great-crested Grebe, Herring Gull, Lesser black-backed Gull, Skylark, Starling, Swallow and Turnstone.

A total of ten species listed as SCI species for the Cork Harbour SPA were recorded, namely, Black-headed Gull, Common Gull, Cormorant, Lesser black-backed Gull, Curlew, Dunlin, Oystercatcher, Redshank, Grey Heron and Great-crested Grebe. The AA screening and Natura Impact Statement (NIS), which accompanies this application, provides a more detailed appraisal of the impact of the proposed development on Natura 2000 sites including the Cork Harbour SPA.

The majority of waterbirds and waders listed in **Table 8** were recorded along the shoreline and waters of Cork Harbour to the east of the proposed development site. However, Curlew were recorded in the fields to the south of the proposed development site on a number of occasions. These fields were also surveyed as part of the EIS for the M28 motorway (RPS 2015). These surveys recorded peak numbers of 42 Curlew, but Curlew were regularly recorded in small flocks during site surveys. Oystercatchers were recorded on one occasional during the M28 surveys as well as occasional Snipe.

The shorter sward within these fields, which are subject to low levels of grazing, provide some terrestrial foraging habitats for wading birds. However, the grassland within the proposed development site is not actively managed and is too long for wading birds. While occasional Snipe were recorded within the proposed development site, overall, the long grass and scrub habitat is not suitable for wading birds and/or waterfowl.

Table 8. Birds recorded during winter bird survey and conservation status

Species		Birds Directive Annex I	BOCCI Red List*	BOCCI Amber List*	Cork Harbour SCI Species**
Black-headed Gull	*Larus ridibundus*			X	X
Brent Goose	*Branta bernicla*			X	

Species		Birds Directive Annex I	BOCCI Red List*	BOCCI Amber List*	Cork Harbour SCI Species**
Common Gull	*Larus canus*			X	X
Cormorant	*Phalacrocorax carbo*			X	X
Curlew	*Numenius arquata*		X		X
Dunlin	*Calidris alpina schinzii*	X	X		X
Great black-backed Gull	*Larus marinus*				
Great Northern Diver	*Gavia immer*	X			
Great-crested Grebe	*Podiceps cristatus*			X	X
Greenshank	*Tringa nebularia*				
Grey Heron	*Ardea cinerea*				X
Herring Gull	*Larus argentatus*			X	
Kestrel	*Falco tinnunculus*		X		
Lesser black-backed Gull	*Larus fuscus*			X	X
Little Egret	*Egretta garzetta*	X			
Magpie	*Pica pica*				
Meadow pipit	*Anthus pratensis*		X		
Oystercatcher	*Haematopus ostralegus*		X		X
Redshank	*Tringa totanus*		X		X
Redwing	*Turdus iliacus*		X		
Robin	*Erithacus rubecula*				
Rook	*Corvus frugilegus*				
Sanderling	*Calidris alba*				
Skylark	*Alauda arvensis*			X	
Snipe	*Gallinago gallinago*		X		
Starling	*Sturnus vulgaris*			X	
Turnstone	*Calidris maritima*			X	
Woodpigeon	*Columba palumbus*				
Wren	*Troglodytes troglodytes*				

*Gilbert G, Stanbury A and Lewis L (2021), “Birds of Conservation Concern in Ireland 2020 –2026”. Irish Birds 9: 523—544; ** • NPWS (2014) Conservation Objectives: Cork Harbour SPA 004030. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Winter roost Cormorant

The largest Cormorant nocturnal roost in Cork Harbour occurs on the southern shoreline of Monkstown Creek, c.1.8km from the proposed development site. The total count of 930 Cormorants in Cork Harbour, and of 426 Cormorants at the Monkstown Creek roost, in November 2023 was the highest count recorded in annual roost counts carried out since 2014 (T. Gittings, unpublished data). However, there are no Cormorant roosts within 1km of the proposed development site.

Bird summary

The study area is of local value for a range of terrestrial bird species that are relatively common in the Irish countryside. The study area is of more value than the intensively agriculturally managed land in this area due to the presence of a greater diversity of habitats and semi-natural habitat i.e. scrub, immature woodland, semi-natural grassland. These habitats have developed due to an absence of active management within the proposed development site. However, the study area does not support a community of birds or individual species that would be considered significant conservation priorities, and the study area, which is small, does not provide critical resources for such communities and/or species.

The coastal area adjoining the proposed development site consists primarily of rock and shingle and therefore does not support the high numbers of wintering waders that are characteristic of high value mudflats with high densities of macro-invertebrates. Some species that are considered of high conservation value (Annex I of the Birds Directive, qualifying species for the Cork Harbour SPA and Red List) were noted in this general area. Many of these birds were recorded overflying the channel, and the proposed development site itself and the shoreline adjoining the proposed development site, did not support high numbers of these species.

4.5 Invasive species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality.

The control of invasive species in Ireland comes under the Wildlife (Amendment) Act 2000, where it states that:

'Any person who— [...] plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora, ['refers only to exotic species thereof']][...] otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence.'

The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibits the introduction and dispersal of species listed in the Third Schedule, which includes Japanese Knotweed and Himalayan Balsam, as follows: *"any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [….] shall be guilty of an offence."*

No third schedule invasive species were recorded within the proposed development site boundary. In 2016, ecological surveys recorded a small stand of Japanese knotweed along the western boundary of the site and also outside the site's north-western boundary. Since the completion of the EIS in 2016, Indaver have engaged a specialist company to actively monitor and treat these stands of Knotweed at the boundary to prevent any spread onto the Indaver site. Monitoring and treatment of the stands has been ongoing since 2017. No signs of active Japanese Knotweed growth during the 2024/2025 site surveys. However, ongoing monitoring for this species will be carried out during (and prior to) the construction phase of the development.

The non-native invasive species Buddleia, Winter Heliotrope, Cotoneaster, Sycamore, Travelers' Joy and Pheasant Bush were recorded within and adjacent to the proposed development site. These species are not included in the Third Schedule of the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011). Therefore, their presence at the site does not have the potential to lead to an offence under the Birds and Natural Habitats Regulations 2011 (S.I. 477 of 2011).

Sycamore and Cotoneaster are on the "Amber List: Recorded Species" (which under the right conditions could represent a significant impact on native species or habitats) while Buddleia, Pheasant Bush, Traveler's Joy and Winter Heliotrope are on the "Amber List: Uncertain Risk" (their ecological impact remains uncertain due to lack of data showing impact or lack of impact). Buddleia, Winter Heliotrope, Cotoneaster and Travelers' Joy are also included in the NRA *Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads* (NRA, 2010) as these species have been shown to have an adverse impact on landscape quality, native biodiversity or infrastructure; and are likely to be encountered during road schemes.

Cotoneaster, Buddleia and Sycamore were recorded from the scrub areas within the development site, while Travelers' Joy, Sycamore and Buddleia were found to have invaded scrub and hedgerows throughout the study area. Winter Heliotrope was found present along the boundary of the L2545 Ringaskiddy Road.

4.6 Water Framework Directive Waterbodies

The proposed development occurs within the Lee, Cork Harbour and Youghal Bay WFD Catchment. The catchment area of 2,153 km^2 discharges to the River Lee and all streams entering tidal water in Cork Harbour and Youghal Bay and between Knockaverry and Templebreedy Battery. The largest urban centre in the catchment is Cork City. According to the cycle three catchment assessment (assessment period of 2016-2021: EPA, 2024) a total of 49% of surface waterbodies were not achieving a 'good' or 'high' ecological status. A total of 33% of all waterbodies are 'at risk' of not meeting their environmental objective in the catchment, with 24% being under 'review' and 43% are 'not at risk'. The Cork Harbour and Lough Mahon are two of the five heavily modified waterbodies in the catchment.

The proposed development has an indirect hydrological connection with the Cork Harbour, Outer Cork Harbour, and Western Celtic Sea Coastal WFD waterbody; and the Lough Mahon, North Channel Great Island and Owenboy Estuary Transitional WFD waterbodies (**Table 9** (taken from **Chapter 13 of the updated EIS**)). All the WFD coastal and transitional waterbodies connected to the Cork Harbour, except the Western Celtic Sea, are 'at risk' of not reaching their goal of 'good' status by 2021 or earlier. The Cork Harbour and Lough Mahon WFD waterbodies have a goal of reaching 'Good Ecological Potential'.

The catchment assessment indicated that all the surface WFD waterbodies have a 'moderate' ecological status, with the exception of the Western Celtic Sea coast WFD waterbody, Lough Beg/Curraghbinny transitional WFD waterbody and Hilltown_010 river WFD waterbody (**Table 9** (taken from **Chapter 13 of the updated EIS**)). The proposed development has an indirect hydrological connection with the Ringaskiddy Groundwater WFD waterbody. The Groundwater WFD waterbody is 'not at risk' and is in a 'good' status. Current pressures on surface water bodies are mainly through urban wastewater, urban runoff and nutrient inputs from agriculture.

Table 9. WFD Waterbodies Risk, Status and Pressures

WFD waterbody type	WFD waterbody	Code	Risk	Status	Pressures	Distance from proposed development
River	Hilltown_010	IE_SW_19H050470	Not at risk	Good		0km
Coastal	Cork Harbour*	IE_SW_060_0000	At risk	Moderate	Urban Run-off Urban Wastewater	0km
Coastal	Outer Cork Harbour	IE_SW_050_0000	At risk	Moderate	Agriculture	3.3km
Transitional	Lough Beg/Curraghbinny	IE_SW_060_1100	Not at risk	Good		2km
Transitional	Lough Mahon*	IE_SW_060_0750	At risk	Moderate	Urban Wastewater	2.5km
Transitional	Owenboy Estuary	IE_SW_060_1200	At risk	Moderate	Agriculture	2km
Groundwater	Ringaskiddy	IE_SW_G_072	Not at risk	Good		0km

*Heavily modified waterbody

4.7 Identification of potential impacts

4.7.1 Direct habitat loss or habitat degradation during construction

The proposed development site does not overlap with any Natura 2000 site. The adjoining shoreline habitats at Gobby Beach, which will be affected by the proposed beach nourishment works, do not lie within any designated Natura 2000 site. Beach nourishment is a well-recognised coastal engineering solution worldwide. It is a soft solution and will not significantly affect the areas in the vicinity of the proposed development site. The net coastal sediment transport goes from south to north according to wind conditions and swell and, therefore, the material is likely to move towards the north in the medium and long term. The closest area of the Cork Harbour Special Protection Area (SPA) is located to the southwest of the site. The net coastal sediment transport goes from south to north according to wind conditions and swell and therefore, the beach nourishment material is likely to move towards the north in the medium and long term. Therefore, the sacrificial material will not impact on this part of the SPA. Other sections of the SPA which are to the north of the site are more than two kilometres from the site and these are too remote from the site to receive any significant quantities of beach nourishment material.

An ecological appraisal of the proposed development site indicates that it supports common habitats which are not of high value in the context of European designations i.e. semi-natural grassland, scrub, scrub/immature woodland. The overgrown habitats at the site are not suitable for SCI birds and no waders/waterfowl were recorded within the proposed development site during winter or summer surveys. The habitats recorded within the proposed development site do not correspond to habitats listed on Annex I of the Habitats Directive and/or qualifying habitat for Great Island Channel SAC.

Indirect impacts on habitats from emissions to surface water, emissions to air, change in site levels, accidental discharges, *ex-situ* disturbance etc. are discussed in the subsequent sections below.

Cork Harbour SPA

The proposed development site is located c.405m from Cork Harbour SPA at its closest point. Based on the findings of the baseline surveys no wintering SCI bird species/waterbirds rely on habitats within the proposed development site. Therefore, the loss of habitats at the proposed development site will not reduce *ex situ* foraging habitat for the SCI birds of Cork Harbour SPA. No breeding habitat for species listed as SCIs for the Cork Harbour SPA will be affected. No likely significant effect from habitat loss within Cork Harbour SPA has been identified.

Great Island Channel SAC

The proposed development site is located c.5.5km from Great Island Channel SAC at its closest point. This SAC is designated on the basis of two qualifying Annex I habitats namely Mudflats and sandflats not covered by seawater at low tide and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*). These habitats are not located within the proposed development site boundary. There is no potential for direct impact on habitats within the SAC. No likely significant effect from habitat loss within Great Island Channel SAC has been identified.

Ballycotton Bay SPA and Sovereign Islands SPA

The proposed development site is located c.18.9km and c.19.5km respectively from Ballycotton Bay SPA and Sovereign Islands SPA at its closest point. There is no potential for direct impacts on habitats within these SPAs. No likely significant effect from habitat loss within Ballycotton Bay SPA and Sovereign Islands SPA has been identified.

4.7.2 Disturbance or displacement of birds during construction, operation and in-combination impacts

Cork Harbour SPA

Construction and beach nourishment works will generate additional noise and activity which could lead to the short-term disturbance/displacement of birds. During operation there will be increased traffic and human activity associated with the proposed development site. There could also be in-combination disturbance effects due to the presence of other developments in Cork Harbour.

The shoreline habitats in proximity to the proposed development site are not considered of high value for birds listed as qualifying interests for the Cork Harbour SPA. However, some of these species were noted overflying the channel that separates the proposed development site from Spike Island or were recorded feeding along shoreline habitats. The fields to the south of the proposed development site frequently provide foraging habitat for Curlew, which is a SCI species for this SPA. Whilst direct disturbance of qualifying species within the SPA boundary have not been identified, likely significant disturbance effects of such birds where they occur outside the SPA boundary cannot be ruled out (i.e. *ex situ* disturbance) in the absence of mitigation.

Great Island Channel SAC, Ballycotton Bay SPA and Sovereign Islands SPA

No potential in-combination effects on the Ballycotton Bay SPA or Sovereign Islands SPA have been identified due to their distance from the proposed development site.

Disturbance of birds and/or other fauna is not relevant to the Great Island Channel SAC which was designated on the basis of habitats.

4.7.3 Bird collision risk during operation and in-combination impacts

Cork Harbour SPA

Structures adjacent to the estuarine environment have the potential to create a collision risk under certain circumstances. The highest buildings at the site of the proposed development will be the main process building (between 23.7-50.7m AOD) and the stack (75m AOD). Buildings at the proposed development site could potentially affect birds via increased collision risk. Bird collisions, if of sufficient magnitude, could potentially impact on the Cork Harbour SPA. There are a number of tall structures within the wider Cork Harbour area including wind turbines, other stacks etc. and, potentially, in-combination impacts could occur which, in turn, could impact on the Cork Harbour SPA.

Great Island Channel SAC, Ballycotton Bay SPA and Sovereign Islands SPA

No potential impacts on the Ballycotton Bay SPA, or Sovereign Islands SPA have been identified due to their distance from the proposed development site. There is no evidence to indicate that the proposed development site lies within a migration route to these sites.

Collision is not relevant to the Great Island Channel SAC which was designated on the basis of habitats.

4.7.4 Emissions to water during construction

Cork Harbour SPA

Construction works may result in surface water pollution to surrounding coastal and surface waterbodies. The presence of fuels and other chemicals from construction activities also have the potential to temporarily affect the surface/ground water quality of the area if not managed properly.

Given the proximity of the proposed development site to Cork Harbour contaminated surface water runoff during construction could impact water quality within Cork Harbour SPA as well as SCI species which use these areas. Therefore, the conservation objectives of Cork Harbour SPA may be impacted by surface water runoff during construction and likely significant effects from surface water emissions during construction cannot be excluded in the absence of mitigation.

Great Island Channel SAC

The Great Island Channel SAC is designated on the basis of two qualifying Annex I habitats namely Mudflats and sandflats not covered by seawater at low tide and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*). These estuarine habitats are robust and, given the distance and dilution available with Cork Harbour at this distance, any impacts from minor accidental discharges of silt or hydrocarbons during construction would be imperceptible. No appreciable impacts from construction emissions have been identified. No likely significant effects on Great Island Channel SAC from the proposed development have been identified.

Ballycotton Bay SPA and Sovereign Islands SPA

Given the distance from Ballycotton Bay SPA and Sovereign Islands SPA, no likely significant effects on these Natura 2000 sites from surface water emissions during construction have been identified.

4.7.5 Emissions to water during operation - surface water

Cork Harbour SPA and Great Island Channel SAC

Within Waste-to-Energy Facility Area

Surface water will be collected in underground drainage systems. All of the underground drainage systems will be designed and constructed as a minimum to comply with the Building Regulations 2010, BS EN 752-4 Drain and Sewer Systems outside Buildings.

The eastern part of the resource recovery facility, when constructed, will form a rainwater catchment area of 3ha consisting of roofed areas, roads and hard standings. The storm water runoff will be discharged to the Local Authority sewer located in the L2545 road to the north of the site.

In order to prevent flooding of the local sewers, the rate of discharge from the site will be controlled to the Greenfield rate, based on the SUDS Design Guidelines. The site will be provided with attenuation to store and control the storm water discharge. The attenuation tank will have a Greenfield discharge rate of 18l/s. The attenuation tank will be constructed from reinforced concrete and will be located beneath the car park adjacent to the administration building.

A combined surface water tank (attenuation tank) and a firewater retention tank will be provided. Both tanks will be located underground beneath the administration building car park to the west of the main entrance.

A dedicated surface water drainage network will collect and convey all the road and service yard runoff to Surface Water Holding Tank 01 via a Class 1 full retention hydrocarbon interceptor. A second dedicated drainage network will collect and convey all the runoff from all roof areas and discharge them direct to Surface Water Holding Tank 02. Surface Water Tank 01, which will have a capacity of 1 690m³.

The tanking unloading area, which is located adjacent to the fuel tank, will be provided with cut off drains to collect any minor spillage that may occur during loading of the fuel and ammonia tanks. A local holding tank with a $2m^3$ capacity will be provided. The outlet valve of the local holding tank will be closed during any tanker loading or unloading operation. If a spillage occurs during a loading or unloading operation, the spilled liquid will be collected in the local holding tank. The contents of the tank will then be pumped out and dealt with appropriately. When the unloading operation has finished, if no spillage has occurred, the valve will be opened and the contents of the tank will drain via a forecourt interceptor to the holding tank.

The fill will be placed in western field to raise the ground level. The area will be finished with stone. Any storm water will infiltrate into the ground. There will be no sources of potential contamination in the area. A new filter drain will be located between the bottom of the raise plateau embankment and the site boundary to aid with the infiltration to ground.

All runoff from the road and hardstanding areas within the proposed development site which drain direct Tank 01 will be monitored by an internal Indaver monitoring and sampling station. In the event of there being an out of specification reading Tank 01 can be isolated from Tank 2 and the water removed in accordance with Indaver operational procedures for dealing with contaminated water. This arrangement allows for the roof runoff to continue to be discharged from the site. Monitoring will also take place at the outfall from the attenuation tank. If the monitoring at either location detects contamination, the outlet valve will be closed, and the contaminated water will not be discharged. The contaminated water may be conveyed by tanker to the aqueous waste tank, for injection into the process, or removed off site for appropriate disposal. It is expected that monitoring will normally show the storm water to be uncontaminated so the holding tank will typically be empty.

Given the operational surface water measures and monitoring measures as well as the dilution provided in the marine environment and the distance from the facility to the Cork Harbour SPA and Great Island Channel SAC, adverse impacts from the discharge of storm water on these Natura 2000 sites can be ruled out. Given the distance involved no impact on the Ballycotton Bay SPA and Sovereign Islands SPA are predicted.

On roads leading to Indaver Facility

Solid hazardous and non-hazardous waste will arrive at the site in a number of different type of waste vehicles such as compactor trucks, skip trucks ejector trailers and walking floor trailers, with all contents appropriately covered. All waste trucks entering the waste-to-energy facility will pass through a radiation detection system to detect the presence of any radioactive elements. The site will work to an operating protocol, that is produced in consultation with an appropriately qualified person such as a Radiological Protection Adviser. This protocol will determine appropriate actions should the detector trigger a radioactive reading. This protocol can be agreed with the Office of Radiation Protection and Environmental Monitoring prior to operation, as needed. If a truck is found to be carrying radioactive waste, the protocol will dictate the next steps which may include the waste not being accepted for treatment. Tankers of aqueous waste will be sampled and analysed prior to offloading into the aqueous waste storage tank or direct injection. This sampling may be done before or after arrival on site. If sampled and analysed on site, the sampling will be done in the aqueous waste unloading area adjacent to the aqueous waste storage tank. Key parameters will be analysed to ensure conformity with the specified waste acceptance criteria and with the parameters agreed with the customers. As a minimum, water content, pH, chlorine and calorific value will be checked for each aqueous waste load. In the event that the specification for the aqueous waste load is not met, then arrangements will be made for the dispatch of the tanker to the most suitable facility either in Ireland or abroad.

Wastes, fuel and liquid and solid process materials will be delivered to site by truck via the M28, N28 and the L2545. All trucks will have to comply with the road transport legislation and regulations. The closest part of Cork Harbour SPA to the N28 is Monkstown Creek. The N28 is several hundred metres from Monkstown Creek. The L2545 is nearly 1km from the Cork Harbour SPA at Loughbeg. An accidental release from a truck, which is on the road network and conveying material to the proposed development site, will not reach the Cork Harbour SPA or other Natura 2000 sites, so no impact on Natura 2000 sites will occur.

4.7.5 Emissions to water during operation - foul and process water

Process Effluent

In respect of the possible impacts from emissions of pollutants from the facility, it is noted that no significant aqueous discharge into the marine environment is proposed from the proposed development during operation. No likely significant effect from process water discharges have been identified.

Foul Effluent

During the operation of the proposed development, untreated sanitary (foul) water will be pumped directly to the Irish Water sewer located east of Ringaskiddy Village, which will then be pumped to the Lower Harbour wastewater treatment facility at Shanbally (Licence number

D0057). This WWPT has a design capacity of 65,000 as an operational capacity of 48,990 (in 2024). The population equivalent for wastewater will be 21 during operation. Given the low level of foul discharge no likely significant effect from foul water discharges have been identified.

4.7.6 Emissions to air

Cork Harbour SPA

The impacts on air quality from emissions are specifically addressed in **Appendix 11** to this NIS**.** It is concluded that, based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will not be significant. This appraisal incorporated all significant potential in-combination impacts.

Notwithstanding the low risk created by emissions, a theoretical pathway, which could impact on ecology, is the aerial deposition of chemicals with ecotoxicological properties such as dioxin or mercury onto marine sediments. Bioaccumulation of such deleterious chemicals could then potentially occur. Generally the impacts, if any, would affect fauna higher up the food chain such as piscivorous birds, some of which are listed as qualifying interests for the Cork Harbour SPA (Common Tern, Cormorant, Red Breasted Merganser, Little Grebe, Great Crested Grebe and Grey Heron). Impacts on the Cork Harbour SPA as a result of air emissions and bioaccumulation, although unlikely, could potentially occur.

Great Island Channel SAC, Ballycotton Bay SPA and Sovereign Islands SPA

As set out in **Appendix 11,** in relation to spatial impacts*,* the modelling results, using both the USEPA regulatory model AERMOD and the more advanced CALPUFF model, indicate that the maximum ambient ground level concentration occurs at or near the facility's northern and north-eastern boundaries. The spatial effect of the facility is limited with concentrations falling off rapidly away from the maximum peak. For example, the short-term concentrations due to process emissions at the nearest residential receptor will be less than 6% of the short-term ambient air quality limit values. The annual average concentration has an even more dramatic decrease in maximum concentration away from the facility with concentrations from emissions at the proposed facility accounting for less than 1% of the limit value (not including background concentrations) at worst case sensitive receptors near the facility.

Therefore, no potential impact from emissions, or subsequently from bio-accumulation, on the Ballycotton Bay SPA or Sovereign Islands SPA can occur due to their distances (18.4km and 19.7km respectively) from the proposed development site and the low level of emissions proposed. The Great Island Channel SAC is located approximately 5km from the proposed development and is designated on the basis of habitats rather than species. Thus, direct impacts via bioaccumulation do not arise and potential impact from direct emissions on these designated sites can be ruled out.

4.7.7 Accidental releases from fire during operation

Cork Harbour SPA

A Hazard Identification and Risk Assessment Study (**Appendix 13**), examined the operation of the proposed development in the context of the Directive 2012/18/EU of the European Parliament and of the Council of 4th July 2012 on the control of major-accident hazards

involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC [the 'Seveso III Directive']. This directive is implemented in Ireland by the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations, 2015 [S.I. 205 of 2015]. The study concluded that the proposed Ringaskiddy Resource Recovery Centre will not be a major accident establishment and that the Seveso III Directive and Regulations will not apply to the proposed development.

Notwithstanding the fact that the proposed development will not be a major accident establishment, a number of accident scenarios which could arise during the operation of the proposed development, were assessed in the study to determine the risk each posed to human health and the environment. Following industry best practice, five risk ratings of increasing significance, based on the probability of occurrence and the hazard posed, were assigned to the scenarios. The risk ratings were trivial, minor, moderate, substantial and priority. No priority risks were identified and one substantial risk was identified. The substantial risk was a fire in the bunker. A fire in the bunker will result in the emissions to air of the products of the combustion and thermal radiation. Contamination by fire water will not occur as the bunker and the recovery tanks will be designed as water retaining structures.

Whilst impacts on the Cork Harbour SPA are considered unlikely, they cannot be entirely discounted due to the relative proximity of the proposed development site.

Great Island Channel SAC, Ballycotton Bay SPA and Sovereign Islands SPA

No potential impact on the Ballycotton Bay SPA or Sovereign Islands SPA will occur due to their distance from of the proposed development site and the low levels of proposed emissions. The Great Island Channel SAC is located over 5km from the proposed development site and is designated on the basis of robust estuarine habitats. No likely significant effects on the Great Island Channel SAC, Ballycotton Bay SPA and Sovereign Islands SPA have been identified.

4.7.8 Disposal of bottom ash

Circa 53,630 tonnes per annum of bottom ash will be produced in the waste-to-energy plant. The bottom ash will consist of silicates, minerals, metal pieces and glass compounds. All trucks leaving the facility, carrying bottom ash, will be securely covered. From experience of operating similar facilities in Meath, Ireland and Flanders, Belgium, it is anticipated that the bottom ash will be non-hazardous for handling and for transport.

Commission Regulation (EU) No. 1357/2014 and Commission Decision 2014/955/EU is utilised to determine the manner in which bottom ash may be characterised, but it is expected to be non-hazardous, similar to that produced the Indaver plant in Duleek, Co. Meath. Bottom ash from waste incineration in EU countries, including the UK, Netherlands and Belgium, is processed for use as an aggregate in construction of roads or other large-scale projects. This processed material is known as incinerator bottom ash aggregate (IBAA). The bottom ash will be sent to further processing facilities either locally within Ireland or exported where it will be further refined to a suitable quality to be used as a renewable aggregate in the circular economy. Targeted Policy TP-14.5 in the National Waste Management Plan for a Circular Economy (NWMP) supports "the provision of national capacity for bottom ash from existing thermal treatment facilities, pending the provision of alternative uses which optimise the circularity of this material". Priority Action PA13.2 within the NWMP sees the responsibility

assigned to the EPA/Local Government and Industry to “Investigate the potential for circularity of Incinerator Bottom Ash using the by-product or end of waste regulatory mechanisms”. Infrastructure development is underway and will be operational for the further processing of IBA during 2025 (Beauparc IBA processing facility at Knockharley Landfill). Should capacity not be available for some or all of the bottom ash at the local processing facilities or should the criteria not be in place or approved for reuse of IBAA within the circular economy, the option remains to consign this material to landfill for recovery where it can be used as a beneficial engineering material or to export the bottom ash for recovery.

Bottom ash will be removed from the site via standard covered trucks. The bottom ash will pose no risk to the Cork Harbour SPA during transport from the site as it is transported on the L2545, the N28 (and M28 once operational) and onwards to its final destination on the road network. The closest part of the Cork Harbour SPA to the N28 is Monkstown Creek. The N28 is several hundred metres from Monkstown Creek. The L2545 is nearly 1km from the Cork Harbour SPA at Loughbeg. A release from a truck, which is on the road network and conveying bottom ash from the site, will not reach the SPA or have a negative effect on it. The bottom ash will be disposed of in a licensed facility or reused in road or rail construction. The EPA can only license the disposal of bottom ash in a facility, if the activity will not have a significant effect on the environment. As noted above the bottom ash from the Meath waste-to-energy facility has been classified as non-hazardous and nontoxic to the aquatic environment and a similar classification will pertain to the bottom ash produced at the proposed development. In this context no likely significant effects on Natura 2000 sites from the disposal of bottom ash have been identified.

4.7.9 Disposal of Boiler Ash and Flue Gas Cleaning Residues

Circa 2,037 tonnes per annum of boiler ash and circa 9,271 tonnes per annum of flue gas cleaning residues will be produced in the waste-to-energy plant. The boiler ash and flue gas cleaning residues will be in the form of fine particles and will contain heavy metals.

In 2017 a salt mine facility in Northern Ireland attained planning consent and an environmental permit to operate as a recovery facility for hazardous residues from waste to energy facilities. This facility will be used for the recovery of the flue gas residues. The preparation process for consigning this material off site will consist of a simple dry-bagging system which will mix the residues, into 1m^3 FIBC bags. The preparation equipment will be located close to the flue gas residue silos within the main process building. The bags will then be loaded directly onto trailers and transported off site. At times when this recovery facility may not available, for example, during a maintenance outage, the flue gas cleaning residues may be exported for final recovery to German salt mines in specialised tanker vehicles.

In the event where export is required, the shipping containers used for such transport are designed and operated in line with international standards. The regulation of the transport of the ash would be subject to Trans Frontier Shipment (TFS) licence which is a licence which must be approved by the origin/destination/transit authorities consenting to the movement/transit and acceptance of wastes between EU member states. The regulation governing this is EU Regulation 1013/2006. This licence tracks waste from origin to destination and ensures that each authority is aware of the status of the waste until final recovery when the individual TFS notification annex consigned with each shipment is signed off as having

been received and treated by the receiver. This completed licence is then circulated back to Indaver as the producer as well as all relevant authorities.

Similar residues from Indaver's Meath facility are currently being shipped to salt mines in Germany where the residues are solidified and used to back-fill the mine instead of using other raw materials. There are no hazardous landfills or salt mines in Ireland at present. The residues will be collected on the site in sealed silos (See **Photo 1** below). The silos are emptied into a tanker via a sealed connection. This will ensure there are no fugitive releases on the site.

Photo 1 Sealed silos

Photo 2 Loading area and tanker

Two container truck loads per week of boiler ash and seven to eight container truck loads per week of flue gas cleaning residues will be removed from the site. The ash and residue containers will be taken to a port, loaded onto a ship and shipped to Rotterdam, or another container port in Europe. From the port of entry, the containers will be transported by road to the final destination.

It is noted that the accident risk during shipping of the boiler ash and residues is low. Van Den Bosch are the preferred international logistic services provider which transports such residues for Indaver. They note that in the 51 years of their history no container has ever fallen overboard and no ship has sunk with their containers on board.

As noted above the addition of water leads to the residues solidifying. Thus, in event of a shipping accident and if the transport container were to loose integrity, the residues would solidify on contact with water and solidified residues will be salvaged from the sea bed.

Given the extremely low risk of an accident, the low risk of leakage from the transport containers, the fact that the residues will solidify on contact with water, no appreciable impacts on Natura 2000 sites along the shipping route from the disposal of this material will occur.

4.7.10 Trans-boundary effects - flue gas cleaning residues disposal and boiler ash in salt mine or landfill in Europe

As noted above, the transport and disposal and recovery of flue gas cleaning residues disposal and boiler ash does not constitute a risk to any designated Natura 2000 sites during transport. In 2017 a salt mine facility in Northern Ireland attained planning consent and an environmental permit to operate as a recovery facility for hazardous residues from waste to energy facilities. This facility will be used for the recovery of the flue gas residues. The preparation process for consigning this material off site will consist of a simple dry-bagging system which will mix the residues, into 1m^3 FIBC bags. The preparation equipment will be located close to the flue gas residue silos within the main process building. The bags will then be loaded directly onto trailers and transported off site.

If the residues are recovered in Northern Ireland, then the residues will be discharged into 1m3 FIBC bags prior to dispatch off-site. The equipment will be located close to the flue gas residue silos within the main process building on the south side. In the event of an accident during transport, given the fact that the boiler ash and flue gas cleaning residues will solidify on contact with water, if there is a release, the material is easily recovered as a solid mass contained within individual bags.

At times when this recovery facility may not available, for example, during a maintenance outage, the flue gas cleaning residues may be exported for final recovery to German salt mines.

In event of export to Germany, such an operation must be approved by the relevant competent authorities. The German authorities are subject to current EU legislation including the Habitats Directive, which requires the consent authority for any project which has the potential to have a negative effect on a Natura 2000 site, and which is not directly connected with or necessary to the management of the site, to undertake an appropriate assessment. The Hattorf facility, which is the proposed final destination for exported material, has been approved by the

relevant competent authority. The letter of confirmation is attached as **Appendix 19.** There will be no appreciable impacts on Natura 2000 sites from disposal of these residues.

4.7.11 Increased predator density or activity or changes in predator behaviour.

Cork Harbour SPA, Great Island Channel SAC, Ballycotton Bay SPA and Sovereign Islands SPA

Local ecological impacts could arise due to increased predator activity if species such as rats or gull species were attracted into the local area due to the presence of waste. Both species can predate on nests for ground nesting birds such as common tern. It is noted that trucks with organic waste discharge their loads within a sealed building and that there will no storage of waste in outside spaces. Trucks are inspected on arrival to ensure that there is no waste adhering to wheels. A standard pest control programme will be implemented at the site. It is also noted that the closest nesting colony of high conservation value (common terns) is located approximately 750m away from the Indaver site. There will be no ledges suitable for predatory species on the proposed stack. Under these circumstances, any impact on birds listed as special conservation interests for the Cork Harbour SPA from increased predator density or increased predator activity is predicted to be imperceptible. There will be no appreciable impacts on the Cork Harbour SPA, Ballycotton Bay SPA, Great Island Channel SAC or Sovereign Islands SPA due to the absence of a risk to bird species listed as special conservation interests for the Cork Harbour SPA.

4.7.12 Impact from flooding and erosion and possible impacts from climate change

Flooding of the site could introduce deleterious chemical substances into surface water with the potential impacts on the marine environment. Coastal erosion could lead to structural damage. The project has been specifically designed to minimise such risks and resilience to climate change has been built into the proposed development design as follows.

Site levels within the Indaver facility

The ground levels of the Indaver facility will be raised to alleviate localised flooding issues. Based on the precautionary principle, climate change scenarios have been considered in the modification of levels and the site design. The levels of the low-lying parts of the site will be raised to 4.55mOD. A small area of land within the waste-to-energy side of the site adjacent to the L2545 road will also be raised to 4.55mOD. This level will offer a very high standard of flood protection to the site. For climate change, the OPW Draft Guidance on the “Assessment of potential future scenarios for Flood Risk Management” suggests the use of two scenarios; a mid-range future scenario (MRFS) and a high end future scenario (HEFS). The MRFS represents a likely future scenario which is within the bounds of the widely accepted projections. The HEFS is a more extreme, but plausible future event, and is within the upper bounds of the widely accepted projections. The proposed 1.0m allowance for climate change allows for the high-end future scenario (HEFS).

It was decided to use an even more conservative site flood defence level of 4.55mOD given that that a number of recent developments close to the site in Ringaskiddy (Beaufort Research Laboratory) have already utilised this level. The 4.55mOD level will therefore offer a very high standard of flood protection to the site.

The ground floor level of most of the waste-to-energy plant will be at 5mOD. The floor level of the bunker will be 0mOD. The bunker, and any tanks constructed below 5mOD, will be of watertight concrete construction and will be impermeable. Full details on flood risk are included in **Appendix 16** of this report.

Coastal Protection

The coastline, which forms the eastern boundary of the site, was found to have eroded over the past 100 years at varying rates.

As part of the study, a conservative rate of erosion was applied to the site in order to assess whether the proposed development could be impacted over the 30-year design life of the facility. The study found that the waste to energy facility section of the proposed development has been located far enough away from the edge of the cliff to ensure that the waste to energy facility will not be impacted by the predicted retreat rates over the design life of the planning permission. However, the study found that there could be a risk of an impact on a small section of the proposed development after 40 years but this would be confined to the amenity walkway and viewing platform outside of the security fence line.

Coastal protection mitigation measures are not required for the waste-to-energy facility element of the development. However, given the concerns raised by An Bord Pleanála (now An Coimisiun Pleanala) and given the low risk that the amenity walkway and viewing platform could be impacted in 40 years' time, coastal protection measures have been included in the proposed development as a precautionary measure so as to reduce the rate of erosion of the glacial till face.

The protection measures will consist of the placement of approximately 1,150m^3 of shingle of appropriate size and shape (rounded) above the foreshore on Gobby Beach along the eastern boundary of the Indaver site. This will be a 'soft' solution which will reduce erosion rates by increasing beach levels i.e. reducing near shore water depth and wave heights and will protect the glacial till face from breaking waves.

The sacrificial material has been designed to remain on site and help lower the natural erosion rate over a number of years. However, the length of time that the material remains in place will depend on the occurrence of extreme wave events which are impossible to forecast. It is proposed that the additional sacrificial material is placed during the construction period of the proposed development. Thereafter, it is proposed that the placement of further additional sacrificial material is carried out if the cliff top retreat rate averaged over the entire length is more than 0.5m per year measured over a period of six years, which would indicate some acceleration in the current retreat rate, or when the cliff top has retreated locally by approximately 3m, whichever is sooner. There is also an option to proactively place shingle to maintain a healthy margin between the cliff top and the proposed development. For this reason, the coastal boundary of the proposed development site will be monitored for erosion on an annual basis.

The proposed protection measures are a soft solution and will not significantly affect the adjoining areas of coastline in the vicinity of the proposed development site. The net coastal sediment transport will go from south to north according to wind conditions and swell. Therefore the material is likely to move towards the north in the medium and long term. The closest area of the Cork Harbour Special Protection Area (SPA) is located to the southwest of the site. The nett coastal sediment transport goes from south to north according to wind conditions and swell and therefore, the beach nourishment material is likely to move towards

the north in the medium and long term. Therefore, the sacrificial material will not impact on this part of the SPA. Other sections of the SPA which are to the north of the site are more than two kilometres from the site and these are too remote from the site to receive any significant quantities of beach nourishment material. Therefore, the sacrificial material will not impact on Cork Harbour SPA.

L2545 Road Upgrade

The principal design objective for the upgrade of the L2545 road is to improve the surface water drainage so that the road does not flood after prolonged rainfall and to raise the level of the road above the 1 in 200 year tidal event and to allow for climate change. The proposed road drainage network upgrade will extend along the entire northern boundary of the proposed development site. It has been designed to cater for the 7 hours when the storm water outfall is tide locked by a 1 in 200 year design high tide, 2.87m top water level (TWL), combined with a 1 in 30 year rainfall event.

Grid Connection

The proposed development will be connected to the 38kV substation, which is located on the eastern side of the Hammond Lane premises, adjacent to the Indaver site or to the 110kV pylon south of the site. The connection in both cases will be via an underground trench.

Raising the level of the Western Field

The ground levels in the western fields area of the proposed development site, i.e. to the west of the Hammond Lane Facility, consisting of a 10,000m^3 area will be raised by a maximum height of 2.5m above ground level.

Conclusions Impact from flooding and erosion and possible impacts from climate change

It is noted that measures have been put in place to prevent erosion and flooding in the vicinity of the proposed development site. Thus, the proposed development will prevent local erosion and flooding that would otherwise occur. There will be no significant potential impact due to flooding or coastal erosion for the Cork Harbour SPA, Ballycotton Bay SPA, Great Island Channel SAC or Sovereign Islands SPA due to their distance from the proposed development site and the absence of significant predicted impacts.

4.7.13 Invasive Species

No third schedule invasive species were recorded within the proposed development site boundary. While a number of other, medium to low impact invasive species were recorded within the proposed development site, these have a limited potential to spread over long distances and will not thrive within the estuarine habitats of the relevant Natura 2000 sites. Furthermore, given the absence of a direct hydrological connection to Natura 2000 sites, no significant pathway for impact has been identified. No likely significant effects on Natura 2000 sites from the spread of invasive species have been identified.

4.7.13 In-combination effects

In-combination impacts refer to a series of individual impacts that may, in combination, produce a significant effect. The underlying intention of this in combination provision is to take account of in-combination impacts from existing or proposed plans and projects and these will often only occur over time.

Article 6(3) of the Habitats Directive requires that:

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 subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.

It is therefore required that the potential impacts of the proposed development are considered in-combination with any other relevant plans or projects. An assessment of plans and projects with the potential for in-combination effects in association with the proposed development was undertaken. A search of planning applications in the vicinity of the proposed development was undertaken in August 2025 to examine projects with potential for in-combination effects (Source: Cork County Council, An Bord Pleanála, EPA). Other projects or developments which could potentially cause in-combination impacts are listed in **Table 10**.

Table 10. Other projects or developments which could lead to potential in-combination impacts

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
River Basin Management Plan 2022-2027	The project should comply with the environmental objectives of the Irish RBMP which are to be achieved generally by 2027. • Ensure full compliance with relevant EU legislation • Prevent deterioration • Meeting the objectives for designated protected areas • Protect high status waters Implement targeted actions and pilot schemes in focus sub-catchments aimed at: targeting water bodies close to meeting their objective and addressing more complex issues which will build knowledge for the third cycle.	The implementation and compliance with key environmental policies, issues and objectives of this management plan will result in positive in-combination effects to European sites. The implementation of this plan will have a positive impact for the biodiversity. It will not contribute to in-combination impacts with the proposed development.
Inland Fisheries Ireland Corporate Plan 2021-2025	To ensure that Ireland's fish populations are managed and protected to ensure their conservation status remains favourable. That they provide a basis for a sustainable world class recreational angling product, and those pristine	The implementation and compliance with key environmental issues and objectives of this corporate plan will result in positive on-combination effects to European sites. The implementation of this corporate plan will have a positive

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
	aquatic habitats are also enjoyed for other recreational uses. To develop and improve fish habitats and ensure that the conditions required for fish populations to thrive are sustained and protected. To grow the number of anglers and ensure the needs of IFI's other key stakeholders are being met in a sustainable conservation focused manner. EU (Quality of Salmonid Waters) Regulations 1988. All works during development and operation of the project must aim to conserve fish and other species of fauna and flora habitat; biodiversity of inland fisheries and ecosystems and protect spawning Salmon and trout.	impact for biodiversity of inland fisheries and ecosystems. It will not contribute to in-combination or cumulative impacts with the proposed development.
Irish Water Capital Investment Plan 2020-2024	Proposals to upgrade and secure water services and water treatment services countrywide.	Likely net positive impact due to water conservation and more effective treatment of water. It will not contribute to in-combination impacts with the proposed development.
Water Services Strategic Plan (WSSP, 2015)	Irish Water has prepared a Water Services Strategic Plan (WSSP, 2015), under Section 33 of the Water Service No. 2 Act of 2013 to address the delivery of strategic objectives which will contribute towards improved water quality and biodiversity requirements through reducing: • Habitat loss and disturbance from new / upgraded infrastructure; • Species disturbance; • Changes to water quality or quantity; and • Nutrient enrichment /eutrophication.	The WSSP forms the highest tier of asset management plans (Tier 1) which Irish Water prepare and it sets the overarching framework for subsequent detailed implementation plans (Tier 2) and water services projects (Tier 3). The WSSP sets out the challenges we face as a country in relation to the provision of water services and identifies strategic national priorities. It includes Irish Water's short, medium and long-term objectives and identifies strategies to achieve these objectives. As such, the plan provides the context for subsequent detailed implementation plans (Tier 2) which will document the approach to be used for key water service areas such as water resource management, wastewater compliance and sludge management. The WSSP also sets out the strategic objectives against which the Irish Water Capital Investment Programme is developed. The current version of the CAP outlines the proposals for capital expenditure in terms of

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
		upgrades and new builds within the Irish Water owned assets. The overarching strategy was subject to AA and highlighted the need for additional plan/project environmental assessments to be carried out at the tier 2 and tier 3 level. Therefore, significant in-combination effects can be ruled out.
WWTP discharges	Cork City WWTP, Ringaskiddy (Shanbally) WWTP, Cobh WWTP, Whitegate Aghada WWTP,	Discharges from municipal WWTPs are required to meet water quality standards. Irish Water Capital Investment Plan 202-2024 proposes to upgrade water treatment services countrywide. Therefore, significant in-combination effects can be ruled out.
Industrial Emissions Licence (IEL)	P0997. The Hammond Lane Metal Company Limited. P0778 JANSSEN SCIENCES IRELAND UC P0013 Pfizer Ireland Pharmaceuticals Unlimited Company (Ringaskiddy) P0864 BioMarin International Ltd P0010 Hovione Limited P0004 Thermo Fisher Scientific Cork Limited P0476 Recordati Ireland Limited P0006 Sterling Pharma Ringaskiddy Limited	Discharges from this facility are governed by strict limits to ensure compliance with quality standards. Therefore, significant in-combination effects can be ruled out.
Other developments in the vicinity	Cork County Council, An Bord Pleanála, EPA planning database was consulted to identify any proposed or permitted developments in proximity to the proposed developments site (August 2025).	
	224356. Granted A new vehicular entrance off the L2545, the temporary use of lands (for a period of 10 years) for open storage of port related cargo, and all ancillary works including road / kerbside re-alignment and security fencing. Haulbowline	In the event that the construction phase of the proposed development was to overlap with this scheme, potential in-combination impacts on water quality could arise (in the absence of mitigation). Potential significant adverse effects on water quality during construction of the

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
	Road, Loughbeg and Ringaskiddy (Townlands), Ringaskiddy, Co. Cork	proposed development have been identified. In the absence of mitigation, the potential for significant in-combination effects on Cork Harbour SPA from emissions to water during construction cannot be ruled out. No significant adverse impacts from changes in air quality were identified during the operational phase of the proposed development. Therefore, no in-combination effects from air emissions have been identified. Given the location of this permitted development within the built up setting of Ringaskiddy and the distance from the SPA, no in combination impacts from noise and disturbance during construction or operation have been identified. No other significant adverse in-combination effects have been identified.
	HA04.HA0053/ MA04.MA0014 Granted. Under construction M28 Cork to Ringaskiddy Motorway Scheme. Ringaskiddy, Cork	Construction of the M28 Cork Ringaskiddy Motorway Scheme is currently at the advance works stage in which the alignment runs through the north-west section of the site for the proposed development. Within this area, there is an approximately 11m cut through soil and rock which has been excavated. This project and the proposed development could have a significant in-combination effect on landslide susceptibility on the newly excavated slope due to the proposed placement of excavated material in the western field adjacent to the slope . The addition of this material at the top of the slope could potentially induce instability in the slope face. The slope would have been designed to have the lowest possible risk of instability, considering this the addition of material in the western field would likely have no effect on the stability of the slope. Hence, the cumulative (in-combination) effect is

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
		imperceptible. If the volume of material to be deposited in the western field significantly increases during construction, the effect this could have on the slope must be considered. In the event that the construction phase of the proposed development was to overlap with this scheme, potential in-combination impacts on water quality could arise (in the absence of mitigation). Potential significant adverse effects on water quality during construction of the proposed development have been identified. In the absence of mitigation, the potential for significant in-combination effects on Cork Harbour SPA from emissions to water during construction cannot be ruled out. No significant adverse impacts from changes in air quality were identified during the operational phase of the proposed development. Therefore, no in-combination effects from air emissions have been identified. Given the location of this permitted development within the built up setting of Ringaskiddy and the distance from the SPA, no in combination impacts from noise and disturbance during construction or operation have been identified. No other significant adverse in-combination effects have been identified.
	OA04.321875. Case is due to be decided by 21/08/2024. Port of Cork "The works to assessed as part of this application are as follows: Ringaskiddy East (Container Berth 2) Construction of the remaining phases of a 200m Container/Multipurpose Berth which are not	In the event that the construction phase of the proposed development was to overlap with this scheme, potential in-combination impacts on water quality could arise (in the absence of mitigation). Potential significant adverse effects on water quality during construction of the

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
	completed by 20th October 2025. The berth is under construction and being developed in 4 phases (1. Combi wall quay wall, 2. Concrete deck piling, 3. Structural slab and 4.Upper slab and yard surfacing), •Dredging of the seabed to a level of -13.0 m Chart Datum (CD) •Installation of link-span comprising a floating pontoon and access bridge •Installation of container handling cranes •Lighting and Fencing Ringaskiddy West (Deepwater Berth Extension): •A new 182m extension to the existing Deepwater Berth (DWB) which will comprise a filledquay structure (of approximately 231m) extending no further seaward than the edge of the existing DWB •Dredging works to varying levels to facilitate navigational access to the new facilities •Lighting Road Improvements: •Improvements to internal road network at Ringaskiddy East to facilitate future access tothe N28 •Lighting and fencing" Ringaskiddy, Cork	proposed development have been identified. In the absence of mitigation, the potential for significant in-combination effects on Cork Harbour SPA from emissions to water during construction cannot be ruled out. No significant adverse impacts from changes in air quality were identified during the operational phase of the proposed development. Therefore, no in-combination effects from air emissions have been identified. Given the location of this permitted development within the built up setting of Ringaskiddy and the distance from the SPA, no in combination impacts from noise and disturbance during construction or operation have been identified. No other significant adverse in-combination effects have been identified.
	254704 Granted Permission for an upgrade and extension to the existing biomedicines manufacturing facility, including: 1) construction of a part single-storey and part two-storey extension to the northern elevation of the existing production building P01 with total floorspace of c. 1,718 sqm and a maximum height of c23.01m, 2) construction of a new medium voltage and low voltage (MV &LV) electrical sub-station with 2 no. single storey over service void building units with total floorspace of c.346sqm and maximum height c.6.33m, and to include a back-up generator, 3) construction of an extension to the existing central utility plant (CUP) to accommodate new boiler, heat pumps and	In the event that the construction phase of the proposed development was to overlap with this scheme, potential in-combination impacts on water quality could arise (in the absence of mitigation). Potential significant adverse effects on water quality during construction of the proposed development have been identified. In the absence of mitigation, the potential for significant in-combination effects on Cork Harbour SPA from emissions to water during construction cannot be ruled out.

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
	plant rooms with total floorspace of c.482sqm and maximum height to parapet, c.14.2m and to include demolition of an existing boiler house of 68.6sqm, 4) works to upgrade and expand the existing on-site Waste Water Treatment plant (WWTP) incorporating new plant and equipment for increased hydraulic and biological treatment capacity; including a new single storey electrical substation with total floorspace of c.233sqm and maximum height c.5.29m, back-up generator, cooling towers, and odour control unit, 5) all associated site development, landscaping and ancillary works including re-profiling of the earthen berms in the vicinity of the WWTP and associated demolition works, boundary fencing, underground services, high-level pipe and cable racks, internal site roads, yards and temporary construction compounds. This application relates to development, which comprises an activity, which holds an Industrial Emissions Directive Licence (reg. no. P0778-02). An Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) has been prepared in respect of the development. Barnahely, Ringaskiddy, Co. Cork	No significant adverse impacts from changes in air quality were identified during the operational phase of the proposed development. Therefore, no in-combination effects from air emissions have been identified. Given the location of this permitted development within the built up setting of Ringaskiddy and the distance from the SPA, no in combination impacts from noise and disturbance during construction or operation have been identified. No other significant adverse in-combination effects have been identified.
	235834 Granted Permission for construction of Bld. 124 - Site Lab Building. This will comprise a new five-storey building (circa 10,881 square metres with a maximum height of circa 30.2m above ground) which will include laboratories, a canteen, ancillary office space and plant and utility space, and associated site development works, including; roads, paths, yards, underground services and landscaping. The proposed development is covered by an existing Industrial Emissions Directive Licence No. P0013-05. As the development refers to a modification to an establishment to which the Major Accident Directive applies, information as specified in the Third Schedule of the Major Accident Regulations will be submitted with the application. Ballintaggart & Ballybricken, Ringaskiddy, Co Cork	In the event that the construction phase of the proposed development was to overlap with this scheme, potential in-combination impacts on water quality could arise (in the absence of mitigation). Potential significant adverse effects on water quality during construction of the proposed development have been identified. In the absence of mitigation, the potential for significant in-combination effects on Cork Harbour SPA from emissions to water during construction cannot be ruled out. No significant adverse impacts from changes in air quality were identified during the operational phase of the proposed development. Therefore, no in-combination effects from air emissions have been identified. Given the location of this permitted development within the built up setting of Ringaskiddy and the distance from the SPA, no in combination impacts from noise and

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
		disturbance during construction or operation have been identified. No other significant adverse in-combination effects have been identified.
	235104 Granted Development is sought for a period of 10 years at a 10.22 hectares site within ESB Aghada Generating Station consisting of 1) Construction/installation of an open cycle gas turbine (OCGT) generating unit and associated plant and equipment, comprising the following main components with approximate dimensions as stated : Gas turbine air intake [24m x 18m x 26m high], Generator enclosure [24m x 18m x 14.5m high], Gas turbine enclosure [53m x 15m x 26m high], Exhauster diffuser [14.5m x 10.4m x 10.5m high], Exhaust stack [40m high, 8m diameter], Gas turbine control and electrical modules [20.5m x 18m x 10m high], Fin fan coolers [27m x 19m x 8m high], Main transformer [12.2m x 7.5m x 8.5m high] including 17.6m x 17.9m concrete bund; and 2 no. 12m high concrete blast walls, Auxiliary transformer [5m x 4.7m x 7.5m high] including 6.8m x 7.5m concrete bund; and 2 no. 12m high concrete blast walls, Demineralised water treatment plant [20m x 10m x 5.4m high], Demin water storage tank [14.63m high x 24.4m diameter], Raw water/Firewater storage tank [14.63m high x 15.2m diameter], Fuel oil storage tanks [two, each 12.19m high x 17.4, diameter], including 67m x 35m concrete bund, Fuel oil forwarding pumps [6m x 10m x 2.2m high], Firefighting pumphouse [10m x 7m x 5.4m high], Gas conditioning compound [42.3m x 11.5m x 6m high]. Above ground installation gas compound expansion [23m x 73m], Indoor switchgear building [20m x 30m x 18m high], Emergency diesel generator <1 MW [10m x 4m x 5m high], Generator circuit breaker [8.8m x 5.1m x 4m high], Continuous emissions monitoring skid [3.5 m x 2.5m x 5m high], Workshop/Stores/Administration building [35.9m x 12m x 15m], Hydrogen storage compound [8m x 4m x 2m high], Surface water drainage system, Vehicle parking, Internal roadways, 2) Demolition of an existing single storey stores building, 3) connection to the	In the event that the construction phase of the proposed development was to overlap with this scheme, potential in-combination impacts on water quality could arise (in the absence of mitigation). Potential significant adverse effects on water quality during construction of the proposed development have been identified. In the absence of mitigation, the potential for significant in-combination effects on Cork Harbour SPA from emissions to water during construction cannot be ruled out. No significant adverse impacts from changes in air quality were identified during the operational phase of the proposed development. Therefore, no in-combination effects from air emissions have been identified. Howwever, it is noted that potential bio-accumulation effects are discussed in further detail in Section 5.6 of this report. Given the location of this permitted development within the built up setting of Ringaskiddy and the distance from the SPA, no in combination impacts from noise and disturbance during construction or operation have been identified. However, potential in-combination effects from collision risk are assessed further in 5.3 of this report.

Plans and Projects	Key Policies/Issues/Objectives Directly Related to the Conservation of the European Network	
	existing on-site above ground installation (AGI), 4) Connection to the National Grid by means of underground cable to existing on-site 220kV substation, 5) All associated works to facilitate the development such as temporary construction compounds, perimeter fencing, use of an existing access to public road, above ground pipe racks, underground cables on the site and crossing the R630 roadway, site lighting and telecommunications. ESB Aghada Generating Station, Ballincarroonig, Aghada, Co Cork	
Existing turbines in Cork Lower Harbour area	Currently in the Cork Lower Harbour area there are four existing wind turbines. The closest turbine is located approximately 400m south of the proposed development stack, at the DePuy facility (Loughbeg). The other constructed wind turbines are located at DePuy (Turbine 2 at Loughbeg), GlaxoSmithKline (Curraghbinny) and at Janssen (Barnahely) located 1.7km and 2.5km from the proposed development stack respectively. The built turbines themselves are separated from each other by distances ranging from 1.7km to 2.5km and all the Lower Harbour turbines are in excess of 5km from the ESB Power Station Stack at Whitegate.	Given the distance between the proposed development stack and wind turbines and the ESB Power Station Stack at Whitegate, the limited size of the proposed stack and the limited bird usage of shoreline habitats adjoining the proposed development site, there will be no significant in-combination effects on birds. No additional effect is predicted from the new proposed development stack.

In the absence of mitigation, the potential for significant in-combination effects on Cork Harbour SPA with certain projects identified in **Table 10** from emissions to water during construction cannot be ruled out. It is noted that potential bio-accumulation effects mercury, dioxins, thallium and cadmium emissions are discussed in further detail in **Section 5.6** of this report. However, no in-combination effects from air emissions have been identified. Given the distance and the dilution available within receiving waters, significant effects on Ballycotton Bay SPA and Sovereign Islands SPA from in-combination impacts can be excluded.

4.8 Screening of Relevant Natura 2000 Sites and Qualifying Interests/Special Conservation Interests

The proposed development is not directly connected with or necessary to the management of any Natura 2000 site. It is, accordingly, necessary for the competent authority to assess whether the proposed development, either individually or in combination with other plans or projects, would be likely to have significant effects on any Natura 2000 site.

As set out in detail in this Stage One Screening Report, the likely significant impacts on Natura 2000 sites within a 20km radius of the proposed development have been considered. The use

of a 20km radius was adopted as a precautionary measure as impacts at or beyond this distance are extremely unlikely.

Four Natura 2000 sites are located within 20km of the proposed development site namely Cork Harbour SPA (405m south), Great Island Channel SAC (5.5km to the north) and the Ballycotton Bay SPA 18.9km east and Sovereign Islands SPA 19.5km southwest.

A precautionary approach has also been adopted in relation to the appraisal of whether the proposed development is likely to have significant impacts on these four sites. Any significant potential impacts were identified and, unless such impacts could be discounted with certainty, it has been determined that a Stage 2 appropriate assessment should be carried out.

The conclusions in respect of each site are as follows.

4.8.1 Potential effects on the Ballycotton Bay SPA and Sovereign Islands SPA

Given the low levels of emissions from the proposed development and the distance of these Natura 2000 sites from the proposed development site, no likely significant effects, whether direct, indirect or in-combination, have been identified.

4.8.2 Potential effects on the Great Island Channel SAC.

The Great Island Channel SAC is designated on the basis of two qualifying Annex I habitats namely Mudflats and sandflats not covered by seawater at low tide and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*). No faunal species are listed as qualifying interests for this site and thus potential impacts from collision risk or bioaccumulation to higher trophic levels do not apply.

These estuarine habitats are robust and, given the distance and dilution available with Cork Habour, any impacts from minor accidental discharges of silt or hydrocarbons during construction would be imperceptible. No appreciable impacts from construction or operational emissions (air or water), direct removal of habitat or disturbance will arise. Similarly, no significant potential impacts from accidents such as fires during construction or operation or from shipping accidents whilst transporting ash and flue gas residues will occur. No likely significant effects on Great Island Channel SAC from the proposed development have been identified.

4.8.3 Potential effects on the Cork Harbour SPA

Although it is considered improbable that significant effects will occur, the likelihood of significant potential impacts on the Cork Harbour SPA with respect to the following, cannot be entirely discounted without further analysis.

1. Disturbance/displacement of birds listed as qualifying interests for the Cork Harbour SPA where they occur outside the SPA boundary (ex-situ disturbance) including potential in-combination effects

2. Potential for collision risk for birds listed as SCI species for the Cork Harbour SPA where they occur outside the SPA boundary including potential in-combination effects

3. Potential accidental releases (i.e. silt, hydrocarbons, etc) from the proposed development site during the construction phase including potential in-combination effects

4. Potential accidental releases from fire during operation including potential in-combination effects

5. Potential for bioaccumulation and impacts on piscivorous birds from air emissions of mercury and dioxins

Therefore in line with a precautionary approach, a Stage 2 Appropriate Assessment of the proposed development is considered necessary in respect of the Cork Harbour SPA. It is also noted that during consultation with the NPWS, queries were raised in relation to particular aspects of the development (**See Section 4.4**). These queries are further addressed within the Stage 2 of this NIS.

4.8.4 Screening conclusion

The aims of this screening section of this report were as follows:

- Determine whether the proposed development, alone or in combination with other projects, is likely to have significant effects on Natura 2000 sites in view of their conservation objectives.

- Provide information on and assess the potential for the proposed development to significantly impact on Natura 2000 Sites (also known as European sites).

- Determine whether the proposed development is directly connected with, or necessary to the conservation management of any Natura 2000 sites.

It has been objectively concluded that:

- The proposed development is not directly connected with, or necessary to the conservation management of any Natura 2000 sites.

- On the basis of objective information, the possibility of significant effects from the proposed development on European sites cannot be excluded. There is potential for the proposed development to significantly impact the Cork Harbour SPA.

- The proposed development, alone or in combination with other projects could potentially impact on the conservation objectives of Cork Harbour SPA.

On the basis of objective information and in view of best scientific knowledge, the possibility of significant effects from the proposed development on the European sites, Cork Harbour SPA, cannot be ruled out and therefore an Appropriate Assessment is required.

The NIS (below) has been prepared to inform and assist ACP, to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effects on Cork Harbour SPA.

5. Stage 2 – Appropriate Assessment

Sections 3 and 4 of this report are relevant to informing the Natura Impact Statement (NIS) in that the proposed development and receiving environment is described in sufficient detail. In **Section 4**, the likely zone of impact (ZoI) of the proposed development and the European sites within the ZoI were identified. Likely significant effects on the Cork Harbour SPA were identified in **Section 4**. This NIS now examines and analyses, in light of the best scientific knowledge, with respect to this Natura 2000 site within the likely zone of impact of the proposed development, the potential effect sources and pathways, how these could impact on the SCI species/habitats and whether the predicted effects would adversely affect the integrity of the Cork Harbour SPA.

In carrying out an appropriate assessment under Article 6(3) and section 177V, the competent authority (i.e., ACP) is obliged to make a determination as to whether or not the proposed development would adversely affect the integrity of the relevant European site (i.e., the Cork Harbour SPA) in view of its conservation objectives. Accordingly, an appropriate assessment of the implications for the Cork Harbour SPA of the proposed development implies that, prior to its approval, all the aspects of the proposed development which can, by themselves or in combination with other plans or projects, affect the Cork Harbour SPAs conservation objectives must be identified in the light of the best scientific knowledge in the field.

5.1 Cork Harbour SPA Conservation objectives

Cork Harbour SPA is a large, sheltered bay system that is an internationally important wetland site. Owing to the sheltered conditions, the intertidal flats are often muddy in character but described principally as ‘mixed sediment to sandy mud with polychaetes and oligochaetes’. These muds support a range of macro-invertebrates, notably *Macoma balthica, Scrobicularia plana, Peringia (Hydrobia) ulvae, Nepthys hombergi, Nereis diversicolor* and *Corophium volutator*, all of which provide a food source for many wintering waterbird species. Salt marshes are scattered through the site and these provide high tide roosts for waterbirds (NPWS 2014b).

The specific conservation objectives for the species listed as conservation interests for the Cork Harbour SPA (**Table 11**) are to maintain a favourable conservation condition of the non-breeding/breeding waterbirds and to maintain the favourable conservation condition of the wetland habitat at Cork Harbour SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Table 11. SCI species for which a potential impact has been identified – specific targets

Species/Habitats	Attribute	Measure	Target
Little Grebe Great Crested Grebe Cormorant Grey Heron Shelduck	Population trend	Percentage change	Long term population trend stable or increasing
Wigeon Teal Pintail Shoveler Red-breasted Merganser Oystercatcher Golden Plover Grey Plover Lapwing Dunlin Black-tailed Godwit Bar-tailed Godwit Curlew Redshank Black-headed Gull Common Gull Lesser Black-backed Gull	Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by each species, other than that occurring from natural patterns of variation
Common Tern	Breeding population abundance: apparently occupied	Number	No significant decline

Species/Habitats	Attribute	Measure	Target
	nests (AONs)		
	Productivity rate: fledged young per breeding pair	Mean number	No significant decline
	Distribution: breeding colonies	Number; location; area (hectares)	No significant decline
	Prey biomass available	Kilogrammes	No significant decline
	Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase
	Disturbance at the breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding common tern population
Wetlands	Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,587 hectares, other than that occurring from natural patterns of variation

The Conservation Objectives Supporting document for Cork Harbour SPA (NPWS, 2014c) provides a review of the site conservation condition and population trends for Cork Harbour SPA with regard to species' all-Ireland and international trends. All-Ireland trends follow I-WeBS data 1994-2015 (Birdwatch Ireland 2022) while International trends follow Wetlands International (2012). The conservation status of Cork Harbour SPA's SCI birds are included in **Table 12.**

Table 12. Conservation Status of SCI species within Cork Harbour

Special Conservation Interests	BoCCI Category [1]	Site conservation condition[2]	Current All-Ireland Trend[3]	Current International Trend[4]
Shelduck	Amber	Unfavourable	Declining	Increasing
Wigeon	Amber	Unfavourable	Declining	Stable
Teal	Amber	Intermediate (Unfavourable)	Stable	Increasing

Special Conservation Interests	BoCCI Category [1]	Site conservation condition[2]	Current All-Ireland Trend[3]	Current International Trend[4]
Pintail	Amber	Highly unfavourable	Stable	Increasing
Shoveler	Red	Highly unfavourable	Stable	Increasing
Red-breasted Merganser	Amber	Highly unfavourable	Stable	n/c
Little Grebe	Green	Favourable	Increasing	Increasing
Great Crested Grebe	Amber	Unfavourable	Stable	Declining?
Cormorant	Amber	Highly unfavourable	Stable	Increasing
Grey Heron	Green	Intermediate	Stable	Increasing
Oystercatcher	Red	Intermediate (unfavourable)	Stable	Declining
Golden Plover	Red	Favourable	Declining	Declining
Grey Plover	Red	Highly unfavourable	Declining	Declining?
Lapwing	Red	Highly unfavourable	Declining	Stable
Dunlin	Red	Unfavourable	Declining	Stable
Black-tailed Godwit	Red	Favourable	Increasing	Increasing
Bar-tailed Godwit	Red	Favourable	Stable	Increasing
Curlew	Red	Unfavourable	Declining	Declining
Redshank	Red	Unfavourable	Stable	Stable/increasing
Black-headed Gull	Amber	Highly unfavourable	n/c	n/c
Common Gull	Amber	Highly unfavourable	n/c	n/c
Lesser Black-backed Gull	Amber	Highly unfavourable	n/c	n/c

1. Gilbert et al. 2021. 2. NPWS, 2014c, 3. Birdwatch Ireland I-WeBS 1994-2015, 4. Wetlands International (2012)

5.2 Assessment of likely significant effects - Noise/Disturbance

5.2.1 Potential noise/disturbance impacts during construction

The schedule for the construction and commissioning of the proposed development is approximately 31 months and thus works will occur during the main wintering season for birds in Cork Harbour (October to March inclusive). Night-time works are likely to take place over a period of 8 weeks. Heavy or noisy construction activities will be avoided outside normal hours and the amount of work outside normal hours will be strictly controlled.

The road upgrade, associated road drainage and diversions of services will take circa ten weeks to complete. The diversion to the 220kV underground cables, if required would take circa four additional weeks. It is anticipated that the road upgrade, associated road drainage and diversions of services will proceed in advance of the main construction of the Resource Recovery Centre.

The placement of sacrificial beach material will take approximately three weeks to complete and it is envisaged that it will be undertaken towards the end of the construction phase. Deliveries of shingle (sacrificial material) for the coastal protection works will take place over a period of three weeks. Placing of sacrificial beach material will take place outside the main wintering season for birds (October to March).

Due to the nature of the activities undertaken on a large construction site, there is potential for the generation of high levels of noise to the surrounding environment. A variety of items of plant will be in use depending on the construction phasing. There will also be vehicular movements to and from the site that will make use of existing roads.

The potential for vibration will be limited to vibration as a result of excavation works, rock breaking, piling operations and lorry movements on uneven road surfaces. The most potentially significant of these will be the vibration associated with rock breaking and piling operations. No blasting is proposed. Any piling activity will be set back from the shoreline area and within the boundary of the Waste to Energy Plant site (west of the amenity walkway).

Disturbance stimuli can divert time and energy from other fitness-enhancing activities such as feeding, parental care, or mating displays. In other words, disturbance signifies a deviation in an animal's behaviour from patterns occurring without human influences. It is generally accepted that disturbance can cause temporary changes in behaviour of migratory and wintering waterfowl. However, birds can and often do compensate for this disturbance by altering their behaviour or habituating to human activities.

The closest part of the Cork Harbour SPA is located approximately 405m south of the proposed development area and no impacts on birds within the SPA from increased noise and activity during construction are predicted. A total of ten species listed as qualifying interests for the Cork Harbour SPA were recorded during winter bird surveys at the site, namely, Black-headed Gull, Common Gull, Cormorant, Lesser black-backed Gull, Curlew, Dunlin, Oystercatcher, Redshank, Grey Heron and Great-crested Grebe. Common Tern were recorded overflying the proposed development site during the summer months. However, none of these species were recorded in nationally significant numbers in proximity to the proposed development site, with relatively small numbers recorded feeding along the rocky shoreline or overflying the channel.

Curlew were recorded foraging in the field to the south of the proposed development site. The shoreline in proximity to the proposed development site consists primarily of rocky shore/shingle habitat and lacks the large estuarine mudflats which are of high value for wintering birds. Small numbers of Dunlin, Curlew, Oystercatcher, Grey Heron and Redshank were recorded along the shoreline during winter bird survey (2024/2025). A breeding colony of Common tern and a colony of tree roosting Cormorants are located 750m and 1km from the proposed development site respectively.

Notwithstanding the lack of high-quality feeding habitat, recreational usage may already be impacting on bird usage of Gobby Beach, which is the shoreline adjacent to the proposed development site's eastern boundary. It is noted that this beach of the proposed development site are subject to high levels of disturbance from recreational users with or without dogs during daylight hours.

5.2.2 Mitigation Measures during construction

Mitigation Measures – Noise & Vibration

The following mitigation is proposed with respect to noise during construction.

During out of hours construction periods or other construction scenarios with high potential for noise and vibration generating activities, best practice noise and vibration control measures will be employed by the contractor. The best practice measures set out in BS 5228 (2009) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to the following:

Selection of quiet plant

This practice will be in relation to static plant such as compressors and generators. Units will be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected.

Noise control at source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier.

- For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.
- For mobile plant items such as cranes, dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant will be switched off when not in use and not left idling.
- For piling plant, noise reduction will be achieved by enclosing the driving system in an acoustic shroud, where necessary. For steady continuous noise, such as that generated by diesel engines, it is possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover.
- For percussive tools such as pneumatic concrete breakers, rock drills and tools a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensure any leaks in the air lines are sealed. Further reductions in noise levels will be achieved by erecting localised screens around breakers or drill bits when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling, materials will not be dropped from excessive heights. Drops chutes and dump trucks will be lined with resilient materials.

- For compressors, generators and pumps, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation, where required.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. It has been assumed for the purposes of this assessment that a standard construction site hoarding will be erected around the site boundaries. The site hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound insulation.

In addition, careful planning of the site layout will also be considered. Where feasible, site buildings such as offices and stores will be placed between the source and receiver to provide noise screening.

Monitoring

Prior to the construction works commencing on the proposed development site, environmental noise and vibration monitors will be installed at the selected monitoring locations. The monitoring programme during the constructions works will ensure the effective implementation of the mitigation measures described in the preceding sections.

5.2.3 Residual effects construction noise

The application of noise limits, monitoring, and controlled working hours, along with implementation of appropriate noise and vibration mitigation measures as set out above, will ensure that noise and vibration impact is sufficiently controlled to within the relevant criteria. The noise assessment presented in **Appendix 12** notes that noise levels associated with of the proposed development for the worst case construction scenarios assessed are calculated to be less than 35dB LAeq at the closest areas of the Cork Harbour SPA to the south of the proposed development site. This particular area of the SPA is located in close proximity to a number of existing industrial facilities (i.e. Thermo Fisher Scientific, De Puy and Hovione) with operational noise limits of 55dB LAeq during daytime periods and 45dB LAeq during night-time periods. Given that predicted construction noise levels at this location are significantly below the permitted operational noise levels from adjacent facilities, the impact noise impact from construction activities at the closest area of the SPA is insignificant.

All other areas of the Cork Harbour SPA are located at distances beyond 1.5km from the proposed development site with lower construction noise levels predicted at these distances, (less than 30dB LAeq) which is well below typical baseline noise levels in the surrounding environment. Taking the above into consideration, the construction phase of the proposed development is determined to have no significant impact to the existing noise environment at any of the designated Cork Harbour SPA's. During construction of the proposed development, peak noise along Gobby Beach will be less than 45dB. In the fields to the south of the proposed development site peak noise will be 45-55dB. It is noted that small numbers of SCI birds use these areas. According to Cutts *et al.* (2013), noise levels below 55dB are unlikely to cause a

flight response in birds and no adverse effects are predicted to *ex-situ* foraging/roosting birds within these areas.

The breeding colony of common tern is located 750m from the proposed development site and the large night-time roost of Cormorants is located approximately 1km from the proposed site. Given that the noise impact during construction will be insignificant at these distances, no adverse impact on the Cork Harbour SPA has been identified.

It is noted that the shoreline habitats in proximity to the proposed development site are not of high value for birds listed as special conservation interests for the this SPA, although some of these species do occur. Disturbance from the proposed development is likely to arise during the construction phase due to increased noise levels. With the exception of limited amount of night-time activity, works will take place during the day when recreational usage of the beach is more likely to be a greater limiting factor for bird usage of the beach.

Night-time works are likely to take place over a period of 8 weeks. This short-term night time activity is likely to have a greater impact, as birds feeding during this period may be less habituated to increased noise, activity and lighting, which could lead to some short-term disturbance/displacement of birds during such works. However, as such an impact will be localised and short-term, and given the low value of the shoreline habitats adjoining the proposed development site for SPA species, no significant adverse impact on birds listed as qualifying interests for the Cork Harbour SPA, where they occur in proximity to the proposed development site, will occur.

5.2.4 Potential noise impacts during operation

Once coastal protection works, road works and building construction works are complete, the main noise sources during the operational phase relate to the operation of the main process building.

There are four key sources associated with the operational phase as follows:

- process and building services plant (fixed installations);
- vehicle movements on site (mobile plant);
- car parking on site, and;
- additional vehicles on public roads.

5.2.5 Mitigation measures-operational noise

The following mitigation is proposed with respect to noise during operation.

Practicable noise control measures will be employed to ensure that noise from process and building services plant do not exceed the specified operational noise levels. Moreover, an acoustic attenuator will be included in the aero condenser structure. In addition to the measures outlined above, the following forms of noise control techniques will be employed as standard to ensure operational plant noise levels are kept to a minimum:

- plant will be sited as far away from noise-sensitive locations as is practicable;

- duct mounted attenuators will be installed on the atmosphere side of all air moving plant;
- splitter attenuators will be installed providing free ventilation to internal plant areas;
- anti-vibration mounts will be installed on all reciprocating plant.

5.2.6 Residual effects operational noise

The noise assessment presented in **Appendix 12** notes that noise levels associated with the operation of the resource recovery centre are calculated to be imperceptible at distances beyond 400 to 500m from the development site. The proposed development site is located 405m from the closest point of the Cork Harbour SPA. The breeding colony of common tern is located 750m from the proposed development site and the large night-time roost of Cormorants is located approximately 1km from the proposed development site. During operation noise levels on Gobby Beach are predicted to be less than 35dB. In the fields to the south of the proposed development site, operational noise is predicted to be between 35db to 55dB. As noted above, Cutts *et al.* (2013), found that noise levels below 55dB are unlikely to cause a flight response in birds. Therefore, no adverse effects are predicted to *ex-situ* foraging/roosting birds within these areas during the operation of the proposed development.

Given that the noise impact during operation will be imperceptible at the relevant distances, no adverse impact on the Cork Harbour SPA has been identified.

The overall noise and vibration impact of the proposed development during operation is expected to be insignificant in the long term, taking account of the existing noise environment and the predicted impact of the proposed development. There will no adverse effect on any bird species listed as special conservation interests for the Cork Harbour SPA, where they occur in proximity to the proposed development site, during the operational phase of the proposed development.

5.2.7 In-combination effects from noise

The noise assessment presented in **Appendix 12** assessed potential in-combination effects on the Cork Harbour SPA. It concluded that noise levels associated with the operation of the proposed development are calculated to be imperceptible at distances beyond 400 to 500m from the development site. The closest area of the Cork Harbour SPA is located c.405m to the south of the proposed development site. This particular area of the SPA is located in close proximity to a number of existing industrial facilities (i.e. Thermo Fisher Scientific , De Puy and Hovione) and hence the operation of the proposed development will have no impact on noise levels at this area considering the contribution of these adjacent facilities to the existing noise environment. All other areas of the Cork Harbour SPA are located at distances beyond 1.5km from the proposed development site and hence the operation of the proposed development is determined to have no measurable or perceptible change to the existing noise environment at any of the designated Cork Harbour SPA's.

It is noted that the shoreline habitats in proximity to the proposed development site are not of high value for birds listed as special conservation interests for the SPA. The nesting colony of Common Tern is located approximately 750m from the proposed development site. The large

night-time roost of Cormorants is located approximately 1km from the proposed development site.

Any predicted noise impacts associated with the proposed development are well below those associated with the existing noise environment, and those noise impacts associated with the proposed M28, the Port of Cork development(s) and other planned projects. Hence, once operational, the proposed development is expected to be imperceptible in terms of noise to its surrounding environment. Potential construction in-combination impacts are not predicted to be significant given the background noise environment at the proposed development site. Based on the above, no adverse in-combination effects to the integrity, special conservation interests and conservation objectives for the Cork Harbour SPA will occur from noise/disturbance during construction or operation.

5.3 Assessment of likely significant effects – Collision Risk

5.3.1 Potential for collision risk for SCI birds

A literature review assessment of the potential for a collision risk for birds created by the type of stack proposed is included as **Appendix 4.** This information is considered in relation to the proposed 75m OD stack below.

Although collisions may occur there are a number of factors, such as total population size, natural mortality levels, and other human related influences, to be considered in order to put the collision mortality factor in proper perspective. Modelling by some authors has found that vulnerability to collision with buildings and towers varied over more than four orders of magnitude among species. Species that migrated long distances or at night, were much more likely to be affected by collisions than year-round residents or diurnal migrants. However, no correlation has been established between relative collision mortality and long-term population trends for these same species.

5.3.2 Factors affecting risk of collision

Factors affecting risk of collision which were identified by the literature include the following:

Building height

There is some evidence to suggest that towers in the lower range (60 m to 150 m) pose a lower risk to migrating birds. The Indaver stack, which will have a height of 75m OD (circa 70m above the ground), will be within this lower range.

Lighting

Apart from size, often the most important structural factor related to collision probability is the use of lighting. There are no detailed studies of the different risks posed by different lighting systems, though several studies show that changes in the type of lighting used, particularly the replacement of continuous red or white lights with intermittent lighting, has, in some circumstances, reduced the trapping effect and thus mortality of nocturnal migrants.

The literature review indicates that, while any light source has the potential to attract birds and therefore increase collision risk, flashing lights are involved in significantly fewer collisions than continuous lights. There is also some indication that white lights are less attractive than red

lights, although the results to date are inconclusive. While bird vision does differ from human, on the lower ultraviolet end of the spectrum, infrared light is also invisible to birds. The proposed development will have white flashing lights, the least risk option for bird collision.

Location of structure

The location of a structure can dramatically affect the likelihood of collision mortality. Clearly, structures present a greater risk of collision if placed on or near areas regularly used by large numbers of feeding, breeding, or roosting birds, or on migratory flyways or local flight paths, such as those between foraging and nesting or roosting areas. A recent radar study, which was commissioned by the Cork Lower Harbour Energy Group in order to identify nocturnal bird movement and interconnectivity within the Cork Harbour SPA, indicated that the proposed Indaver stack will not be located on or near any migratory route.

Differing Species Susceptibility

Not all bird species are equally susceptible to collision. Gregarious species that form flocks during the autumn and winter appear prone to collision. Flight height is clearly an important factor in collision and varies greatly, depending not only on species and behaviour, but also on topography, season, time of day and weather conditions. Flight distance also affects flight height, with local movements, such as between feeding and nesting or roosting areas, tending to be at low altitude.

Seasonality

There appears to be some correlation between seasonality and bird-strikes. This relates mainly to the seasonal movements of birds, with increased incidence of mortality events often occurring during peak migration periods. Higher mortality at this time is perhaps also due to the lack of familiarity of migrant and over-wintering birds with the locations of obstacles, compared with resident individuals. Determining risk based on migrant versus resident status is not straightforward, and mitigating factors, such as familiarity with the presence of structures, must be weighed against factors, such as period of exposure and species (or individual) susceptibility. However, as indicated previously the proposed Indaver stack will not be located on or near any migratory route.

Flight characteristics

Commuting flights between foraging grounds generally take place at a lower altitude (i.e. 0-5 metres) and thus could potentially encounter the buildings of the proposed development. At Ringaskiddy, this is likely to include Cormorants, ducks, some wader species and gulls. However flights such as this are likely to take place within the estuarine habitats (i.e. the open water or mudflats) and not over the landward site of the proposed development.

Some attempts have been made to quantify the risk of wind turbine collision. While this is not entirely comparable to collision risk with static buildings, such as stacks, it does give some indication of relative species risk. **Table 13** lists the bird species of qualifying interest and conservation concern located within Cork Harbour SPA. The vulnerability to collision of each of these species, according the *European Commission Guidelines on Windfarms* (2010) is also listed. It is most notably the flocking species of Dunlin, Lapwing and Golden Plover which

are at potential risk of impact. The higher risk identified for Common Tern is probably associated with their foraging behaviour during breeding seasons.

Table 13. Bird species of qualifying interest and conservation concern within Cork Harbour SPA

	Common Name	*Scientific Name*	Annex of EU Birds Directive	Vulnerability to Collision
Qualifying interests	Cormorant	*Phalacrocorax carbo*	n/a	1
	Shelduck	*Tadorna tadorna*	n/a	0
	Oystercatcher	*Haematopus ostralegus*	n/a	0
	Golden Plover	*Pluvialis apricaria*	Annex I	2
	Lapwing	*Vanellus vanellus*	n/a	2
	Dunlin	*Calidris alpine*	n/a	2
	Black-tailed godwit	*Limosa limosa*	n/a	1
	Bar-tailed godwit	*Limosa laponica*	n/a	0
	Curlew	*Numenius aquata*	n/a	0
	Redshank	*Tringa tetanus*	n/a	0
	Common tern	*Sterna hirundo*	Annex I	3
Special Conservation Interest	Little grebe	*Tachybaptus ruficollis*	n/a	0
	Great crested grebe	*Podiceps cristatus*	n/a	2
	Grey heron	*Ardea cinerea*	n/a	0
	Wigeon	*Anas Penelope*	n/a	0
	Teal	*Anas crecca*	n/a	0
	Pintail	*Anas acuta*	n/a	0
	Shoveler	*Anas clypeata*	n/a	0
	Red-breasted merganser	*Mergus serrator*	n/a	0
	Grey plover	*Pluvialis squatarola*	n/a	0
	Black-headed gull	*Larus ribundus*	n/a	0
	Common gull	*Larus canus*	n/a	0
	Lesser black-backed gull	*Larus fuscus*	n/a	0

4 = Evidence on substantial risk of impact, 3 = Evidence or indications of risk or impact, 2 = Potential risk or impact, 1 = small or non-significant risk or impact, but still to be considered in assessments, 0 = no risk.

5.3.3 Mitigation measures

The top of the stack will be indicated by white strobe (flashing) obstacle warning lights. The lights will be incandescent or of a type visible to Night Vision Equipment. The lights will emit light at the near infra-red (IR) range of the electromagnetic spectrum specifically at or near 850 nanometres (nm) of wavelength. Light intensity is to be of a similar value to that emitted in the visible spectrum of light.

5.3.4 Conclusions

In determining the potential collision risk the following points were taken into consideration:

- A radar study was commissioned by the Cork Lower Harbour Energy Group, in order to identify nocturnal bird movement and interconnectivity within the Cork Harbour SPA. A number of significant nocturnal flight corridors were identified, particularly connecting Lough Beg to the Owenboy River Estuary at incoming and outgoing tide periods. This is located to the south of the proposed development. No widespread distinct patterns

were observed between Monkstown Creek and Lough Beg, although minor patterns were observed from birds flying northwards from Lough Beg over the Martello tower area, to the west of the proposed development. It is noted that during winter bird surveys for the proposed development in 2024/2025, foraging Curlew were recorded within the fields near the Martello Tower. However, no distinct flight patterns were observed over the proposed development site. The location of the proposed stack at proposed development although 405m from the Cork Harbour SPA, is not a roosting/foraging area, or on a significant flightline or migratory path for the birds using the SPA.

- The coastal areas adjacent to the proposed development site are not of high value for bird species listed as special conservation interests for the Cork Harbour SPA.

- The nesting colony of Common Tern is located approximately 750m from the proposed Indaver stack. The large night-time roost of Cormorants is located approximately 1km from the proposed development site. The surveys carried out do not indicate that either species have significant flight lines through the proposed development site.

- The proposed stack height is relatively low, at just 75m OD (circa 70m above the ground), a height which has been shown to pose less collision risk than higher wind turbines and communication towers. Migratory flights over the area, would generally occur at a much greater height that 75m OD, thus eliminating or very substantially reducing the collision risk to migratory birds overflying the site of the proposed development.

- The static nature of the stack, compared to wind turbines, means it will create a significantly lower risk of collision.

- The literature review indicates that flashing lights are involved in significantly fewer collisions that continuous lights. There is also some indication that white lights are less attractive than red lights. While bird vision does differ from human, on the lower ultraviolet end of the spectrum, infrared light is also invisible to birds. Therefore the proposal for a combination of white flashing and IR lights on the stack, is the most favourable choice and is unlikely to pose a significant collision risk to birds.

- The potential in-combination impacts of the proposed development, with other developments in the vicinity, are not predicted to result in any adverse effects on the conservation objectives of the Cork Harbour SPA as the stack in the proposed development is located at a sufficient distance from other developments. The closest wind turbine is 400m away and, following radar studies conducted during the planning process for these turbines, no significant in-combination collision risk is predicted. No additional impact is predicted from the new planned turbines/stacks, which will be at least 1km from the Indaver stack.

Based on the above and given the fact that the stack is a static structure, which is relatively low in height and which is not located on or in proximity to significant roosting areas, nesting areas, flight lines or migratory paths for birds, there will not be adverse effects on the constitutive characteristics (i.e., the thirteen bird species) of the Cork Harbour SPA.

Specifically, in light of the best available scientific knowledge, the Indaver stack as proposed will not create a collision risk of a magnitude sufficient to adversely impact on the integrity of any of the special conservation interests and/or conservation objectives for the Cork Harbour SPA. Given the distance of the stack from other tall structures including wind turbines, no adverse in-combination effects to the integrity, special conservation interests and conservation objectives for the Cork Harbour SPA will occur.

5.4 Assessment of likely significant effects - Accidental Releases from the Site During the Construction Phase

Potential accidental releases with a higher risk of occurrence during construction would include siltation from construction runoff or hydrocarbon leaks from construction machinery.

5.4.1 Mitigation during construction

A range of easily implemented control measures, will ensure that any risks are minimised as follows:

- To prevent incidental damage by machinery or by the deposition of spoil during the site clearance stage, any trees /habitats earmarked for retention will be securely fenced early in the construction phase. The fencing will be clearly visible to machine operators.
- A dedicated holding tank for storage of construction foul effluent will be constructed prior to commencement of the main construction activities. The effluent will be regularly disposed of off-site by tanker by a licensed contractor to an approved licenced facility
- Storm water will be managed carefully during construction. In general, storm water will be infiltrated to ground via silt traps and managed soakaways. The laydown areas will be suitably drained and any areas which will involve the storage of fuel and refuelling will be paved and bunded and hydrocarbon interceptors will be installed to ensure that no spillages will get into the surface water or groundwater.
- The construction management of the site will take account of the recommendations of the CIRIA guide *Control of Water Pollution from Construction Sites 2001*. Construction mitigation measures are outlined in **Appendix 9**.

Construction activities have the potential to generate dust emissions, particularly during the site clearance and excavation stages. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with ambient conditions, including rainfall, wind speed, wind direction and on the distance to potentially sensitive locations. Most of the dust would be deposited close to the potential source and any impacts from dust deposition would typically be within 100 metres or so of the construction area.

- The following avoidance, remedial or reductive measures will be implemented as part of the dust minimisation plan:
    - During very dry periods when dust generation is likely, construction areas will be sprayed with water.
    - Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor through regular servicing of machinery.
    - Vehicle speeds will be limited in the construction site.
    - Surrounding roads used by trucks for access to and egress from the site will be cleaned regularly using an approved mechanical road sweeper. Roads will be

cleaned subject to local authority requirements. Site roads will be cleaned on a daily basis, or more regularly, as required.

- Wheel-wash facilities will be provided with rumble grids to remove excess mud from wheels. These facilities will be located at the exit from the site and away from sensitive receptors, where possible.
- Internal haul roads will be paved at the earliest possible opportunity and inspected regularly for cleanliness.
- Materials carried on vehicles to site will be enclosed or covered with tarpaulins.
- Daily visual inspections will be carried out at locations around the site boundary as required. These inspections will monitor the effectiveness of dust mitigation measures.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind.
- Wheel wash facilities will be provided for vehicles exiting the project site. Wheel wash run off will be stored in an onsite storage tank and will be disposed of by permitted waste haulage company at a permitted or licensed facility.

- Waste generated during the construction phase will be carefully managed according to the accepted waste hierarchy which gives precedence to prevention, minimisation, reuse and recycling over disposal with energy recovery and finally disposal to landfill.
- All waste removed from the site will be collected only by contractors with valid waste collection permits, under the Waste Management (Collection Permit) Regulations 2007 and 2008. All facilities to which waste will be taken will be audited in advance, to ensure that they have appropriate waste licences or permits, under the Waste Management Act 1996, as amended, and the regulations thereunder, allowing them to accept the type of waste that is to be sent there. Hazardous waste generation will be minimised, and such waste will be recovered where feasible, and only disposed of if recovery is not feasible. Hazardous waste will be managed in accordance with the relevant legislation.
- The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. The Construction Industry Research and Information Association (CIRIA) in the UK has issued a guidance note on the control and management of water pollution from construction sites, *Control of Water Pollution from Construction Sites, guidance for consultants and contractors* (Masters-Williams *et al*. 2001). Additional guidance is provided in the CIRIA technical guidance on *Control of Water Pollution from Linear Construction Projects* (Murnane *et al.* 2006).
    - Measures, as recommended in the guidance above, that will be implemented to minimise the risk of spills and contamination of soils and waters, include:
    - Training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures,
    - Careful consideration will be given to the location of any fuel storage facilities. These will be designed in accordance with guidelines produced by CIRIA, and will be fully bunded.
    - All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site.

- Where feasible, soil excavation will be completed during dry periods and undertaken with excavators and dump trucks. Topsoil and subsoil will not be mixed together.
- All areas where liquids are stored or cleaning is carried out will be located within a designated impermeable area that is isolated from the surrounding area, e.g. by a roll-over bund, raised kerb, ramps or stepped access.
- Use collection systems to prevent any contaminated drainage entering surface water drains, watercourses or groundwater, or draining onto the land.
- Minimise the use of cleaning chemicals.
- Use trigger-operated spray guns, with automatic water-supply cut-off.
- Use settlement lagoons or suitable absorbent material such as flocculent to remove suspended solids such as mud and silt.
- Ensure that all staff are trained and follow vehicle cleaning procedures.
- Post details of the procedures in the work area for easy reference.

5.4.2 Conclusions - Potential Accidental Releases from the Site During the Construction Phase

In the unlikely event that construction does result in small scale spillages of hydrocarbons or increased silt levels in surface water run-off, the impacts on the marine environment would be limited and localised. Given the dilution provided in the marine environment and the distance of the Cork Harbour SPA from the proposed development such spillages would not have an adverse impact on the integrity of the Cork Harbour SPA or the conservation objectives for qualifying bird species. However, following the precautionary principle, mitigation measures for the control of surface water runoff during construction will be implemented.

The only accidental release from the site during construction, which would have the potential to have a negative effect on the SPA, would be a fire. In such a scenario, combustion products would be released during a fire. It is noted that the risk of fire during construction is low and the impact is also likely to be low as the development is industrial in nature with a predominance of steel, concrete and other non-combustible materials in the main process building. Fuel storage on the proposed development site will be limited to small diesel tanks to supply earth moving plant. Moreover, it is also noted that the Cork Harbour SPA is located c.405m from the proposed development site at its closest point and thus any impact on the SPA from a construction fire is predicted to be imperceptible. Given the dilution provided in the marine environment and the distance of the Cork Harbour SPA from the proposed development, run-off of fire water would not have an adverse impact on the integrity of the Cork Harbour SPA or the conservation objectives for qualifying bird species.

Whilst minor localised impacts on water quality could occur, there will not be an adverse effect on the integrity, special conservation interests and conservation objectives for the Cork Harbour SPA, even in the event of a highly unlikely accidental release from the site during the construction period.

Given the above, no adverse in-combination effects to the integrity, special conservation interests and conservation objectives for the Cork Harbour SPA will occur from emissions to water during the construction phase.

5.5 Appraisal of likely significant effects - Potential Accidental Releases from fire during operation

5.5.1 Hazard Identification and Risk Assessment study

Notwithstanding the fact that the proposed development will not be a major accident establishment, a number of accident scenarios which could potentially arise during the operation of the facility, were assessed in the Hazard Identification and Risk Assessment study to determine the risk each posed to human health and the environment. The only risk identified as substantial was a fire in the bunker.

5.5.2 Consequence of Fire in the Bunker

Byrne Ó Cléirigh (**Appendix 13**) modelled the effects of a fully developed fire in the bunker, which was the only substantial risk identified. The report concluded the following:

Calculations show that "*there is a very wide margin of safety between the expected dioxin intake to people at receptors closest to the proposed development site when compared with the WHO's Tolerable Daily Intake (TDI) for lifetime exposure of 1-4 pg/kg/day (taken as 1 pg/kg/day for the purposes of this calculation). As such the overall exposure to dioxins in the surrounding area as a result of the Indaver facility would be very low (several orders of magnitude less than the overall TDI established by WHO)".*

"The closest Protected Site to the Indaver facility is Lough Beg, which is part of the Cork Harbour SPA and is also a pNHA. This is located c.500 m from the facility. Applying the same calculations the resulting factor of safety works out as 7,690, based on the WHO criteria for human health." It is predicted that the dioxin intake level at the closest point of the SPA would be imperceptible and would not have an adverse impact on the integrity of the Cork Harbour SPA or the conservation objectives for qualifying bird species.

The thermal radiation from a fully developed fire in the bunker was also modelled. A thermal dose end point of 4kW/m^2 is the level sufficient to cause pain to persons exposed if unable to reach cover within 20 seconds. The distance to this thermal dose was 49m. The closest point of the Cork Harbour SPA is approximately c.405m from the site and well beyond this distance. Accordingly, the thermal dose at the nearest point of the SPA would be well below a level which would affect any of the species identified as the qualifying interests for this SPA.

5.5.3 Control Measures to Prevent a Fire in the Bunker

The measures will be put in place to protect against a fire in the bunker, either by reducing the likelihood of occurrence or mitigating the impacts if it did occur:

5.5.4 Prevention Measures

- Visual inspection of waste as it is unloaded at the reception hall/tipping hall, to check for any irregularities.
- Hot work permitting system – control on ignition sources in area.
- Trained operators.
- Lower explosive limit (LEL) monitoring in bunker.

- Where practicable, equipment is taken outside of the bunker for maintenance works to protect against risk of fire from maintenance activities.
- Due to the manner in which the activity is carried out, there is a quick throughput at the bunker which means that waste is not left in situ for a long period of time.
- Bunker Management Programme - once or twice per year the level in the bunker is lowered (as far as practicable) in the course of a lead in to plant shut down.
- Barrier in place at waste receipt area, to protect against scenario in which a trailer falls into the bunker.

5.5.5. Control Measures if a fire occurs

- In the event of a fire in the bunker, the fire damper will close and air to boiler will be taken from elsewhere.
- The control room is a manned area that has visibility on the bunker at all times via a large window that looks out onto it; this would facilitate rapid detection of smoke formation.
- Negative pressure at waste reception area.
- ultraviolet/infrared detectors in the bunker.
- If smouldering waste is detected it is loaded directly to hopper and more waste is then dumped on top to smother it.
- 4 x fixed water cannons in place to douse spot fires.
- Sprinkler system on roof as back up to the water cannons.
- Bunker is concrete structure.
- Fire wrapping of cables to ensure continued function during fire event.

5.5.6 Fire Water Containment

Fire water retention, for the retention and control of contaminated water generated when fighting a fire on site, will be provided to the waste-to-energy plant.

In the event of a fire in the bunker, the water used to fight the fire will be captured in the bunker where it will be stored for disposal. The bunker will have more than adequate capacity for the volume of water used to fight the fire as well as the waste which will be in it. If there is a fire in any other part of the waste-to-energy facility, the water used to fight the fire will be captured by the recovery water and clean water tanks which will be located below the building floor. The bunker and the recovery tanks will be designed as water retaining structures. The fire-fighting water from any fire anywhere else on site will be captured in the storm water drainage system and will be collected in the holding tank, where it can be stored for disposal. The outlet valve from the holding tank will close if there is a fire alarm. If the holding tank has insufficient capacity, the water will overflow to the attenuation tank, in which it can be retained pending testing and disposal.

5.5.7 Conclusions - Potential Accidental Releases from fire during operation

A range of mitigation measures will be implemented to prevent a fire in the bunker. Even in the event of a bunker fire the dioxin intake level at the closest point of the SPA would be imperceptible. Moreover, in the extremely unlikely event of a fire occurring, the thermal dose at the nearest point of the SPA would be well below a level which would affect the any of the species identified as the qualifying interests of the SPA. In the event of a fire in the bunker, the water used to fight the fire will be captured in the bunker, which will have sufficient capacity, where it will be stored for disposal. If a fire occurs in another part of the waste-to-energy facility, the water used to fight the fire would be captured in the recovered water and clean water tanks which will be located under the floor. If a fire occurred in an external area, the potentially contaminated water used to fight the fire would drain to the storm water drainage system and be collected in the holding tank. If the holding tank has insufficient capacity, the water will overflow to the attenuation tank, in which it can be retained pending testing and disposal. Accordingly, there will no release of water used to fight the fire to the aquatic environment and no adverse effects on the conservation objectives of the Cork Harbour SPA can occur.

In light of the above evaluation, including the effective implementation of measures to prevent a fire, even if a fire did occur at the waste-to-energy facility, such a fire would not have an adverse impact on the integrity of the Cork Harbour SPA site and its conservation objectives. No potential in-combination impacts, in relation to a fire on site, have been identified, which could have an adverse impact on the integrity of the Cork Harbour SPA or the conservation objectives for qualifying bird species.

5.6 Assessment of likely significant effects - Potential impacts on piscivorous birds from air emissions and possible bioaccumulation

5.6.1 Assessment of potential air and sediment impacts

Appendix 11 of this NIS provides a detailed assessment of the potential impacts on air. It is noted that due to the localised nature of possible impacts from dust generation during construction, the limited nature of potential impacts and the distance from the Cork Harbour SPA (405m) no significant potential impact from dust has been identified. Thus, this section is concerned with possible emissions from the operation of the proposed development.

The Ringaskiddy Resource Recovery Centre will have one furnace and flue gas cleaning line. The line will have a moving grate furnace with a state-of-the-art flue gas cleaning system. The combustion of waste produces a number of emissions, the discharges of which are regulated by the EU Directive on Industrial Emissions (IED) (2010/75/EU). The emissions to atmosphere which have been considered are: Nitrogen Dioxide (NO_2), Nitrous Oxides (NO_x) Sulphur Dioxide (SO_2), Total Dust (as PM_{10} and $PM_{2.5}$), Carbon Monoxide (CO), Total Organic Carbon (TOC), Hydrogen Fluoride (HF) and Hydrogen Chloride (HCl), Dioxins/Furans (PCDD/PCDFs), Cadmium (Cd) and Thallium (Tl), Mercury (Hg) and the sum of Antimony (Sb), Arsenic (As), Lead (Pb), Chromium (Cr), Cobalt (Co), Copper (Cu), Manganese (Mn), Nickel (Ni) and Vanadium (V). In addition, Polycyclic Aromatic Hydrocarbons (PAHs) have been assessed as incineration is a potential emission source for this group of compounds.

The scope of the evaluation of the potential effects on air quality arising from the proposed development consists of the following components:

- Review of maximum emission levels and other relevant information needed for the modelling study;
- Review of construction phase potential emissions;
- Identification of the significant substances which are released from the proposed development;
- Review of background ambient air quality in the vicinity of the proposed development including an extensive baseline survey which was carried out in the region of the proposed development over the period August 2024 – January 2025. This data supplements the extensive baseline surveys undertaken in November 2006 to February 2007, from April 2008 to July 2008, from August 2014 to July 2015 and October 2018 to January 2019;
- Air dispersion modelling of significant substances released from the proposed development;
- Particulate deposition modelling of Dioxins & Furans, Polycyclic Aromatic Hydrocarbons (PAHs) and heavy metals released from the proposed development;
- Identification of predicted ground level concentrations of released substances at the proposed development boundary and at sensitive receptors in the immediate environment;
- The potential in-combination effects of the proposed development on air quality in combination with other relevant planned or permitted development in the area;
- Evaluation of the significance of these predicted concentrations, including consideration as to whether ground level concentrations are likely to exceed the applicable stringent ambient air quality standards and guidelines.

5.6.2 Modelling Under Maximum & Abnormal Operating Conditions

In order to assess the potential effect from the proposed development under maximum and abnormal operations, a conservative approach was adopted that is designed to "over-predict" ground level concentrations. This cautious or conservative approach will ensure that an over-estimation of effects will occur and that the resultant emission standards adopted are stringent in their protection of ambient air quality. The approach incorporated several conservative assumptions regarding operating conditions at the proposed development. This approach incorporated the following features:

- For the maximum operating scenario, it has been assumed that the emission point is continuously operating at its maximum operating volume flow. This will over-estimate the actual mass emissions from the proposed development.
- For the maximum operating scenario, it has been assumed that the emission point is operating at its maximum emission concentration for 24-hrs/day over the course of the full year.

- Abnormal operating emissions were obtained from the process engineer and are pessimistically assumed to occur as outlined below:
    - NOX - 400 mg/m3 for 3% of the year (11 days per annum)
    - SO2 - 200 mg/m3 for 3% of the year (11 days per annum)
    - Total Dust - 30 mg/m3 for 3% of the year (11 days per annum)
    - TOC - 30 mg/m3 for 3% of the year (11 days per annum)
    - HCl - 60 mg/m3 for 3% of the year (11 days per annum)
    - HF - 4 mg/m3 for 3% of the year (11 days per annum)
    - CO - 200 mg/m3 for 5% of the year (18 days per annum)
    - Dioxins & Furans - 0.5 ng/m3 for 3% of the year (11 days per annum)
    - Heavy Metals (other than Hg, Cd & Tl) - 30 mg/m3 for 3% of the year (11 days per annum)
    - Cd & Tl - 0.2 mg/m3 for 3% of the year (11 days per annum)
    - Hg - 1 mg/m3 for 3% of the year (11 days per annum).
- As a result of these conservative assumptions, there will be an over-estimation of the emissions from the proposed development and the effect of the proposed development on human health and the surrounding environment.

5.6.3 Modelling Study Methodology

The air dispersion modelling input data consists of detailed information on the physical environment (including building dimensions and terrain features), design details from all emission points on-site and a full year of worst-case meteorological data. The worst-case ambient concentration was then compared with the relevant ambient air quality standard to assess the significance of potential releases from the site. In the absence of detailed guidance from Ireland, the selection of appropriate modelling methodology has followed the guidance from the USEPA which has issued detailed and comprehensive guidance on the selection and use of air quality models. Based on guidance from the USEPA, the most appropriate regulatory model for the current application is the AERMOD model (Version 24142). The selection of the appropriate meteorological data has followed the guidance issued by the USEPA.

5.6.4 Background Concentrations

The ambient concentrations detailed in the following sections include both the emissions from the proposed development site and the ambient background concentration for that substance. Background concentrations have been derived from a conservative analysis of the existing background air quality and an analysis of cumulative sources in the region in the absence of the proposed development. A detailed baseline air quality assessment was carried out to assess background levels of those pollutants, which are likely to be released from the proposed development.

5.6.5 Cumulative Assessment

As the region around Ringaskiddy is partly industrialised and thus has several other potentially significant sources of pollutants, a detailed cumulative assessment has been carried out using the methodology outlined by the USEPA. The impact of nearby sources should be examined where interactions between the plume of the point source under consideration and those of nearby sources can occur. These include the area of maximum impact of the point source, the area of maximum impact of nearby sources and the area where all sources combine to cause maximum impact on air quality. Background concentrations for the area, based on natural, minor and distant major sources need also to be taken into account in the modelling procedure. A major baseline monitoring programme was undertaken over several months which, in conjunction with other available baseline data, was used to determine worst-case background concentrations in the region. Full detail of the cumulative impact assessment and associated results can be seen in **Appendix 11.**

5.6.6 Ambient Air Quality Standards

Ambient air quality legislation designed to protect human health and the environment is generally based on assessing ambient air quality at locations where the exposure of the population is significant relevant to the averaging time of the pollutant. However, in the current appraisal, ambient air quality legislation has been applied to all locations within a 10km radius of the proposed development regardless of whether any sensitive receptors (such as residential locations) are present for significant periods of time. This represents a worst-case approach and an examination of the corresponding concentrations at the nearest sensitive receptors relative to the actual quoted maximum concentration indicates that these receptors generally experience ambient concentrations significantly lower than that reported for the maximum value.

5.6.7 Receiving Environment

An extensive baseline survey was carried out in the region of the proposed development over the period August 2024 – January 2025. This data supplements the extensive baseline surveys undertaken in November 2006 to February 2007, from April 2008 to July 2008, from August 2014 to July 2015 and October 2018 to January 2019. These surveys focused on the significant pollutants likely to be emitted from the proposed development and which have been regulated in Council Directive 2010/75/EU. The substances monitored over these survey periods were NO_2, NO_X, PM_{10}, $PM_{2.5}$, benzene, SO_2, heavy metals, HCl, HF and PCDDs/PCDFs. The air monitoring program was used to determine long-term average concentrations for these pollutants in order to help quantify the existing ambient air quality in the region. NO2, benzene and SO2 were also monitored at a number of additional locations to give some spatial representation of the levels of these species.

The updated extensive baseline survey which was carried out in the region of the proposed development over the period August 2024 – January 2025 focused on NO_2, PM_{10}, $PM_{2.5}$, benzene and SO_2. The air monitoring programme was used to determine long-term average concentrations for these pollutants in order to help quantify the existing ambient air quality in the region. NO_2, benzene and SO_2 were also monitored at a number of additional locations to give greater spatial representation of the levels of these species

5.6.8 AERMOD dispersion model

Council Directive 2010/75/EU on Industrial Emissions Directive (IED) has established air emission limit values. The Directive has also outlined stringent operating conditions in order to ensure sufficient combustion of waste thus ensuring that dioxin formation is minimised. Specifically, combustion gases must be maintained at a temperature of 850°C for at least two seconds under normal operating conditions for non-hazardous waste whilst for hazardous waste containing more than 1% halogenated organic substances, the temperature should be raised to 1,100°C for at least two seconds. These measures will ensure that dioxins/furans, polychlorinated biphenyls (PCBs) and PAHs are minimised through complete combustion of waste.

Emissions from the proposed development have been modelled using the AERMOD dispersion model which is the USEPA's regulatory model used to assess pollutant concentrations associated with industrial sources(1). Emissions have been assessed, firstly under maximum emissions limits of the EU Directive 2010/75/EU and secondly under abnormal operating conditions.

The proposed development site has one main process emission point (flue). In order to assess the possible impact from the proposed facility under maximum and abnormal operations, a conservative approach was adopted that is designed to over-predict ground level concentrations. This cautious approach will ensure that an over-estimation of impacts will occur and that the resultant emission standards adopted are protective of ambient air quality. The approach incorporated several conservative assumptions regarding operating conditions at the proposed facility.

NO_2 & NO_X

NO_2 modelling results, using AERMOD, indicate that the ambient ground level concentrations will be below the relevant air quality standards for the protection of human health for nitrogen dioxide under both maximum and abnormal operation of the proposed development. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the proposed development boundary. Emissions at maximum operations lead to ambient NO_2 concentrations (including background concentrations) which are 18% of the maximum ambient 1-hour limit value (measured as a 99.97th%ile), 49% of the maximum ambient 24-hour limit value (measured as a 95.1th%ile) and 26% of the annual average limit value at the respective worst-case receptors.

The annual average NO_X concentration (including background concentration) will also be below the critical level for the protection of vegetation accounting for 35% of the annual limit value at the worst-case receptor in the region of the Lough Beg Proposed NHA and the Cork Harbour SPA.

SO_2, CO, PM_{10} & $PM_{2.5}$

AERMOD modelling results indicate that ambient ground level concentrations will be below the relevant air quality standards for the protection of human health for sulphur dioxide, carbon monoxide and PM_{10} under maximum and abnormal operation of the proposed development. Results will also be below the air quality standard for $PM_{2.5}$ and the SO_2 critical level for the protection of vegetation under maximum and abnormal operation of the proposed

development. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the proposed development boundary. Emissions at maximum operations equate to ambient concentrations (including background concentrations) ranging from 16% - 68% of the respective limit values at the worst-case receptors.

TOC, NH_3, HCl & HF

AERMOD modelling results indicate that the ambient ground level concentrations will be below the relevant air quality guidelines for the protection of human health for TOC (assumed pessimistically to consist solely of benzene), NH_3, HCl and HF under maximum and abnormal operation of the proposed development. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the proposed development boundary. Emissions at maximum operations equate to ambient concentrations (including background concentrations) for NH_3, HCl and TOC of only 1.2%, 11% and 31% respectively of the ambient limit values.

HF modelling results indicate that emissions at maximum operations equate to ambient HF concentrations (including background concentrations) which will be 1% of the maximum ambient 1-hour limit value and 2% of the annual limit value.

PCDD / PCDFs (Dioxins/Furans)

Currently, no internationally recognised ambient air quality concentration or deposition standards exist for PCDD/PCDFs (Dioxins/Furans). Both the USEPA and WHO recommended approach to assessing the risk to human health from Dioxins/Furans entails a detailed risk assessment analysis involving the determination of the effect of Dioxins/Furans in terms of the TDI (Tolerable Daily Intake) approach. The WHO currently proposes a maximum TDI of between 1-4 pgTEQ/kg of body weight per day.

Background levels of Dioxins/Furans occur everywhere and existing levels in the surrounding area have been extensively monitored as part of this study. Monitoring results indicate that the existing levels are similar to rural areas in the UK and Ireland. The additional contribution from the proposed development to levels of Dioxins/Furans is minor, with levels at the maximum off-site receptor to the south of the proposed development, under maximum and abnormal operation, accounting for only a small fraction of existing levels. Levels at the nearest residential receptor will also be minor, with the annual contribution from the proposed development accounting for less than 1% of the existing background concentration under maximum operating conditions.

PAHs

PAHs modelling results, based on AERMOD, indicate that the ambient ground level concentrations will be below the relevant air quality limit value for the protection of human health under maximum and abnormal operation of the proposed development. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the proposed development boundary. Emissions at maximum operations equate to ambient benzo[a]pyrene concentrations (excluding background concentrations) which are 0.1% of the EU annual average limit value at the worst-case receptor.

Hg

Mercury (Hg) modelling results, based on AERMOD, indicate that the ambient ground level concentrations will be below the relevant air quality standards for the protection of human health under maximum and abnormal operation of the proposed development. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the proposed development boundary. Emissions at maximum operations equate to ambient mercury concentrations (including background concentrations) which are only 1% of the annual average limit value at the worst-case receptor.

Cd and Tl

AERMOD modelling results indicate that the ambient ground level concentrations will be below the relevant air quality standard for the protection of human health for cadmium under maximum and abnormal operation from the proposed development. Emissions at maximum levels equate to ambient Cd and Tl concentrations (including background concentrations) which are 28% of the EU annual limit value for Cd close to the proposed development boundary (the comparison is made with the Cd limit value as this is more stringent than that for Tl).

Sum of As, Sb, Pb, Cr, Co, Cu, Ni, Mn and V

AERMOD modelling results indicate that the ambient ground level concentrations will be below the relevant air quality standards for the protection of human health for arsenic (As), nickel (Ni) and vanadium (V) (the metals with the most stringent limit values) under maximum and abnormal operation emissions from the facility (based on the ratio of metals measured at a Waste to Energy facility in Carranstown, County Meath). Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the proposed development boundary. Ambient concentrations have been compared to the annual limit value for As and Ni and the maximum 1-hour limit value for V as these represent the most stringent limit values for the suite of metals. Emissions at maximum operations equate to ambient As and Ni concentrations (including background concentrations) which are 17% and 48% of the EU annual limit value respectively at the worst-case receptor whilst emissions at maximum operations equate to ambient V concentrations (including background concentrations) which are only 0.2% of the maximum 1-hour limit value at the worst-case receptor. Emissions under abnormal operations equate to ambient As and Ni concentrations (including background concentrations) which are 24% and 53% of the annual limit value respectively at the worst-case receptor whilst emissions at maximum operations equate to ambient V concentrations (including background concentrations) which are 0.2% of the maximum 1-hour limit value at the worst-case receptor.

5.6.9 AERMOD Modelling Summary

AERMOD modelling results indicate that the ambient ground level concentrations will be below the relevant air quality standards or guidelines for the protection of human health for all parameters under both the maximum and abnormal operation scenarios. The modelling results indicate that the maximum long-term ground level concentration occurs to the south of the development's boundary. Maximum operations are based on the emission concentrations outlined in EU Directive 2010/75/EU.

An appropriate stack height has been selected to ensure that ambient air quality standards for the protection of human health will not be approached even under abnormal operating scenarios. Air dispersion modelling was undertaken in an iterative fashion in order to determine the stack height for the proposed development. The air dispersion modelling study found that a stack height of 70 metres was appropriate.

The spatial effect of the proposed development is limited with concentrations falling off rapidly away from the location of the maximum ambient ground level concentration. For example, the short-term concentrations due to process emissions at the nearest residential receptor will be less than 10% of the short-term ambient air quality limit values. The annual average concentration results in an even more dramatic decrease in maximum concentration away from the proposed development with concentrations from emissions at the proposed development accounting for less than 3% of the limit value (not including background concentrations) at worst case sensitive receptors near the proposed development.

In the surrounding areas of Cobh, Carrigaline and Monkstown, levels are significantly lower than most background sources with the concentrations from emissions at the proposed development accounting for less than 1% of the annual limit values for the protection of human health for all pollutants under maximum operations of the proposed development.

In terms of Ireland's obligations under the Gothenburg Protocol and the POPs Convention, the effect of the facility will not be significant.

5.6.10 CALPUFF Modelling Assessment

The CALPUFF modelling system has been recommended by the USEPA as a Guideline Model for source-receptor distances of greater than 50km and for use on a case-by-case basis in complex flow situations within 50km. CALPUFF has some important advantages over steady-state Gaussian models such as AERMOD in areas of complex meteorology.

NO_2 & NO_X

NO_2 modelling results indicate that the ambient ground level concentrations will be below the relevant air quality standards for the protection of human health for nitrogen dioxide under maximum and abnormal operation of the facility. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the facility boundary. Emissions at maximum operations lead to ambient NO_2 concentrations (including background concentrations) which are 67% of the maximum ambient 1-hour limit value (measured as a 99.8th%ile) and 32% of the annual average limit value at the respective worst-case receptors.

SO_2, CO, PM_{10} & $PM_{2.5}$

Modelling results indicate that ambient ground level concentrations will be below the relevant air quality standards for the protection of human health for sulphur dioxide, carbon monoxide and PM_{10} under maximum and abnormal operation of the facility. Results will also be below the air quality standard for $PM_{2.5}$ under maximum and abnormal operation of the facility. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the facility boundary. Emissions at maximum operations equate to ambient concentrations (including background concentrations) ranging from 10% - 58% of the respective limit values at the worst-case receptors.

TOC, HCl & HF

Modelling results indicate that the ambient ground level concentrations will be below the relevant air quality guidelines for the protection of human health for TOC (assumed pessimistically to consist solely of benzene), HCl and HF under maximum and abnormal operation of the facility. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the facility boundary. Emissions at maximum operations equate to ambient concentrations (including background concentrations) for HCl and TOC of only 18% and 21% respectively of the ambient limit values.

HF modelling results indicate that emissions at maximum operations equate to ambient HF concentrations (including background concentrations) which will be 6% of the maximum ambient 1-hour limit value and 2% of the annual limit value.

PCDD / PCDFs (Dioxins/Furans)

Currently, no internationally recognised ambient air quality concentration or deposition standards exist for PCDD/PCDFs (Dioxins/Furans). The EU, USEPA and WHO recommended approach to assessing the risk to human health from Dioxins/Furans entails a detailed risk assessment analysis involving the determination of the effect of Dioxins/Furans in terms of the TDI (Tolerable Daily Intake) or TWI (Tolerable Weekly Intake) approach. The EU currently proposes a maximum TWI of between 14 pg WHO-TEQ/kg of body weight per day.

Background levels of Dioxins/Furans occur everywhere and existing levels in the surrounding area have been extensively monitored as part of this study. Monitoring results indicate that the existing levels are similar to rural areas in the UK and Ireland. The contribution from the facility in this context is minor, with levels at the worst-case receptor to the south of the Facility, under maximum and abnormal operation, accounting for only a small fraction of existing levels. Levels at the nearest residential receptor will be minor, with the annual contribution from the proposed facility accounting for less than 1% of the existing background concentration under maximum operating conditions.

PAHs

PAHs modelling results indicate that the ambient ground level concentrations will be below the relevant air quality limit value for the protection of human health under maximum and abnormal operation of the Facility. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the facility boundary. Emissions at maximum operations equate to ambient benzo[*a*]pyrene concentrations (excluding background concentrations) which are only 0.5% of the EU annual average limit value at the worst-case receptor.

Hg

Hg modelling results indicate that the ambient ground level concentrations will be below the relevant air quality standards for the protection of human health under maximum and abnormal operation of the facility. Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the facility boundary. Emissions at maximum operations equate to ambient mercury concentrations (including background concentrations) which are only 0.8% of the annual average limit value at the worst-case receptor.

Cd and Tl

Modelling results indicate that the ambient ground level concentrations will be below the relevant air quality standard for the protection of human health for cadmium under maximum and abnormal operation from the facility. Emissions at maximum levels equate to ambient Cd

and Tl concentrations (including background concentrations) which are 25% of the EU annual limit value for Cd close to the facility boundary (the comparison is made with the Cd limit value as this is more stringent than that for Tl).

Sum of As, Sb, Pb, Cr, Co, Cu, Ni, Mn and V

Modelling results indicate that the ambient ground level concentrations will be below the relevant air quality standards for the protection of human health for arsenic (As), Nickel (Ni) and vanadium (V) (the metals with the most stringent limit values) under maximum and abnormal operation emissions from the facility (based on the ratio of metals measured at a Waste to Energy facility in Carranstown, County Meath). Thus, no adverse effect on public health or the environment is envisaged to occur under these conditions at or beyond the facility boundary. Ambient concentrations have been compared to the annual limit value for As and Ni and the maximum 1-hour limit value for V as these represent the most stringent limit values for the suite of metals. Emissions at maximum operations equate to ambient As and Ni concentrations (including background concentrations) which are 17% and 47% of the EU annual limit value respectively at the worst-case receptor whilst emissions at maximum operations equate to ambient V concentrations (including background concentrations) which are only 0.7% of the maximum 1-hour limit value at the worst-case receptor.

5.6.11 Ecology Results – Proposed Operations

Critical Levels

The Air Quality Standards Regulations 2022 outline an annual critical level of 30 µg/m3 for NOX and a level of 20 µg/m3 for SO2 for the protection of vegetation and natural ecosystems in general. The CAFE Directive (2008/50/EC) defines 'Critical Levels' as "a level fixed on the basis of scientific knowledge, above which direct adverse effects may occur on some receptors, such as trees, other plants or natural ecosystems but not on humans".

An annual critical level of 3 µg/m3 for NH3 for the protection of vegetation and natural ecosystems in general, or a critical level of 1 µg/m3 where lichens or bryophytes are present within an ecosystem is given by the United Nations Economic Commission for Europe and the German Environment Agency (UNECE, 2022).

Critical Loads

A 'Critical Load' is defined by the United Nations Economic Commission for Europe (UNECE) as "a quantitative estimate of an exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge" (UNECE, 2003).

Critical loads are presented as a range, within which there is the potential for effects on sensitive ecological receptors. Critical load ranges for N deposition and acid deposition were derived from the Air Pollution Information System (APIS) website (APIS, 2025) (See Section 8.2.2.2 of Appendix 8.1 in **Appendix 11** to this NIS. Also shown in these tables are the site feature code and name (i.e. the qualifying feature the site is designated for), the corresponding critical load class and EUNIS codes (European Nature Information System (EUNIS) by the European Environment Agency).

Critical loads are only available for internationally designated habitats (SPAs and SACs), and for NHAs.

Critical loads for pNHAs are not defined on the APIS website. In the absence of defined critical loads, and in order to carry out an assessment for pNHAs, the site synopsis for each pNHA (NPWS, 2025) relevant to this assessment was reviewed for its range of habitats. Where possible, pNHA habitats identified from the site synopsis were assigned an equivalent nitrogen deposition or critical load class. These can be derived by searching APIS for the habitat type, rather than a specific site, or by reviewing SACs and SPAs with similar features. Where no equivalent critical load class could be assigned or a site synopsis was not available this has been denoted by “n/a”.

As pNHAs are not fully designated Natural Heritage Areas and therefore have not undergone the same process of qualifying feature identification (which can then be processed by APIS), the critical load classes assigned to pNHA habitats are an interpretation as part of this assessment and may vary from those identified in future should the pNHA become fully designated.

In order to determine the appropriate nitrogen deposition critical load, and in addition to APIS, the EPA publication Research 390: Nitrogen-Sulfur Critical Loads: Assessment of the Impacts of Air Pollution on Habitats (EPA, 2021) was consulted. In Table 3.2 of the publication empirical critical loads of nutrient nitrogen are outlined with a worst-case range of 5-10 kg/ha/yr for most habitat types. In addition, for most habitat types, the EPA publication recommends the midpoint is used to define the critical load (e.g. 7.5 kg/ha/yr). Thus, the mid-range critical load for the worst-case habitat type within the relevant sites have been used to compare with modelled process contributions.

Acid deposition critical loads are further categorised by nitrogen (N) or sulphur (S) components. Modelled acid deposition process contributions are therefore calculated in terms of both nitrogen (N) and sulphur (S) where relevant.

Deposition of sulphur (as sulphate (SO42-)) and nitrogen (as nitrate (NO3-), ammonium (NH4+) and nitric acid (HNO3-)), can cause acidification and both sulphur and nitrogen compounds must be taken into account when assessing acidification of soils. For the purposes of determining links between critical loads and atmospheric emissions of sulphur and nitrogen, critical loads are further derived to produce a maximum critical load for sulphur (CLmaxS), a minimum critical load for nitrogen (CLminN) and a maximum critical load for nitrogen (CLmaxN). These components define the critical load function and when compared with deposition data for sulphur and nitrogen, they can be used to assess critical load exceedances.

The modelled acid deposition process contributions (as N) have been compared to the minimum critical load (N) (MinCLminN). Where a process contribution is greater than 1% of this minimum critical load, the predicted environmental concentration (PEC) should then be calculated by adding the acid deposition background concentration to the process contribution. The PEC should then be compared to the lower end of the maximum critical load (N) range i.e. MaxCLminN. This is in line with the Screening Acidity Critical Loads approach taken by APIS (available as a tab in the APIS app) for designated sites. Notably, APIS does not consider the critical load function to be exceeded unless the PEC is larger than the maximum critical load, not the minimum (which is typically considered worst case).

Appropriate Assessment (AA) & IN2

In October 2024, the EPA published the draft guidance Licence Application Instruction Note 2 (IN2) (DRAFT): Assessing the Impact of Ammonia Emissions to Air and Nitrogen Deposition from EPA licensable activities on European Sites (hereafter referred to as IN2).

IN2 and the flowchart s designed to assist in determining the course of action to be taken when evaluating the impacts on European sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs)) and of ammonia emissions to air and nitrogen deposition from main air emission points at EPA licensable industrial sites (Industrial Emissions, Integrated Pollution Control and Waste), excluding intensive agriculture installations, for the purposes of an Appropriate Assessment (AA). This approach may also be applied to NO_X and SO_2 specifically in the context of AA.

Once permitted, the proposed development will be a licensable facility, the methodology from IN2 and the flowchart steps are considered appropriate for determining ecological impacts from a variety of air pollutant emission sources, and have therefore been applied in this assessment:

1. The installation is not within 250 m of a European site. Proceed to Q2.
2. (i) Is the process contribution (PC) ≤1% of the relevant critical level and critical load at all European sites within the zone of influence, and (ii) can significant in-combination effects be ruled out?

- The PCs for the Cork Harbour SPA are greater than 1% of the relevant critical levels and critical load and therefore, the impact of air emissions at this site have been assessed in further detail. Additionally, the PCs for Lough Beg pNHAs is above 1% of the relevant critical loads for acid deposition. Proceed to Q3.

- Planning applications and the EPA register of Industrial Emissions (IE) licences was reviewed for developments and facilities with the potential for cumulative impact with the proposed development. There are IE licenced facilities within 1 km of the proposed development which operate significant sources of NO_2, and thus a cumulative impact assessment was required.

3. Does modelling indicate that the Predicted Environmental Concentration (PEC) will exceed a critical level and/or critical load for any qualifying interests for European Sites within the zone of influence?

- Nitrogen deposition and acid deposition PECs have been calculated for all European sites where the PC is greater than 1% of the relevant critical load. These are presented in Section 8.2.2.2 of Appendix 8.1 in **Appendix 11** to this NIS. Whether the PECs exceed critical loads and if there are adverse effects to site integrity was determined in consultation with the project ecologist.

As per the IN2 guidance, where a PC is greater than 1% of the critical level, this site has been included in further assessment, where the PEC is determined by combining the background concentration with the PC. If a PC is less than the 1% threshold then the IN2 guidance states *"emissions are not considered to be likely to have a significant effect on European sites. No need to progress to further questions. Submit application to EPA for consideration".* "Further

questions" refers to Question 3 in the IN2 guidance, which states "*Does modelling indicate that the PEC will exceed a critical level and/or critical load for any relevant qualifying interests for European sites within the zone of influence?"*. Calculation of PECs is therefore only technically required if Question 3 requires addressing i.e. if PCs are >1% threshold.

If there are no PCs greater than 1% of the critical level at any of the modelled European sites, no further assessment (i.e. calculation of PEC) is required as per IN2 guidance.

The IN2 process applies specifically to European sites with international designation, namely Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). However, the same approach has been taken to assess the effect of emissions impacts on nationally designated sites such as Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs). SACs and SPAs are protected under the EU Habitats Directive (92/43/EEC), and EU Birds Directive (2009/147/EC) respectively, and are also known as Natura 2000 sites. NHAs are designated under the Wildlife (Amendment) Act 2000, and pNHAs were identified as sites of conservation interest in the 1990s but have not since been statutorily proposed or designated.

The results of this modelling is summarised below, with full details and calculations included in Section 8.2.2.2 of Appendix 8.1 in **Appendix 11** of this report.

NOx – Proposed Operations

The NO_X modelling results for ecological receptors under the Proposed Operations scenario are detailed in Section 8.3.3.1 of Appendix 8.1 in **Appendix 11** to this NIS.

Process contributions (PCs) of NO_X at the ecological receptors within the Zone of Influence (ZoI) were compared to the relevant critical level.

Where a PC is greater than 1% of the critical level, this site has been included in further assessment where the PEC is determined by combining the background concentration with the PC. The potential for adverse effect of these PECs is determined by the project ecologist in the AA.

PCs are greater than 1% of the relevant critical level within the most impacted European site (Cork Harbour SPA). Therefore, at the worst-case location, emissions from the facility lead to an ambient NO_x concentration (including background) which is at most 20% of the annual limit value site over the five years of meteorological data modelled.

PCs are greater than 1% of the relevant critical level within the most impacted national site (Lough Beg pNHA). Therefore, at the worst-case location, emissions from the facility lead to an ambient NO_x concentration (including background) which is at most 19% of the annual limit value site over the five years of meteorological data modelled.

NH_3 – Proposed Operations

The NH_3 modelling results for ecological receptors under the Proposed Operations scenario are detailed in Section 8.3.3.1 of Appendix 8.1 in **Appendix 11** to this NIS.

Process contributions (PCs) of NH_3 at the ecological receptors within the Zone of Influence (ZoI) identified were compared to the relevant critical level.

Where a PC is greater than 1% of the critical level, this site has been included in further assessment where the PEC is determined by combining the background concentration with the PC. The potential for adverse effect of these PECs is determined by the project ecologist in the AA.

PCs are greater than 1% of the relevant critical level within the most impacted European site (Cork Harbour SPA). Therefore, at the worst-case location, emissions from the facility lead to an ambient NH_3 concentration (including background) which is at most 70% of the annual limit value site over the five years of meteorological data modelled.

PCs are greater than 1% of the relevant critical level within the most impacted national site (Lough Beg pNHA). Therefore, at the worst-case location, emissions from the facility lead to an ambient NH_3 concentration (including background) which is at most 70% of the annual limit value site over the five years of meteorological data modelled.

SO_2 – Proposed Operations

The SO_2 modelling results for ecological receptors under the Proposed Operations scenario are detailed in PCs are greater than 1% of the relevant critical level within the most impacted European site (Cork Harbour SPA). Therefore, at the worst-case location, emissions from the facility lead to an ambient SO_2 concentration (including background) which is at most 5% of the annual limit value site over the five years of meteorological data modelled.

PCs are greater than 1% of the relevant critical level within the most impacted national site (Lough Beg pNHA). Therefore, at the worst-case location, emissions from the facility lead to an ambient SO_2 concentration (including background) which is at most 5% of the annual limit value site over the five years of meteorological data modelled.

Process contributions (PCs) of SO_2 at the ecological receptors within the Zone of Influence (ZoI) identified were compared to the relevant critical level.

PCs are greater than 1% of the relevant critical level within the most impacted European site (Cork Harbour SPA). Therefore, at the worst-case location, emissions from the facility lead to an ambient SO_2 concentration (including background) which is at most 6% of the annual limit value site over the five years of meteorological data modelled.

PCs are greater than 1% of the relevant critical level within the most impacted national site (Lough Beg pNHA). Therefore, at the worst-case location, emissions from the facility lead to an ambient SO_2 concentration (including background) which is at most 5% of the annual limit value site over the five years of meteorological data modelled.

Nitrogen Deposition – Proposed Operations

In order to consider the effects of nitrogen deposition (as N) owing to emissions from the facility on ecological receptors, the maximum annual mean NO_2 process contribution concentrations (PC) are converted into the dry deposition fluxes and then nitrogen deposition fluxes (as described in **Appendix 11** to this NIS.

Process contributions (PCs) of nitrogen deposition at ecological receptors were compared to the relevant critical load.

Where a PC is greater than 1% of the lowest critical load, this site has been included in further assessment where the PEC is determined by combining the background concentration with the PC. The potential for adverse effect of these PECs is determined by the project ecologist in the AA.

PCs are greater than 1% of the worst-case critical load within the most impacted European site (Cork Harbour SPA). Therefore, at the worst-case location, the maximum nitrogen

deposition level is 5.954 kg/ha/yr. This is within the critical load range of 5-10 kg/ha/yr for the most sensitive feature Pioneer, low-mid, mid-upper saltmarshes and below the midpoint critical load of 7.5 kg/ha/yr.

PCs are greater than 1% of the worst-case critical load within the most impacted national site (Lough Beg pNHA). Therefore, at the worst-case location, the maximum nitrogen deposition level is 6.032 kg/ha/yr. This is within the critical load range of 5-10 kg/ha/yr for the most sensitive feature Pioneer, low-mid, mid-upper saltmarshes and below the midpoint critical load of 7.5 kg/ha/yr.

Acid Deposition – Proposed Operations

In order to consider the effects of acid deposition (as N) owing to emissions from the facility on ecological habitat sites, the maximum annual mean NO_2 and NH_3 process contribution concentrations (PC) are converted into the dry deposition fluxes and then acid deposition fluxes.

Process contributions (PCs) of acid deposition (as N) at ecological receptors were compared to the relevant critical load.

Where a PC is greater than 1% of the lowest critical load, this site has been included in further assessment where the PEC is determined by combining the background concentration with the PC. The potential for significant effect of these PECs is determined by the project ecologist in the AA.

PCs are greater than 1% of the worst-case critical load within the most impacted European site (Cork Harbour SPA). Therefore, at the worst-case location, the maximum total acid deposition (as N) flux is 0.439 keq/ha/yr. This is within the maximum critical load range of 0.714 – 5.962 keq/ha/yr for the most sensitive feature *Calcareous grassland (using base cation).*

PCs are greater than 1% of the worst-case critical load within the most impacted national site (Lough Beg pNHA). Therefore, at the worst-case location, the maximum total acid deposition (as N) flux for the worst-case year is 0.445 keq/ha/yr. This is within the maximum critical load range of 0.714 – 5.962 keq/ha/yr for the most sensitive feature *Calcareous grassland (using base cation)*.

In order to consider the effects of acid deposition (as S) owing to emissions from the facility on ecological habitat sites, the maximum annual mean SO_2 process contribution concentrations (PC) are converted into the dry deposition fluxes and then acid deposition fluxes.

Process contributions (PCs) of acid deposition (as S) at ecological receptors were compared to the relevant critical load.

Where a PC is greater than 1% of the lowest critical load, this site has been included in further assessment where the PEC is determined by combining the background concentration with the PC. The potential for adverse effect of these PECs is determined by the project ecologist in the AA.

PCs are greater than 1% of the worst-case critical load within the most impacted European site (Cork Harbour SPA). Therefore, at the worst-case location, the maximum total acid deposition (as S) flux for the worst-case year is 0.404 keq/ha/yr. This is within the maximum critical load range of 2.241 – 5.247 keq/ha/yr for the most sensitive feature *Calcareous grassland (using base cation)*.

PCs are greater than 1% of the worst-case critical load within the most impacted national site (Lough Beg pNHA). Therefore, at the worst-case location, the maximum total acid deposition (as S) flux for the worst-case year is 0.404 keq/ha/yr. This is within the maximum critical load

range of 2.241 – 5.247 keq/ha/yr for the most sensitive feature *Calcareous grassland (using base cation)*.

5.6.12 Conclusion on modelling

Based on the emission guidelines outlined in Council Directive 2010/75/EU, detailed air dispersion modelling has shown that the most stringent ambient air quality standards for the protection of human health are not exceeded either as a result of operating under maximum or abnormal operating conditions.

The modelling results, using both the USEPA regulatory model AERMOD and the more advanced CALPUFF model, indicate that the maximum ambient Ground Level Concentrations occurs at or near the facility's boundary. The spatial effect of the facility is limited with concentrations falling off rapidly away from the maximum peak. For example, the short-term limit values at the nearest residential receptor will be less than 6% of the short-term ambient air quality limit values. The annual average concentration has an even more dramatic decrease in maximum concentration away from the facility with concentrations from emissions at the proposed facility accounting for less than 1% of the limit value (not including background concentrations) at worst case sensitive receptors near the facility.

In the surrounding areas of Cobh, Carrigaline and Monkstown, levels are significantly lower than most background sources with the concentrations from emissions at the proposed facility accounting for less than 1% of the annual limit values for the protection of human health for all pollutants under maximum operations of the facility.

In terms of Ireland's obligations under the Gothenburg Protocol and the POPs Convention, the effect of the facility will not be significant.

Ecological modelling indicates that all air emissions are within critical loads ranges. Therefore, predicted emissions are below the range where habitats within Cork Harbour SPA will be impacted. In conclusion, no adverse effects on receptors within Cork Harbour SPA are predicted to occur as a result of air emissions.

5.6.13 Mitigation by design

A number of measures have been incorporated into the design of the proposed development to ensure that emissions from the plant do not exceed regulatory emission limit values as outlined in Industrial Emissions Directive 2010/75/EU. In addition, the stack height has been designed in an iterative fashion in order to ensure that ambient ground level concentrations are minimised.

Air modelling predictions indicate that ambient air quality levels from the proposed development will be within the ambient air quality standards at all locations beyond the proposed development site boundary, based on maximum and abnormal operating conditions. Thus, no specific additional mitigation measures are required during the operational phase of the proposed development. Based on the above, no adverse in-combination effects to the integrity, special conservation interests and conservation objectives for the Cork Harbour SPA will occur from air emissions during operation of the proposed development.

5.6.14 Summary of Sediment and Soil Survey

The report Sampling and analysis of soil and sediment samples for PCDDs, PCDFs and PCBs at various locations around Cork Harbour (AWN, 2019) is attached as **Appendix 14** of this report.

Soil and sediment sampling was conducted at 12 locations in the Cork Harbour Area and at EPA Iniscarra, with the aim of determining background concentrations of PCDD, PCDF and dioxin-like PCBs in the vicinity. Three of these sites are within the Cork Habour SPA. Samples were analysed for dioxins and furans with results compared to previous data recorded by AWN and EPA sampling in 2000.

The primary aims of the sampling programme carried out by AWN were as follows (where site refers to the proposed Resource Recovery Centre):

- Establish the current concentrations of PCDDs, PCDFs and dioxin-like PCBs in soil and sediments in the vicinity of the site;
- Discuss the relevance of recorded concentrations of PCDDs, PCDFs and dioxin-like PCBs; and
- Compare recorded concentrations in this round with soil and sediment dioxin and furan concentrations obtained for the site by AWN in 2001, 2008, 2009 and historically by the EPA and Cork County Council. As this report is concerned primarily with potential impacts on the Cork Harbour SPA, the sediment sampling programme is relevant. The sediment sampling sites are indicated in the full report **(Appendix 14)** and, as far as the Cork Harbour SPA is concerned, were located as follows:
    - Beach 1A, Strand at Whitegate Village (more than 3km east of the proposed development) within the Cork Harbour SPA
    - Beach 2A, Ringaskiddy – Gobby Beach adjacent to road to Haulbowline Island
    - Beach 3A Mud Flats at Buncoille (Monkstown) (circa 2.5km northwest of the proposed development) within the Cork Harbour SPA
    - Beach 4A Mud flats in bay west of Hovione plant at Loughbeg, (circa 900m southwest of the proposed development) within the Cork Harbour SPA.

By sampling in these areas, PCDD/F concentrations in the sediment of these designated areas can be determined and used to whether there will be any adverse impacts on species which may breed, feed, roost or winter in the SPA. In addition, all sediment sampling sites chosen were in areas of muddy sediment which can provide bird feeding habitats and which are known, or which have an apparent potential, to accumulate contaminants. Details on the sampling methodology and assumptions which were required when assessing results are included in **Appendix 14**.

The results of sediment sampling shows that PCDD/F concentrations in beach sediments were generally higher in the 2015 sampling event than in the 2009 event, with the exception of levels at location Beach 2A which reduced from 0.035 ng/kg to 0.015 ng/kg. The concentration at Beach 1A in Whitegate Village was significantly higher in 2015 with an increase in concentration of more than ten times that of 2009.

There are no Irish statutory threshold values for PCDD/F or dioxin-like PCBs in soils or sediments. However, there are Dutch Target and Intervention values assigned to sum value of the EC7 PCB congeners and in the absence of Irish guidance, these values are typically used. The Dutch Government have set a national target value of 20 µg/kg PCB in soil and a threshold value (the concentration above which remedial action should be considered) of 1000 µg/kg. The highest measured concentration in soil in the Cork Harbour area in the 2015 sampling round was 0.113 ng/kg at Location 3A (Martello Tower) which is well below even the target value, therefore the recorded concentrations can be considered as insignificant.

The UK EA published a document in 2004 entitled "UK Proposed Environmental Quality Guidelines for Dioxins and Furans in Water and Sediments" which applies the concept of using a 2000 ng/kg as a TEQ x fraction of organic carbon to determine an appropriate limit value for dioxin concentration in sediments. When the measured concentrations are compared against the limit value they are all shown to be less than the assigned limits.

The AWN 2015 report concluded as follows:

"Background concentrations of PCDD/Fs in soil samples were found to be reduced from samples measured at similar locations in 2001 and 2008. The concentration at Martello Tower (Location 3A) continues to be elevated above locations and in this recent round, the total PCDD/F concentration at Roche's Point Lighthouse (Location 7A) was found to be highest with a TEQ of 0.802 ng/kg. Dioxin-like PCB concentrations were typically similar to recorded concentrations in 2008 and remain well below Dutch limit value concentrations. TEQ PCDD/F concentrations in beach sediment samples were shown to be slightly higher at three out of the four sampling locations in 2015 with the most elevated concentration (0.485 ng/kg) recorded at the strand in Whitegate Village to the east of the site (Beach 1A). PCDD/F concentrations in sediments were still well below UK EA limit values, however. TOC and pH values were within expected ranges with slight alkalinity in the sediment samples as expected in marine conditions. Heavy metal concentrations were recorded at each of the twelve locations with highest lead (110 mg/kg) and zinc (140 mg/kg) concentrations recorded at Locations 4A and 2A, respectively."

5.6.15 Ecological Risk Assessment

An ecological risk assessment report was prepared by AWN which specifically considers the risk to piscivorous birds and otter within Cork Harbour. (Ecological Risk Assessment for PCDD/F for Indaver Ringaskiddy Resource Recovery Centre (AWN, 2019). This report is attached as **Appendix 15.**

The risk assessment approach taken was that presented by the US EPA in the documents: Framework for the Application of the Toxic Equivalency Methodology, Polychlorinated Dioxins, Furans and BiPhenyls in Ecological Risk Assessment, US EPA 2003 1 and Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities, US EPA, 1999 2.

The approach taken was as follows:

- Model baseline impact of existing background dioxin with respect to predicted concentration in bird egg and concentration in forage fish in otter diet. The bird species focused on were cormorant and common tern.

- Model worst case theoretical increase due to PCDD/F emissions from the waste-toenergy facility,
- Model impact of predicted sediment concentration on selected species
- The receptor location for sediment concentration was in front of Whitegate Village (Beach 1A), which had the highest background levels.
- The baseline calculation for both gull eggs and otters follows the relevant equations from the Framework Application Document above as follows:

  C (fish eating bird egg) = (Cs/Foc) x BSAF (egg) x fl(egg)

  Where

  C (fish eating bird egg) is dioxin concentration (pg/g)

  Cs is dioxin concentration in sediment (pg/g)

  Foc is fraction of organic carbon in sediment

  BSAF is the Biota-sediment accumulation factor

- The increase in dioxin concentration in sediment resulting from airborne dioxin deposition was estimated using a very conservative approach, which was to assume that the maximum dioxin deposition rate from the waste-to-energy facility, which is predicted to be close to the boundary of the facility, would, for the purposes of the model, impact on the chosen sample point (beach B1A, which in reality is more than 3 km to the east of the waste-to-energy facility site), so deposition is likely to be many times lower than that modelled. It was also assumed that the sediment in question was permanently exposed to the atmosphere, whereas in reality the sediments will be covered by the tide for much of the day. The modelled increase was determined using deposition data modelled by AWN and the MARI model for soil dioxin.

The ecological risk assessment report concluded the following:

- Baseline dioxin concentrations in the eggs of fish-eating birds and in otters considered to be low and well within limit values for the eggs of fish eating birds.
- The predicted change in dioxin concentrations is considered to be insignificant for both fish-eating birds' eggs and otters, based on exposure to forage fish.

5.6.16 Possible impacts on the environment from emissions of dioxin and mercury with a particular emphasis on bio-accumulation in piscivorous birds

There is considerable public, scientific and regulatory concern over the possible adverse health effects of chronic exposure to trace levels of persistent organic pollutants and heavy metals. Persistent organic pollutants (POPs), including polychlorinated dibenzo para dioxins (PCDDs; dioxins) and polychlorinated dibenzofurans (PCDFs; furans), hexachlorobenzene (HCB), polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs), are directly toxic to human health, animals and plants. These bio-accumulative compounds are of particular concern because of their possible carcinogenic, immunological and reproductive effects, and their potential impact on human development. Eliminating POPs is therefore a key goal of environmental action at EU and international levels. The polychlorinated dibenzo-p-dioxins (PCDDs) and furans (PCDFs) were unintentionally produced and released from a range of human activities. A detailed literature review has been carried out to examine published literature on the impact POPs on piscivorous birds and mammals (**Appendix 3**).

Historically dioxin and mercury emissions from incinerators have been the cause of much public concern. However, the implementation of the EU Waste Incineration Directive 2000/76/EC and the Clean Air Act in the US has led to large reductions in incinerator emissions across the developed world. In Ireland dioxin levels are currently significantly less than applicable limits and are considered as low background levels in European terms.

Laboratory studies on birds and mammals have found an array of negative effects from dioxins and heavy metals. While a number of studies have attempted to replicate these effects in the wild, in areas which are heavily polluted, the results have been inconclusive. In one study, uptake of dioxins in the bird population resident near a waste incinerator were not increased in the ten years following the facility's opening. One complication of feeding animals diets containing fish collected from contaminated waters, appears to be that other unaccounted for contaminants can influence the overall toxicity of the mixture. While gaps in the research exist, between lab and field based studies, it does appear that the impact of polluted sediments on animals is complex. The complexities of examining individual and combination effects of dioxins, PCBs and heavy metals in the field seem, at present, to be beyond the reach of researchers. However, it does appear that the contribution of waste incineration to these pollutants has decreased significantly. In the years since strict legislation governing waste incineration has been implemented, mercury concentrations in bird feathers has dropped significantly alongside declines in mercury inputs from industrial sources.

5.6.17 Additional information requested by the NPWS during consultation in relation to possible emission impacts (See section 4.4)

During consultation with the NPWS, information was sought in relation to particular issues that relate to the possible impacts of emissions from the proposed facility on Natura 2000 sites. These are addressed in **Appendix 2** and the responses are summarised below. The NPWS information requirements are as follows:

- Comparative data from similar waste-to-energy incinerator facilities (Point 3 of DAU letter).
- Information on plant start-up and shut-down procedures including frequency of startup and shut-down, and emergency response procedures (Requested at the NPWS meeting, May 2015).
- Review of potential bio-monitoring programmes (Requested at the NPWS meeting, May 2015).
- Information on air emission monitoring data from Indaver's plant at Carranstown, Co Meath. (Requested at the NPWS meeting, May 2015).
- Effects of hazardous compounds (Point 8 of DAU letter).

5.6.18 Conclusions – Impacts on piscivorous birds from air emissions and possible bioaccumulation

In determining the potential impact from emissions and bioaccumulation, the following points were taken into consideration:

- In line with the Industrial Emissions Directive, Directive 2010/75/EC, best available techniques (BAT) are required to be used in pollution prevention and control. BAT have been incorporated into all aspects of the design of this project.
- The facility will be operated under an industrial emission licence. Indaver must implement an environmental management system to manage and control all aspects of the operation.
- Within the incineration process, a hazardous substance that is fed into the furnace does not come out unchanged as the same hazardous substance, either in the residues or in the exhaust gases. In the furnace the hazardous substance is oxidised which means it under goes a chemical reaction and is converted into one or more different substances with different properties. These different substances are removed in the ash or flue gas cleaning residues and a very small quantity is discharged to the air in the exhaust gases. Activated carbon consists of small, porous carbon particles, which due to their porosity have a very large surface area. The large surface area will adsorb heavy metals and trace levels of organics present in the flue gas, such as dioxins, furans, Polycyclic Aromatic Hydrocarbons (PAHs) and hydrocarbons. These carbon granules and other particulates, such as dust, will then be removed by filtration as the flue gases pass through the baghouse filter. The activated carbon/clay mixture will work in a similar manner to activated carbon and the activated carbon/clay mixture will contain a minimum of 10 % activated carbon. This is to ensure the adsorption of heavy metals and mercury.
- Potential impacts on air quality have been comprehensively addressed. This appraisal reviewed background information on ambient air quality, potential cumulative impacts, identified significant substances which could arise from the facility, identified suitable models and used the two most appropriate models to predict the concentrations at ground level by reference to stringent air quality standards. Modelling was based on conservative assumptions which overestimate the impact of the facility. Notwithstanding these conservative assumptions it was concluded that '*Air modelling predictions indicate that ambient air quality levels from the proposed facility will be within the ambient air quality standards at all locations beyond the site boundary, based on maximum and abnormal operating conditions.*'
- Soil and sediment sampling was conducted at 12 locations in the Cork Harbour Area with the aim of determining background concentrations of PCDD, PCDF and dioxinlike PCBs in the vicinity. Samples were obtained from areas of muddy sediments where birds will feed and 3. Sediment sampling locations were located within the Cork Harbour Special Protection Area (SPA). Background concentrations were found to be below the Dutch limit value concentrations and UK Environment Agency limit values.
- A literature review concluded that dioxins and mercury can impact on birds and mammals. However, the implementation of the EU Waste Incineration Directive 2000/76/EC and the Clean Air Act in the US has led to large reductions in incinerator emissions across the developed world. In the years since strict legislation governing waste incineration has been implemented, mercury concentrations in bird feathers has dropped significantly alongside declines in mercury inputs from industrial sources.
- Since 1995, the Irish EPA have regularly monitored dioxin levels in cow's milk. The primary mechanism for dioxins entering the food chain is through atmospheric deposition. Therefore cow's milk is seen as a suitable means of assessing the presence of dioxins in the environment, since cows tend to graze over relatively large areas and these compounds will, if present, concentrate in the fat content of the milk. Levels of dioxins in cow's milk have been consistently low since the surveys began. According to Ireland's EPA (2021) the main source of dioxins is illegal burning of waste.

Dioxin concentrations, as in recent years, were well below European limit values i.e. 2.5pg WHOTEQ/g for dioxins only, and 5.5pg WHOTEQ/ g for dioxins and PCBs combined (Concannon, 2014). The EPA results are in line with results from Cork County Council's animal health surveillance programme, which has been operating in the Cork Harbour Region since 1991 (Buckley et al., 2013). The Cork Harbour report found dioxin, furan and PCB levels were significantly less than the applicable limits. This study, which began in 2005 and is still ongoing, found dioxins and furan levels remained generally stable at values considered as low background levels in European terms. AWN Consulting AWN obtained the EPA data for the Ringaskiddy area, for the time period 2013 to 2023. This data indicates that the PCDD/F and PCB concentrations in milk (and hence in the general environment) over the time period 2013 to 2023 have remained practically unchanged and are considered to be low, at 6 to 8% of the limit value for PCDD/F in milk (See **Appendix 14** for details).

- An Ecological Risk Assessment concluded that the baseline dioxin concentrations in the eggs of fish-eating birds and in otters considered to be low and well within limit values for the eggs of fish-eating birds. The predicted change in dioxin concentrations is considered to be insignificant for both fish-eating, bird's eggs and otters, based on exposure to forage fish.
- A review of the start-up and shut down processes and procedures has concluded that the risk of poor performance with respect to dioxins during start-up and shut down of the furnace will be effectively prevented.
- The closest part of the Cork Harbour SPA is located c.405m from the site boundary and the area of shoreline which adjoins the site boundary is not of high value for birds listed as special conservation interests for this SPA.
- Based on the above, and taking possible in-combination impacts into consideration, there will be no adverse effects on the conservation objectives of the Cork Harbour SPA arising from any emission from the proposed waste-to-energy facility. Similarly, given the low background levels and the low concentrations of toxic substances in emissions, the risk that significant bioaccumulation will occur is considered imperceptible. Therefore, there will be no adverse effect on the integrity, special conservation interests and conservation objectives for the Cork Harbour SPA from emissions, including in-combination emissions and possible bioaccumulation.

5.7 Implementation of Mitigation measures

5.7.1 Implementation of mitigation measures - evidence of how these will be secured and implemented and by whom and evidence of how measures will be monitored and should mitigation failure be identified how that failure will be rectified.

There will be an Indaver contract management team (comprising Indaver staff) on site for the duration of the construction phase. The team will supervise the construction of the works including monitoring the contractor's and the PSCS's performance to ensure that the proposed construction phase mitigation measures are implemented, and that construction effects and nuisance are minimised.

5.7.2 Implementation of mitigation measures - evidence of degree of confidence in their likely success.

The proposed mitigation measures are tried and tested on many construction projects and their efficacy is proven. The likely success of the proposed mitigation measures is high, either in their current form or as they will be adapted on-site to achieve the desired result. The

measures incorporated into the project design and mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage. It is clear in what the mitigation measures are designed to achieve in lowering or reducing the risk of impact to acceptable levels. Whilst the proposed methods of mitigation may be amended and supplemented the risk that the mitigation measures will not function effectively in preventing adverse impacts on designated sites is low.

5.7.3 Implementation of mitigation measures - timescale, relative to plan or project for their implementation or completion.

The timescale for implementation of the mitigation measures will be dependent on the construction programme of the proposed development. However, based on evidence from other projects, the mitigation measures can only commence in tandem with other site operations as staff, machinery and other resources are necessary to implement the measures. Certain mitigation measures will have to be undertaken in advance of certain construction works, while others can proceed in parallel and others will only be necessary following completion of the main site works.

5.8 Biomonitoring

The NPWS requested that the potential benefits and practicality of a bio-monitoring programme for mercury and dioxin levels within birds in Cork Harbour during operation of the facility be assessed. Specifically, the use of bird feathers and eggs of piscivorous birds was considered as a potential mechanism for assessing possible bioaccumulation. A review including a literature review was carried out to assess the viability of such a bio-monitoring programme (**Appendix 6).**

5.8.1 Conclusion of bio-monitoring review

A notable method for examining the impact of pollutants in the wild is bio-monitoring. While studies on heavy metals, in particular mercury, are well established, non-invasive biomonitoring for dioxins is still relatively new. Bird feathers and eggs have been successfully used to monitor mercury levels in birds for many years. In the case of dioxins, bird livers and muscle are commonly used, although a number of studies have successfully used eggs to monitor contamination levels. However, other factors, including age, sex, time of year, migratory status and, in the case of eggs, laying sequence, will affect the levels of mercury or dioxins detected. Therefore, using such techniques to monitor mercury patterns in a single area, or from a single source (in this case the proposed development) appears very difficult if not impossible.

Indaver contacted representatives of the waste-to-energy industry in the UK, Ireland, Germany, Belgium and The Netherlands but found no evidence for a biomonitoring programme instigated by a specific incinerator. The general consensus was that such programmes are not required due to the low emission levels and the low potential for impacts.

The predicted levels of dioxins and mercury generated by the facility will be low and no significant impact on piscivorous bird species is predicted. Given the difficulties inherent in determining the source of dioxins and mercury in piscivorous birds and the difficulties in ascribing levels to any particular source, the use of cows' milk is considered an adequate means of determining if problematic levels of dioxins are entering the food chain via

atmospheric deposition. The EPA conducts such monitoring of dioxin in cow's milk in Ireland, including in the Ringaskiddy area.

6. Conclusions of the Natura Impact Statement

The Stage One Screening appraisal contained in this report considered the potential for significant impacts arising from the proposed development on Natura 2000 sites within a 20km radius. Following screening, the only Natura 2000 site for which potential significant impacts have been identified is the Cork Harbour SPA, which is located approximately c.405m from the proposed development site at its closest point.

Impacts which were considered to have the potential to impact on the Cork Harbour SPA related to disturbance during construction and operation, a possible fire in the bunker during operation, impacts on the marine environment during construction and operation, the collision risk to birds created by the stack during operation and the potential for emissions of substances with eco-toxicological effects and possible bioaccumulation through the food chain. Potential in-combination impacts were also considered.

A range of precautionary measures have been incorporated into the design of the proposed development, and other mitigation measures have been developed and proposed, with the purpose of avoiding or minimising impacts on the qualifying interests and conservation objectives of the Cork Harbour SPA, which is located c.405m from the proposed development site. The likely success of these measures was also considered and no particular difficulties in their effective implementation were identified.

The provisions of Article 6 of the 'Habitats' Directive 92/43/EC (2000) defines 'integrity' as the 'coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and / or population of species for which the site is or will be classified'. *The draft documents Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (Draft)* (EC, 2015) states that the integrity of the site can be usefully defined as the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated"

Following a comprehensive evaluation of the potential direct, indirect and in-combination impacts on the qualifying interests and conservation objectives for the Cork Harbour SPA, it has been concluded that the proposed development will not have an adverse effect on the integrity of the Cork Harbour SPA.

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