Greenore Port Unlimited Company

Proposed Greenore Port Operations and Maintenance Facilities at Greenore Port, Greenore, Co. Louth

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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CHAPTER 1
INTRODUCTION

VOLUME II
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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1 Introduction

This Environmental Impact Assessment Report (EIAR) sets out the results of the environmental assessments which have been completed for the proposed development to inform the planning consent process.

The assessment has been completed as a statutory environment assessment. The environmental impact assessment process has been completed in line with Directive 2014/52/EU, based on the guidance presented in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA 2022).

EIA is a process for anticipating the effects on the environment caused by a development. The document produced as a result is termed the EIAR. Article 1(2)(g) of the 2014 Directive (2014/52/EU) states that:

> *"Environment impact assessment" means a process consisting of:*
>
> *(i) The preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2).*
>
> *(ii) The carrying out of consultations as referred to in Article 6 and, where relevant, Article 7.*
>
> *(iii) The examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7.*
>
> *(iv) The reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and*
>
> *(v) The integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a."*

The EIAR is a presentation of the potential environmental impacts of the proposed development with a focus on significant impacts.

Chapter 1 introduces the project and described the scope and methodology of the EIA process. The consultation process which was undertaken is outlined and the competencies of the environmental assessment team are provided.

1.1 The Applicant

The Applicant, **Greenore Port Unlimited Company** is a wholly owned subsidiary of Doyle Shipping Group (DSG). DSG acquired Greenore Port in December 2014. Greenore Port is Ireland's only privately owned commercial port.

DSG is the largest independent provider of shipping agency services and logistics in Ireland, providing a range of marine services including importing and exporting goods, shipping agency, chartering, freight shipping, logistics, project cargo terminal management, warehousing, ship repair, tug hire and passenger ferries. The company has a dedicated workforce of over 600 people and has offices and warehouses in all the major Irish ports, including Dublin, Belfast and Foynes, and owns and operates three private port facilities: Cork Dockyard and Passage West in Cork Harbour and Greenore Port in Louth.

Greenore Port employs 41 people and provides marine and logistical support for sectors including, agricultural feed, construction, renewable energy, livestock exports and manufacturing industries.

Under previous management Greenore Port had suffered a prolonged period of sustained under investment and Greenore Port's immediate priority was to undertake works to improve the neglected infrastructure. To date, DSG have invested €20 million in Greenore Port since taking ownership and envisage further substantial investments in the future. Further details on the Applicants, the workings of Greenore Port and their future vision is contained in the **Greenore Port Vision 2024** document submitted with this application.

1.2 Reference to Guidelines Relevant to Discipline

This chapter has been prepared having regard to the following guidelines:

- Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency (EPA), May 2022).
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).
- EU Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (EU, 2017).
- EU Environmental Impact Assessment of Projects: Guidance on Scoping (EU, 2017).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (OPR,2018).

1.3 Brief Project Description

A detailed description of the project is provided in Chapter 2. To summarise, the applicant seeks permission for Operation and Maintenance (O&M) Facilities which will serve as the support base for offshore wind arrays. In general, it will comprise of landside and marine side works, with Three individual combined warehouse and office units landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required. The proposed development will involve ancillary facilities including carparking, upgrade works to quay deck and quay wall and all associated site and development works. A ten-year permission is sought.

Figure 1.1 Site Layout (extract from Drg.No. 2100, prepared by CSEA)

1.4 Proposed Development Site

1.4.1 The Site

The application site (c.4.88ha) is located at Greenore Port and Shore Road, Greenore, Co. Louth.

The site is generally located northwest of Greenore village and is within the Port complex. Part of the site is located on Shore Road, a vacant residential dwelling. This part of the site is to the rear of No.'s 7-15 Euston Street, with a pedestrian link to the rear of No.'s 1-7 Euston Street.

The proposed scheme is distributed over several individual plots. These plots comprise of:-

i. **'Terrestrial Port Area'**, (c.1.9ha) which includes, a port commodity warehouse (former open hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.

ii. '**Nearshore Environment'** (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.

iii. '**Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road. Eircode - A91DD42

iv. **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

See Figure 1-2 for a general location plan of the plots identified above.

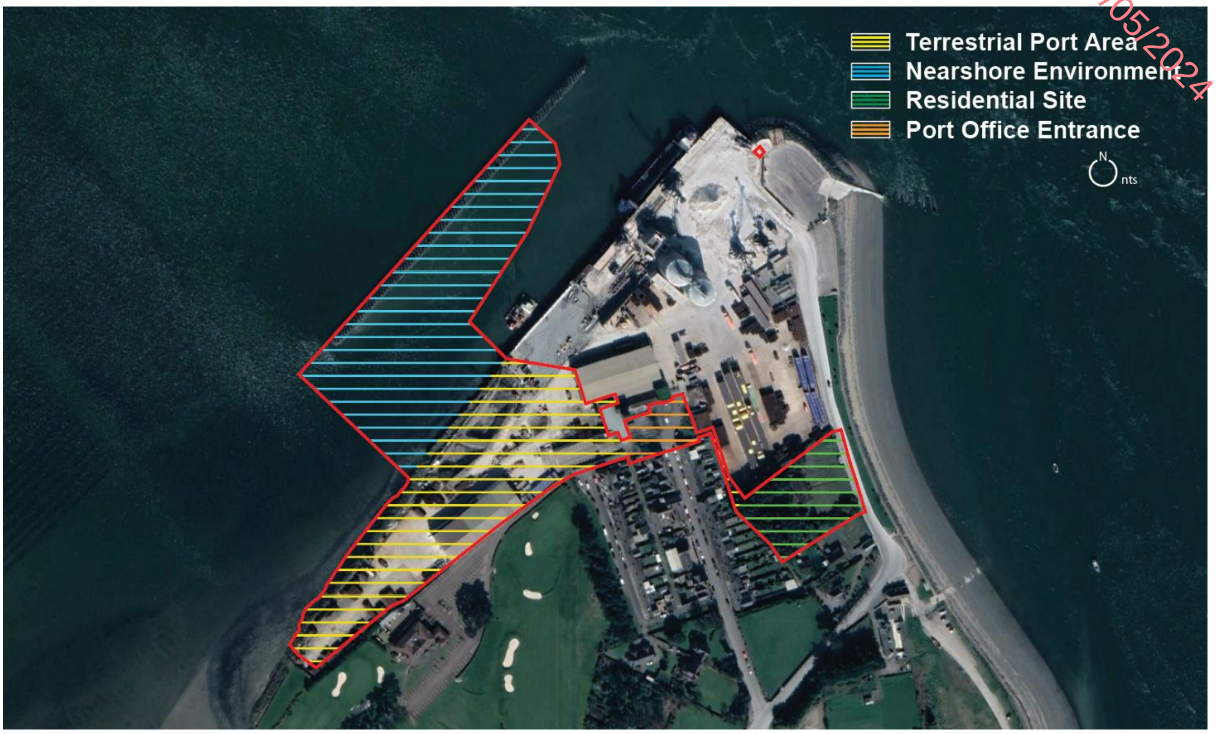

Figure 1.2 General Location Plan

1.4.2 Existing Structures

The subject site comprises several existing structures, the largest of which is a warehouse (1,607sqm Groos Floor Area (GFA)). This warehouse, located at the western side of the subject site, is known as the former Open Hydro building and is currently used by Greenore port for storing port commodities, c.6,000 tonnes of dry bulk goods including animal feed.

At the port office entrance, at the northern end of Euston Street, a part of the existing port office accommodation, the Sea Farer's room, is included within the application boundary.

Furthermore, a brick wall associated with the engine shed of the former Greenore Railway station and a ESB Substation and switch room are located immediately to the west of the existing port offices.

Additionally, the subject site comprises Berth 3 which consists of a number of degenerated caissons.

A vacant residential dwelling is located at the site on Shore Road.

The primary entrance to the site is via the former entrance to the Open Hydro building. All HGV traffic associated with the port enters and exits via the Shore Road entrance.

There is no record of any protected structure, archaeological or cultural heritage features within the application site area.

1.4.3 Surrounding Context

The site is situated within and immediately adjoining Greenore Port. It is bounded to the east by established harbour related development in Greenore Port; to the south and west by Greenore village and Greenore Golf Club and to the north and west by Carlingford Lough.

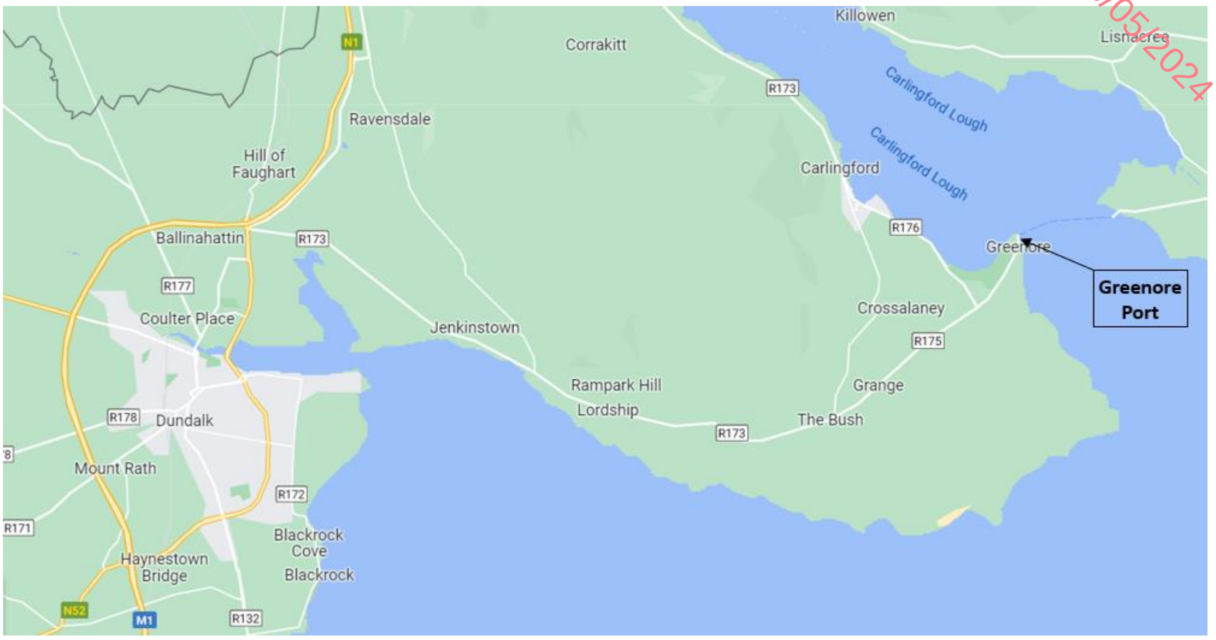

Figure 1.3 Greenore Port and surrounding area (Source: Google Maps, Edited by MHP)

1.4.3.1 Greenore Port

Greenore Port is the second largest port in the County, and is Ireland's only privately owned commercial port. The original port was constructed in 1867, located on a promontory extending northwards from the Cooley Peninsula, with Carlingford Lough to the west, north and east. It provides marine and logistical support for sectors including, agricultural feed, construction, renewable energy, livestock exports and manufacturing industries. The port contains two berths with the capacity to handle c40,000 gross tonnes per annum in addition to berth 3. A ferry service across Carlingford Lough to Greencastle, Co. Down commenced in 2018 from a smaller additional berth on the promontory.

Greenore port is strategically located roughly mid-way between Dublin and Belfast at the entrance to Carlingford Lough on the eastern end of the Cooley Peninsula and is connected to the M1 motorway by 15km of uncongested R175 regional route, making the Port one of the one most easily accessible ports in the country (see Figure 2).

The Port is accessed either by Euston Street or Shore Road, with the latter providing for all HGV trips to and from the port as part of operational procedures. The application area is bounded to the south by Greenore Village and Golf Club and to the south west and east by established harbour related activity.

There are 3 no. protected structures within the wider Greenore Port landholding, as shown in Figure 4 below:

1. LHS009-001 | Watertower | An attached three-stage stone water tower, built located south of the proposed development area, built c.1840. Canted bay windows and projecting hipped porch to east elevation and a three-bay two-storey kitchen wing to the west.

2. LHS009-043 | Greenore Lighthouse | A freestanding two-stage lighthouse built in 1830 with a circular-plan and taper profile. Currently not in use, located east of the proposed development.
3. LHS009-044 | Greenore Lighthouse Keeper's House | A detached three-bay single-storey structure of which the attic was a former lighthouse keeper's dwelling - built c. 1830. Currently not in use, the structure is located east of the proposed development.

1.4.3.2 Greenore Village

Greenore village is located on the eastern end of the Cooley Peninsula, at the entrance to Carlingford Lough. It is c.3.7km west of Carlingford and c.15km the M1 Dublin-Belfast Motorway. The town is situated in close proximity to the border c. 12km with Northern Ireland.

This is a planned village which was constructed in the 19th century to provide homes for dock and railway workers. The village lies to the southwest of the application area and is centred on two parallel streets - Euston Street and Anglesey Street. Euston Street comprises a terrace of 29 two-storey dwellings. It also includes a café and interiors shop in the former National Schol and Greenore Railway / Maritime Museum and café in the co-operative building. Anglesey Street is single sided with a terrace of 15 two storey dwellings facing south-west towards the golf club.

The population of the village and hinterland recorded in the 2022 Census is 306 persons (Source – Census 2022, Greenore Small Area). Refer to Chapter 4 for further details on population.

Further to the southeast, there is a mix of uses including industrial port areas operated by Greenore Port and commercial premises operated by Teelings and Hanlon Transport Limited. Greenore Coast Guard. Shore Road lies to east of the village, running parallel to the village. This road provides access to Carlingford Lough Ferry and also HGV access to the Port.

The Village is designated as an Architectural Conservation Area (ACA) in the Louth County Development Plan 2021-2027 (LCDP). The ACA starts at the bungalows on the southern outskirts, and includes Euston Street, Anglesey Terrace, and the coastguard houses. Figure 1-4 illustrates the extent of the ACA relative to Greenore Port and the subject site. The application area overlaps with the ACA area at the public/private realm in front of the port office but does not include any buildings within the ACA boundary.

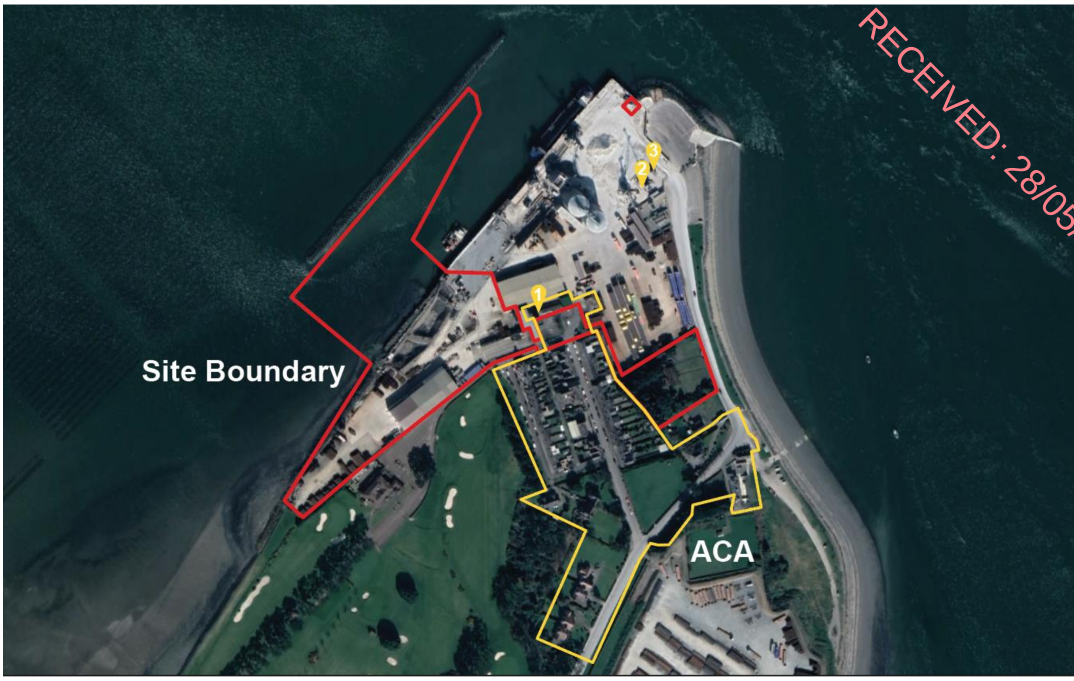

Figure 1.4 Site Boundary and Surrounding Context including Greenore Architectural Conservation Area and Protected Structures (Source: Google Earth, Edited by MHP)

1.4.3.3 Greenore Golf Club

Greenore Golf Club adjoins the southern boundary of the application site, with the entrance to the golf club from Euston Street / Anglesey Terrace running parallel to the entrance to the former Open Hydro carpark.

The Golfclub is more than 125 years old, founded in 1896 by London & North Western Railway Company. Its history is intrinsically linked with the development of the Port. It is an 18 hole course, comprising a mix of links and heathland terrain.

The Clubhouse is located south west of the proposed Building A, with the golf club access road and carpark south of Buildings B and C.

1.4.3.4 Carlingford Lough

The application site is bounded by Carlingford Lough to the west and north, with part of the site within the Lough.

Carlingford Lough is a designated Special Area of Conservation (SAC) and Special Protection Area (SPA) - Carlingford Shore SAC (Site code: 002306) and Carlingford Lough SPA (Site code: 004078).

Carlingford Shore SAC is designated as a SAC for Annual Vegetation of drift lines and Perennial vegetarian of stony banks. Perennial vegetarian of stone banks is associated with shingle beaches while Annual Vegetation of drift lines is normally associated with sand dune systems. However, as there are no dunes present anywhere at Carlingford, it is assumed that these two habitats occur in close association with each other.

Carlingford Lough SPA is designated for Brent Goose and Wetlands and Waterbirds.

Further detail on these sites is provided in the Biodiversity chapter of this EIAR as well as the *Supporting Information for Screening for Appropriate Assessment* and *Natura Impact Statement* submitted under separate cover.

1.4.4 Land Use Zoning Objective

The subject site is located within the functional area of Louth County Council and is governed by the Louth County Development Plan 2021-2027 (LCDP).

Greenore is categorized as a 'Rural Node' / Level 5 settlement in the LCDP with the settlement boundary of Greenore outlined in Map 5.10 from the LCDP (See Figure below).

There is no land use zoning objectives for the settlement of Greenore. There are no land use zonings included for any of the Level 5 settlements in the Plan.

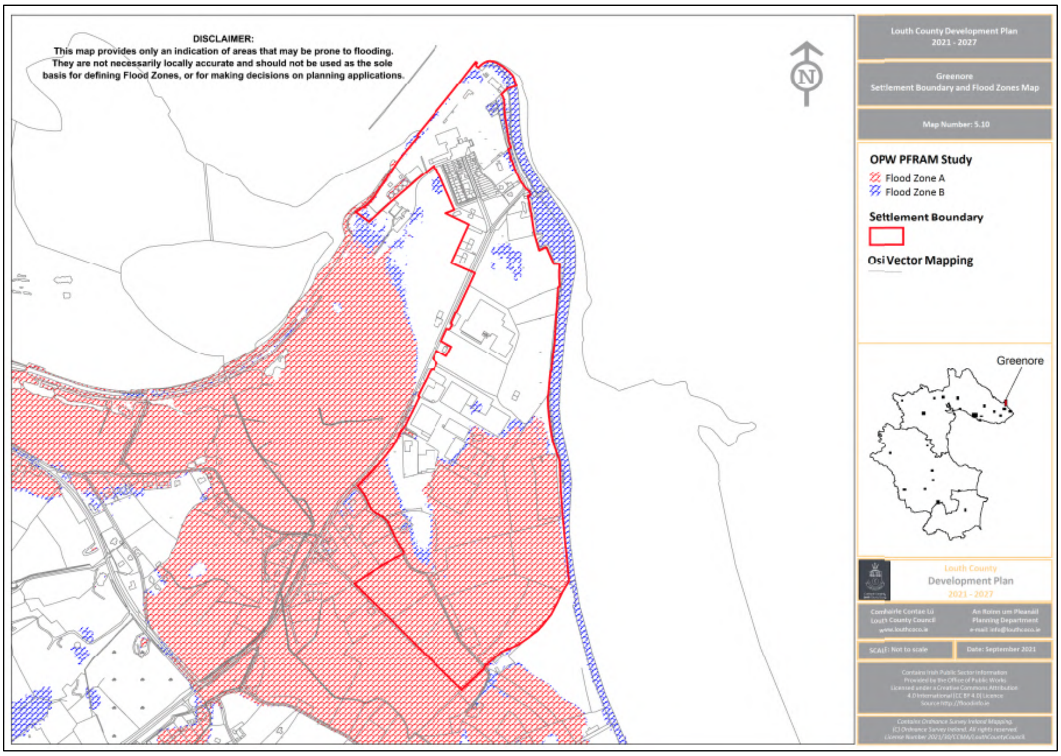

Figure 1.5 Greenore Settlement Boundary (Source: Map 5.10 from the LCDP 2021-2027)

The Plan recognises the importance of ports in enabling economic growth and providing international connectivity, with specific references made to Greenore Port in both the narrative and associated policy objectives.

With regard to the role of Greenore Port, section 5.10 of the Plan provides a strong narrative on the importance of Greenore Port to the economic growth and development of the County. This narrative is supported by policy objective EE26.

Policy Objective	
EE 26	To support the development and growth of the maritime economy and balance the competing demands for available space along the coast by different users and encourage co-location and co-existence of activities and infrastructure while having regard to appropriate environmental considerations.

The guidance and policy context within Chapters 5, 9, and 13 of the Plan support the development of the Port whilst also ensuring that any development would be sensitive to the surrounding environment.

Development within the settlement boundary is subject to policy objective PO EE 27 –

Policy Objective	
EE 27	To recognise that the Port facilities at Drogheda, Greenore, Dundalk, and Clogherhead are an important economic resource and to support any improvements or expansion to these Port facilities at Drogheda, Greenore and Clogherhead and the consolidation of Dundalk Port, subject to the preparation of a Masterplan and appropriate environmental considerations.

A masterplan document has been prepared for Greenore Port and is included under separate cover within this application. This EIAR will assess the environmental considerations of the development which is the subject of this planning application.

1.4.5 Study Area

In general, the study area/ Zone of Influence are defined individually for each environmental topic, according to guidance and the geographic scope of the potential impacts or of the information required to assess those impacts. Details are provided by each discipline as part of the description of baseline conditions of the site.

1.5 Requirement for EIAR

Environmental Impact Assessment (EIA) requirements derive from EU Directives. Council Directive 2014/52/EU amended Directive 2011/92/EU and is transposed into Irish Law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

Proposed development which falls within one of the categories of development specified in Schedule 5 of the Planning and Development Regulations 2001, as amended, which equals or exceeds, a limit, quantity, or threshold prescribed for that class of development must be accompanied by an EIAR.

There is no mandatory requirement under the above provisions for an EIAR for the proposed development, however having regard to case law (refer to Section 1.11 below), this EIAR has been prepared to support the proposed application.

This EIAR has been prepared in accordance with the aforementioned legislative provisions and the following guidelines, among others, as specified in the various specialist EIAR chapters:

- Department of Housing, Planning and Local Government (DHPLG) (2018). Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.
- DHPLG (2017). Circular letter PL 1/2017 – Advice on Administrative Provisions in Advance of Transposition.
- European Commission (EC) (1999). Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.

- EC (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment.
- EC (2017). Environmental Impact Assessment of Projects. Guidance on Scoping.
- EC (2017). Environmental Impact Assessment of Projects. Guidance on the preparation of Environmental Impact Assessment Report.
- EPA (2015). Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements.
- EPA (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports.

1.6 Purpose of Environmental Impact Assessment

The objective of the Directive (Directive 2011/92/EU), as amended by Directive 2014/52/EU, is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for environmental impact assessment (EIA), before development consent being given, of public and private developments, that are likely to have significant effects on the environment.

The 2014 Directive, for the first time, provides a definition of EIA and this is now defined by Section 171A of the Planning and Development Act, 2000 (as inserted by Regulation 16 of the 2018 Regulations).

It is defined as a process consisting of:

a) the preparation of an EIAR by the developer;
b) the carrying out of consultations with the public, prescribed bodies (and, where relevant, any affected Member States);
c) the examination by the competent authority of the EIAR, any supplementary information provided, where necessary, by the developer and relevant information received through the consultation process;
d) the reasoned conclusion of the competent authority on the significant effects of the project on the environment; and
e) the integration of the competent authority's reasoned conclusion into any development consent decision.

The definition of EIA thus provides for a clear distinction between the process of environmental impact assessment to be carried out by the competent authority and the preparation by the developer of an EIAR.

Section 2 of the 2000 Act has been amended to define an EIAR as '*a report of the effects, if any, which proposed development, if carried out, would have on the environment and shall include the information specified in Annex IV of the Environmental Impact Assessment Directive*'.

1.7 Content of Environmental Impact Assessment Report

The EIAR entails a systematic analysis and assessment of the potential environmental effects of a proposed development on its receiving environment. Article 3(1) of the amended Directive prescribes a range of environmental topics that must be addressed in the EIAR, as follows:

> *"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors":*

a) A description of the likely significant effects of the project on the environment;

b) A description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

c) A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics and an indication of the main reasons for the options chosen, considering the effects of the project on the environment ; and

d) A non-technical summary; and,

e) Any additional information specified in Annex IV of the Directive/Schedule 6 to the 2001 Regulations, as amended, relevant to the specific characteristics of the project and to the environmental features likely to be affected.

As is required by Annex IV of the 2014 Directive, this EIAR addresses matters including proposed demolition works, risks to human health, major accidents/disasters, biodiversity, climate change and cumulative effects with other existing and/or approved projects.

1.8 Competency

It is a requirement that the EIAR must be prepared by competent experts. For the preparation of this EIAR, the Applicant engaged McCutcheon Halley Chartered Planning Consultants to direct and coordinate the preparation of the EIAR and a team of qualified specialists were engaged to prepare individual chapters, the consultant firms and lead authors are listed in the **Table 1.1**. Details of competency, qualifications, and experience of the lead author of each discipline is outlined in the individual chapters.

Various environmental specialists were commissioned to complete the specialist chapters of the EIAR, as required by Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment:

> *"Experts involved in the preparation of [EIARs] should be qualified and competent. Sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality".*

1.8.1 Author Information and Competency

This chapter was prepared by Louise O'Leary, BA MRUP, Dip EIA Management, MIPI. Louise an Associate Director with over 18 years experience in planning and development projects including experience directing and contributing to the preparation of environmental impact assessments for a variety of projects including port lands, infrastructure and commercial i.e:-

- Waterford North Quays Reg. Ref. 19/928 – a mixed use development of a brownfield site encompassing retail, leisure, office and residential uses. The permitted development included the removal of existing quayside and wharf and the placement of a piled foundation, alongside and within an SAC. This application included an EIAR and a NIS.
- Cherrywood Infrastructure Development – various applications for the development of roads, drainage and public parks on a greenfield site of c. 300 acres. The permitted developments provided critical infrastructure to enable the development of individual plots to proceed in line with the phasing requirements of the approved SDZ Planning Scheme.

1.9 Format and Structure of the EIAR

This EIAR is prepared according to the 'Grouped Format Structure' as described in the Guidelines on information to be contained in Environmental Impact Statements (EPA, 2022). This means that each topic is considered as a separate section. The advantages of using this format are that it is easy to investigate a single topic and it facilitates easy cross-reference to specialist studies.

The EIAR is sub divided into 3 no. volumes as follows:

- **Volume I** Non-Technical Summary;
- **Volume II** Environmental Impact Assessment Report; and
- **Volume III** Appendices to Environmental Impact Assessment Report.

Volume II is presented as 18 chapters as outlined in Table 1-1.

Table 1.1 EIAR Chapters and Contributors

Chapter	Aspect	Significance	Lead Consultant
1	Introduction	McCutcheon Halley Planning Consultants	Louise O'Leary
2	Project Description	McCutcheon Halley Planning Consultants	Paula Galvin
3	Alternatives	McCutcheon Halley Planning Consultants	Paula Galvin
4	Population & Human Health	McCutcheon Halley Planning Consultants	Paula Galvin
5	Landscape & Visual	Cunnane Stratton Reynolds	Jamie Ball
6	Material Assets: Traffic & Transport	Traffic Wise	Julian Keenan
7	Material Assets: Built Services	McCarthy Browne Consulting Engineers, Clifton Scannell Emerson Associates and Belton Engineering	Joe McCarthy
8	Material Assets: Waste	AWN	Chonaill Bradley
9	Land & Soils	AWN	Teri Hayes

Chapter	Aspect	Significance	Lead Consultant
10	Water & Hydrology	AWN	Teri Hayes
11	Biodiversity	Merc Consulting RegIntel Irish Whale and Dolphin Group	Louise Scally Breffni Martin Simon Berrow
12	Coastal Processes	RPS	Kristopher Calder
13	Noise & Vibration	AWN	Alistair Maclaurin
14	Air Quality	AWN	Jovanna Arndt
15	Climate	AWN	Jovanna Arndt
16	Cultural Heritage - Archaeological	ADCO	Niall Brady
17	Cultural Heritage - Built Heritage	7l Architects	Ferghal McNamara
18	Interactions of the Foregoing	McCutcheon Halley Planning Consultants	Paula Galvin
19	Summary of Mitigation Measures	McCutcheon Halley Planning Consultants	Paula Galvin

In addition, contributors have had regard to other relevant discipline-specific guidelines, these are noted in individual chapters of the EIAR.

1.10 Scoping

The purpose of scoping is to identify the information to be contained in an EIAR and the methodology to be used in gathering and assessing that information. The scope of this EIAR is informed by the requirements of the Directive 2014/52/EU and the transposing Regulations together with the Guidelines set out above. Applicants are not required to seek a formal scoping opinion.

The scope of individual assessments is informed by discipline specific guidelines and, where this is the case, they are referenced in each chapter.

Scoping requires the consideration of the nature and likely scale of the potential environmental impacts likely to arise from a proposed development or project. It is an iterative process that is ongoing throughout the development of the EIAR. The following topics, which include those stipulated in the amended Directive, have been scoped in for this assessment.

- Population and human health
- Landscape and visual
- Traffic and transportation
- Built Services
- Waste
- Land & Soils
- Water & Hydrology
- Biodiversity
- Noise and vibration
- Air quality
- Climate
- Cultural heritage, archaeology and built heritage;

- Interactions between the above-listed topics.

1.11 Scope of Cumulative Effects

Directive 2014/52/EU substituted a new Annex IV into Directive 2011/92/EU. Annex IV of the EIA Directive is to be read in conjunction with article 5(1) and sets out the information to be included in an EIAR. Annex IV was transposed into national law via article 97 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (the "2018 Regulations") which substituted a new Schedule 6 into the Planning and Development Regulations 2000, as amended.

The Directive requires that the EIAR describes the cumulation of effects with other existing and/or approved projects.

Cumulative effects may arise from:

> *"- The interaction between the various impacts within a single project;*
>
> *- The interaction between all the differing existing and / or approved projects in the same areas as the proposed project."* [1]

In August 2018, the Department of Housing, Planning and Local Government issued *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*. The Guidelines summarise "cumulative effects" in the following way at page 40;

> *"Effects are not to be considered in isolation but cumulatively i.e., when they are added to other effects. A single effect on its own may not be significant in terms of impact on the environment but, when considered together with other effects, may have a significant impact on the environment. Also, a single effect which may, on its own, have a significant effect, may have a reduced and insignificant impact when combined with other effects.*

Paragraph 2(e)(i)(V) of Schedule 6 (paragraph 5(e) of Annex IV) provides as follows;

> *"the cumulation of effects with other* ***existing or approved developments, or both****, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources." (emphasis added).*

Accordingly, each chapter of this EIAR assesses the cumulative effect of permitted development in combination with the proposed development. A list of the projects considered is attached in Appendix 1-1.

Individually, each specialist consultant has reviewed under construction, permitted, and or under consideration development in the local area, and using their expertise they have identified projects

[1] Department of Housing, Planning and Local Government, "Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment" (August 2018), page 40.

relevant to their discipline that may interact to produce a cumulative effect. The detail of the identified projects and plans is set out within each specialist chapter of this EIAR.

While the Directive does not require a cumulative assessment of future proposals where a planning application has not been lodged, recognising the broad scope and purpose of the EIA Directive, regard is had to the judgement of *Fitzpatrick v An Bord Pleanála* [2019] IESC 23, henceforth referred to as the 'Apple Case'.

The Supreme Court in the Apple Case held that:

1) An EIA must contain an assessment of the cumulative effects of future developments that form an "integral part" of the development applied for (i.e., where there is a "functional or legal interdependence" between the development applied for and the envisaged future development).

The Proposed Development for which permission is sought is the O&M facilities and the associated pontoon installation, Berth 3 works and carpark. The proposed O&M facility is intended to service offshore wind farms, which are captured under Annex II Class 3(i) EIA Project type of the EIA Directive. The question of whether EIA is required, however, is answered by reference to the nature and extent of the proposed development for which consent is sought.

The analysis of the Supreme Court in *An Taisce (Kilkenny Cheese)*[2] is relevant in this respect. In *Kilkenny Cheese* the case being made was that the Board had failed to assess the effects of milk production (for the cheese factory) on climate, or on water catchments adjoining the farms from which the milk would be supplied. It was argued that these were the indirect effects of the proposed factory, arising from offsite activities which were closely functionally and operationally connected to the proposed cheese factory.

The Court analysed a suite of case law dealing with the issue of functionally interdependent projects or elements of a project that should be the subject of the EIA process, and other cases where the effects of other 'offsite' activities were deemed to be too remote and not the effects of the project for which consent was sought.

- The Court considered that an off-site construction assembly site would be subject to the EIA for the proposed development which the construction assembly site would serve.[3] A construction assembly site for an offshore wind farm project, for example, should be assessed as part of the EIAR for the offshore wind farm.
- The Court noted that in *O'Grianna*[4], the connection of the wind farm to the grid was considered so fundamental to the purpose of developing and operating a wind farm that it could not be omitted from the EIA of the project.

[2] *An Taisce – The National Trust of Ireland v An Bord Pleanála* [2022] IESC 8 ('Kilkenny Cheese')

[3] See paragraph 81 of the *Kilkenny Cheese* judgment.

[4] *O'Grianna v An Bord Pleanála* [2020] IEHC 601

- In the *Apple* case[5], the Court was satisfied that the first data centre hall and its grid connection were closely interrelated and should be assessed within the EIA process, but that subsequent phases of development only had to be assessed to the extent reasonably practicable, because the first phase and grid connection could be developed and operated on an independent and stand-alone basis. Significantly, any subsequent phases of development would also be subject to EIA and cumulative impact assessment before proceeding.
- In *Kemper*[6] the Court was satisfied that the EIA of a wastewater treatment plant did not have to include the ultimate application of the waste biosolids to as yet unidentified lands as fertilizer. The use of biosolids for that purpose would depend on landowners coming forward to 'purchase' the fertiliser for use on their lands. That did not form part of the development for which consent was sought and was too remote to be assessed within the EIA process, save in the most general terms.
- In UK cases *Finch*[7] and *Greenpeace*[8] the Courts considered that the obligation to assess a project requires the EIA to assess the direct and indirect effects *of the project for which consent is sought*, including its operation, and not some other project for which consent is not sought. Indirect effects are less immediate than direct effects, but they are nevertheless the effects *of the project.*

This line of case law strongly establishes that the obligation to carry out EIA depends on whether the project or development for which consent is sought is a Class of project to which the Directive applies, and if so, the scope of that EIA process is linked to the development for which consent is sought (the O&M facilities, pontoon, works to Berth and the carpark), and not to some other project for which consent is not sought (the offshore wind farms).

Cumulative effects are not limited to projects, and it is necessary to also consider relevant Plans. According to the Environment Protection Agency (2020), in Ireland, key cumulative effects – where environmental receptors are at, or near, their thresholds or their capacity to assimilate more change – include climate change; water quality, flood risk, air quality, biodiversity and landscape. For the purpose of this EIAR, the following have been considered in relation to cumulative impacts:

- **Louth County Development Plan 2021-2027** - gives spatial expression to the economic, social, housing and cultural development of the County. The Plan has a key role in protecting the environment, heritage, and amenities of the county and in mitigating against the impacts of climate change. It includes policies and objectives for all of the aspects included in this EIAR. Accordingly, this EIAR provides a narrative on the cumulative effect of the proposed development together with the Development Plan policies and objectives.
- **The Climate Action Plan, 2024** - climate change is the ultimate cumulative effect, nationally and internationally. Thresholds for greenhouse gas (GHG) emissions are being exceeded. Ireland is committed to achieving a 51% reduction in GHG emissions from 2021 to 2030, and

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[5] See *Fitzpatrick and Daly v An Bord Pleanála and Apple Distribution International*, [2019] IESC 23, [2019] 3 IR 617

[6] *Kemper v An Bord Pleanála* [2020] IEHC 601

[7] *R (Finch) v. Surrey County Council* [2020] EWHC 3566 (Admin)

[8] *Greenpeace Limited v. The Advocate General* [2021] CSIH 53

to achieving net-zero emissions no later than 2050. Following on from Climate Action Plans 2019, 2021 and 2023, Climate Action Plan (CAP) 2024 sets out the roadmap to deliver on this climate ambition. One of the key measures of the CAP is to accelerate and increase the deployment of renewable energy to replace fossil fuels to reach the target of 80% of electricity demand from renewable energy by 2030. Therefore, the CAP sets a target of at least 5 GW of offshore wind by 2030 (and an additional 2 GW offshore wind for green hydrogen production). The cumulative effects of this Plan together with the proposed project are considered in the following chapters; Population & Human Health, Material Assets: Traffic & Transport, and Climate.

- **National Biodiversity Plan** - The Plan sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity. It has been developed in line with the EU and International Biodiversity strategies and policies. The cumulative effects of this Plan together with the proposed project is considered in the Biodiversity chapter.

- **Standards in the EU Air Quality Directive and 'daughter' directives** - establish the levels of air pollutants that have no significant impacts on human health or the environment. The cumulative effects of the Directive together with the proposed project is considered in the Population & Human Health Chapter and the Air Quality Chapter.

In addition, each of the specialist chapters (4 - 16) considers the cumulative effects of projects and plans relevant to the zone of influence and discipline specific factors.

1.12 Impact Assessment Methodology

Each chapter of this EIAR assesses the direct, indirect, cumulative, and residual impact of the proposed development for both the construction and operational stage of the proposed development.

The impact assessment methodology is detailed in the respect of the various environmental topics in the respective chapters herein. The assessment of impacts is based on the source-pathway-receptor model, which dictates that, for an environmental impact to occur, there must be a source, a receptor which is sensitive to the effect in question, and a pathway by which the effect can reach the receptor. Unless otherwise stated, the criteria for effect / impact characterisation are as per the EPA guidelines (as set out in Table 1.2). The significance of an impact is determined through comparison of the character of the predicted effect to the sensitivity of the environment / receptor in question.

Table 1.2 Impact Rating Terminology

Quality of Effect	
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of and ecosystem, or by removing nuisances or improving amenities.
Neutral	No effects of effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Significance of Effect	
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight Effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effect	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effect	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant Effect	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effect	An effect which obliterates sensitive characteristics.
Duration of Effects	
Momentary	Seconds to minutes
Brief	Less than 1 day
Temporary	Less than 1 year
Short-term	1-7 years
Medium-term	7-15 years
Long-term	15-60 years
Permanent	Over 60 years
Extent and Context of Effects	
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?).
Probability of Effects	
Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Type of Effects	
Indirect	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
Do Nothing	The environment as it would be in the future should the subject project not be carried out.
Worst Case	The effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable	When the full consequences of a change in the environment cannot be described.

Irreversible	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Synergistic	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

1.13 Consultation

Prior to lodging this application, the required information has been issued to the Department of Housing, Planning and Local Government's EIA Portal. The purpose of this tool is to inform the public, in a timely manner, of applications that are accompanied by an EIAR.

Pre-planning Consultation was undertaken with Louth County Council in May 2024, at the offices of Louth County Council on May 10th and online on May 20th. The following is relevant to the environmental assessment in this EIAR:-

- Traffic, terrestrial and marine side, with terrestrial traffic to be considered for both the construction and operational phases.
- Consideration of noise and light spill from the proposed car park access pathway.
- Effects on Built Heritage and Archaeology, both terrestrial and marine side, including protected structures and the Greenore Architectural Conservation Area (ACA).
- Shellfish beds and potential impacts on aquaculture sites
- Disposal of Dredge material including identification of suitable licensed facilities
- Utilities including strategies for Foul and Surface Water Disposal
- Flood Risk and potential effects of displacement
- Ecology to consider lighting, Guillemots and swift population, sea bird habitats, other mammals and native planting
- Construction exclusion windows, related to biodiversity mitigation
- Phasing, design flexibility and duration of permission.

A consultation meeting with the National Parks and Wildlife Service (NPWS) was held on the 9th of January 2024 to scope NPWS's view regarding the proposed infrastructure being located partially within a European Designated Site (Carlingford Shore SAC (Site code: 002306) and Carlingford Lough SPA (Site code: 004078)) and ensure the project team provides the most robust information from the outset. Feedback at this meeting is relevant for the biodiversity assessment in this EIAR.

Local Stakeholders were met in the preparation of this application including direct engagement between the applicant and / or the Design Team with the following:-

- Aquaculture and Pilot Representatives
- Greenore Golf Club
- Greenore Port Operational Management Team

The applicant hosted a community information meeting on Thursday, May 16th, 2024. The meeting's purpose was to brief the community on the proposed development. The meeting was held in Coast & Co., a café in Greenore, from 16:30 to 20:30. The applicant and design team were available to speak with people individually to explain the development and answer any questions. A suite of information was made available, including computer-generated images (CGIs) and verified photomontages so as to be as transparent as possible. The design of the three units was largely welcomed, with attendees complementing the design approach and recognising the clear intent to contribute positively to the village through the material selection and improvements at the interface with the village. There was widespread agreement that the architectural response was a significant improvement compared with the extant permission for warehousing.

Further details on these consultation events are included in the Planning Statement by McCutcheon Halley Chartered Planning Consultants, submitted with this application.

CHAPTER 2

DEVELOPMENT DESCRIPTION

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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2 Development Description

2.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) sets out the proposed development and provides details in relation to the demolition, construction, and operational phases of the scheme. The content of this chapter is informed by the Design Team, and it should be read in conjunction with the submitted drawings and supporting reports.

Generally, the proposed development is to establish an Operations and Maintenance (O&M) Facility at Greenore Port that will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland. The proposed development will deliver the scheme to 'shell and core' finish and the individual wind farm operators who will occupy the buildings as tenants of the applicant, will fit the buildings out as per their individual requirements.

Operations refers to supporting the management of the offshore wind asset. It includes remote site monitoring, operation of vessels, onshore logistics, and other administrative support. Onshore logistics includes storage of small parts and equipment such as components and equipment for the maintenance and servicing of the turbines to support wind farm operations. Large component parts i.e. replacement nacelle, rotor, towers etc. will not be stored on site. The quayside and berthing areas will be used to transfer personnel, goods and supplies between the O+M facility and the offshore windfarms.

As part of the operation and maintenance of the wind turbines, both regular and unplanned maintenance will be carried out at sea. This will include general inspection, minor motor wind turbine generator repairs, minor offshore substation platforms repairs, repairs of navigation equipment, removal of marine growth and painting etc.

These activities will be carried out by technicians, using crew transfer vessels (CTVs) to access the offshore windfarms from the O&M base. Design CTV vessels are typically 12 or 24 pax (passenger). The proposed arrangement of the pontoon berthing is based on 9 no. Vessels (5 no. 24 pax vessel and 4 no. 12 pax vessels), with 2no. layby berths for 12 pax vessels on the outer (southern) side.

A 10 year permission is sought.

The following is the description of the proposed development as stated in the statutory notice that accompanies the application.

> ***Greenore Port Unlimited Company*** *intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare). The development comprising of Operation and Maintenance (O&M) Facilities will serve as the support base for future offshore wind arrays in the Irish Sea. The proposed development will comprise of:-*
>
> (i) *Three standalone buildings, each with a gross floor area (GFA) of 1,670 sqm, comprising 681 sqm warehouse floor space, 322 sqm office space and 667 sqm plant,*

welfare, storage, ancillary and circulation space per unit. The height of each unit ranges from 7.2m for the warehouse (single-storey / double-height space) to 13.5m max for the office 3-storey element. 76 car parking spaces are proposed distributed adjacent to the units including 6 no. disabled parking spaces and 15 no. electric vehicle (EV) charging spaces. Each building includes an internal bike storage room, with 20 spaces per building. Each building includes rooftop solar photovoltaic panels.

(ii) *Nearshore works including dredging of harbour sediments to -4m Chart Datum to provide navigable water depths, new quay wall (70m), a 40m anti-slip access ramp, floating pontoon for berthing crew transfer vessels (CTV's). 9 no. berths are proposed, with an additional 2 no. layby berths and a push-on / service berth adjacent to the new quay wall.*

(iii) *Improvement works to the quay deck including installation of a new reinforced concrete deck with surface water management system incorporating silt traps and hydrocarbon interceptors, and berth infrastructure including bollards, fenders, ladders, lifesaving equipment, power outlets and fire hydrants.*

(iv) *Surface car park at the Residential site on Shore Road comprising 135 car parking spaces, including ducting for 30 no. EV charging spaces, relocation of existing entrance on Shore Road by c.6m to the east, new boundary wall to Shore Road and a pedestrian access route from the car park through port lands to the O&M Units crossing improved public realm at top of Euston Street.*

(v) *Re-instatement of former Open Hydro carpark (62 spaces) until the surface car park on Shore Road is operational.*

(vi) *Upgrade to public/private realm in the foreground of the existing Greenore Port Office building, including upgrade of existing entrance to former open hydro carpark, new pedestrian gate, new feature wall entrance, removal of 6 port car parking spaces, link to new pedestrian route from surface carpark including new opening in port boundary wall, and hard and soft landscaping. Works are partially located within the Greenore Architectural Conservation Area (ACA).*

(vii) *Replacement of existing 25m mast with new 40m mast to facilitate communications with CTV's while offshore.*

(viii) *Demolition works to facilitate the above development including:-*

  a. *The former "Open Hydro" warehouse (c. 1,607 sqm GFA);*
  b. *Part of single storey office building (c.38sqm GFA) located adjacent to the entrance to former Open Hydro carpark;*
  c. *ESB substation and associated switch room;*
  d. *Dwelling house (c. 192sqm GFA) and boundary wall on Shore Road.*

(ix) *And all associated site and development works including single storey ESB substation, above-ground fuel storage tank (c. 200m3), drainage and utilities, landscaping and boundary treatments, security fencing, lighting and signage, etc.*

There are no Protected Structures within the proposed development site. The development to be applied for is within Greenore Port's landholding within which curtilage also exists the water tower, lighthouse and lighthouse keeper's cottage which are all included in the Louth Record

of Protected Structures, ref. LH009-01, LH009-043, LH009-044 respectively, all at Greenore Port, Greenore, Co. Louth.
A Maritime Area of Consent accompanies this planning application Ref. MAC20230003, granted on 10 April 2024 for a 45-year term.
A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) have been prepared in respect of the proposed development.

2.2 Proposed Development

The proposed development layout is illustrated on Site Layout drawing prepared by Clifton Scannell Emerson Associates (Drawing No.'s 2100, 2101, 2102 and 2103), contained within the suite of drawings accompanying this application. The following computer-generated image identifies the key components and their location relative to the wider port activities and Greenore Village.

Figure 2.1 Proposed General Arrangement

A **Design Statement** prepared by McCarthy Browne Civil and Marine Consultants in conjunction with Eoghan Carr Architects and 7L Architects, is submitted with the application which explains the design principles that have been applied to the development.

The design is cognisant of the functional requirements of the future occupants i.e., operators of offshore renewable energy wind arrays, combined with an understanding of the site constraints and opportunities. The key principles that the proposed development respond to are:

Design & Character: To create an attractive, self-contained, and functional development with clear identity, which relates well within its context. The building should be well-designed, with attention to detail and provide clear legibility in the choice of façade material specifications.

Functionality: To provide a development that will meet the long-term needs of tenants for running an efficient and successful business. Clear thought must be given to optimise functionality.

Protect Key Viewpoints: To design the building form and elevation treatment considering key viewpoints established in the Louth County Development Plan.

Orientation & Movement: To ensure that the development provides a sense of arrival for visitors arriving by vehicle or on foot. Routes for HGVs, cars, cyclists, and pedestrians should be clearly segregated to avoid potential conflicts. New footpaths should link into the wider existing network, increasing amenity and connectivity.

Quality of Interface with Protected Structures and the Greenore Architectural Conservation Area (ACA): To create a development which enhances the quality of public realm within the ACA and does not detract from the Protected Structures that exit within the port and the wider village area.

2.2.1 Development Overview

An overview of the key development statistics is set out in the following Table:

Table 2-1 Key Development Statistics

Development Statistics		
Site Area		4.88 ha
Plot Ratio (based on Site Area of 1.9ha)		0.26:1
Site Coverage (based on Site Area of 1.9ha)		17%
Buildings		3 No.
Total GFA		5,010 sqm
GFA Per Building		1,670 sqm
Comprising of:-		
Warehouse per building	681 sqm	
Office per building	322 sqm	
Welfare, ancillary and circulation per building	667 sqm	
Building Height		7.2m - 13.5m
Car Parking		211 spaces
Comprising of:-		
On Site	76	
Surface Carpark (Residential Site, Shore Road)	135	
Car Parking (temporary re-instatement of former Open Hydro Spaces)		62

Development Statistics			
Bicycle Parking (20 spaces per building)			60
Berth 3			70m
Pontoon			220m

2.2.2 Demolition Works

To facilitate the development, demolition works are required. This will include the demolition of the former ‘Open Hydro building’, and a small portion of the port’s office accommodation, an ESB substation, and an unoccupied dwelling house. The general locations of these structures are illustrated in Figure 2.2.

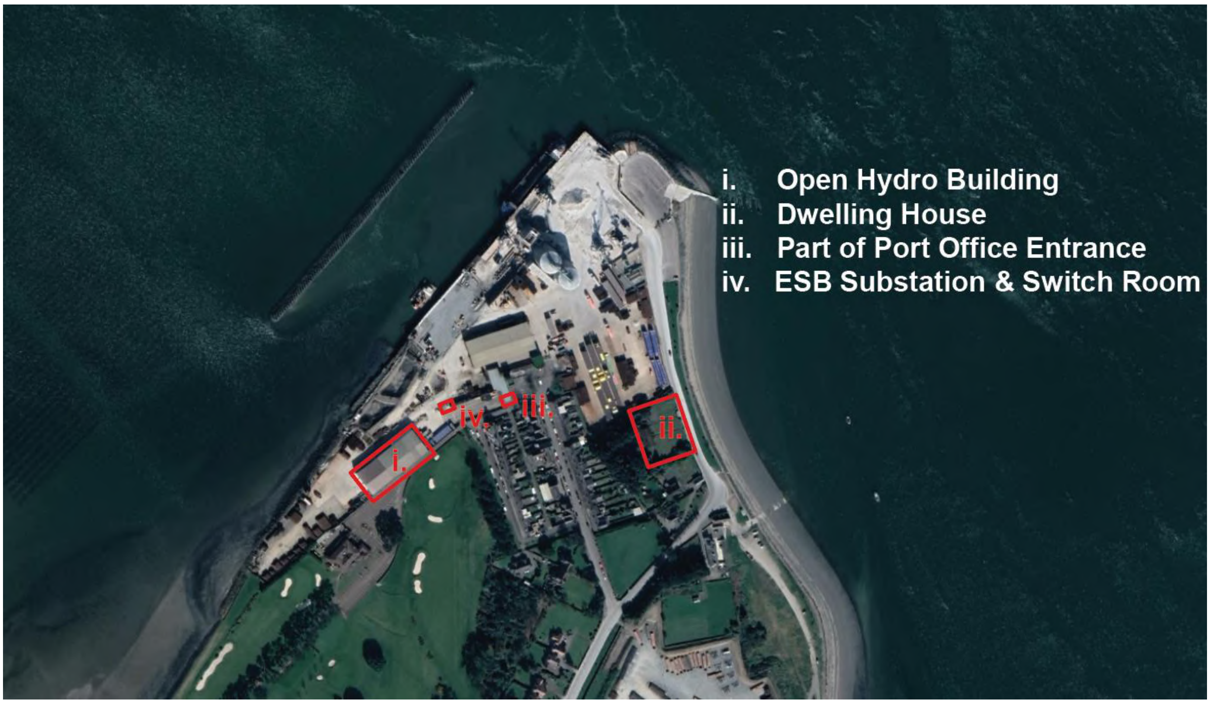

Figure 2.2 General Location of Demolition Works

2.2.2.1 Former Open Hydro Building

To facilitate the proposed development, it is necessary to demolish an existing warehouse, known as the former 'Open Hydro Building'. The name refers to its historic use as the technical headquarter of a tidal company which closed in 2018.

The existing building is finished in render and metal cladding and sits along the southern boundary of the port’s curtilage, where it adjoins the golf course. The building’s principal dimensions are 66.7 m length, 25.7m width with a maximum height of 11.1m. It has a gross floor area of 1,607sq.m.

Figure 2.3 Former Open Hydro Building

The former Open Hydro Building is a functional structure, used by Greenore Port to store the delivery of dry bulk commodities (c.6,000 tonnes) onsite before its onward transfer to end users (Planning Ref. 19807). It will continue to be operational during Phase 1 of the development and until its demolition is undertaken as part of the Phase 2 programme (The Phasing sequence is described in Section 2.5.1). Following its demolition, these commodities will be distributed directly from the ships to satellite storage facility or end users, reverting back to how these commodities were imported and distributed prior to the Former Open Hydro building coming into use in 2020. The pattern of HGV movements associated with removing these commodities from the port will also revert back to the pre-2020 levels.

2.2.2.2 Residential Site, Shore Road

To facilitate the development of the new surface carpark, the proposed development includes the demolition of an unoccupied single storey dwelling, its outbuildings and roadside boundary wall. This house is located at the residential site on Shore Road.

A search of Louth County Council's planning search tool indicates that the house pre-dates the 1970s, with one planning entry for an extension granted in August 1970, Ref. 70347.

The house has an approx. GFA of 192sqm with a ridge height of 6.2m. The existing roadside boundary wall to be demolished is c. 1.0m in height high and c. 64.5m long.

Figure 2.4 Vacant Dwelling at Residential Site on Shore Road

2.2.2.3 Part of Existing Port Office

The proposed development includes the demolition of c.38 sq.m of the 'Sea Farer's room', part of the existing Greenore Port Office building (see Figure below). This demolition is proposed as part of the upgrade to public / private realm in the foreground of the Port Office building described in Section 2.2.2.6.

This demolition is proposed as part of the upgrade to public / private realm in the foreground of the Port Office building. The works will include revised access arrangements (vehicular, cyclist and pedestrian) to the proposed O&M facilities, and hard and soft landscaping to the public / private realm. 6 no. parking spaces in front of the Port Office Building will be removed as part of these works.

Figure 2.5 Sea Farer's Room, Existing Greenore Port Office

2.2.2.4 ESB Substation and Switch Room

The proposed development includes the demolition of an existing ESB substation and associated switch room. (These works were previously approved by An Bord Pleanála as part of a separate application to construct 2 new stores by the applicant - (Pl. Ref. LCC 20543 - ABP Ref 310184). This extant permission also provided for the demolition of existing structures including railway and engine room walls within the port. It is notable that these industrial heritage structures are not proposed for demolition in the proposed development which is subject of this application, with the structures not impacted by the proposal.

Figure 2.6 Substation and Switch Room

2.2.2.5 Quay Deck

The existing external concrete pavement within the site will be taken up to facilitate the proposed development. The quay deck pavement, between the proposed buildings and the quayside highlighted in the Figure below, will also be removed and replaced with a heavy-duty reinforced concrete pavement designed to withstand 50kPa port loading. While this is not demolition, it is included in the project description as it will give rise to waste concrete and will impact on the quantum of materials arising in both demolition and construction stages.

Figure 2.7 Location of quay wall and pavement upgrades

2.2.3 Landside Development

The proposed development set out in this section are the elements of the project that will occur within the terrestrial port area.

Figure 2.8 General location of O&M Facilities Development Area (Refer to Site Location Map and Site Layout plan for detailed drawings).

2.2.3.1 Operations and Maintenance Facilities

Three standalone individual operation and maintenance (O&M) buildings (Buildings A, B and C) designed to serve the needs of three individual offshore renewable energy (ORE) projects. These buildings are combined warehouse and office units and will incorporate office accommodation, warehousing, and ancillary space (meeting rooms, canteen, welfare, and plant). They are proposed in the western extent of the port landholding. Each of the buildings shall be constructed to a shell and core finish which allows each tenant to arrange the internal space to their own specifications.

The buildings are identical in design with a gross floor area of 1,670sq.m per building, comprising 765 sqm warehouse floor space and 905 sqm office and welfare space per unit. The buildings incorporate a stepped profile ranging from 7.2m for the warehouse (single-storey / double-height space) to 13.5m max for the office 3-storey element. Changing and welfare facilities are located at ground floor level. Enclosed plant rooms are located at first and second floor level. The plant room at the third-floor level is only enclosed by the surrounding walls i.e. there is no roof enclosure.

The maximum height of each building is 13.5m. The finished floor level is 5.05mOD. The buildings are each 24.8m in width and 48.9m in length. The ground floor façade will have a black brick finish and the balance of the façade will be cladded with metal cladding panels in anthracite grey. Rooftop solar photovoltaic panels are provided.

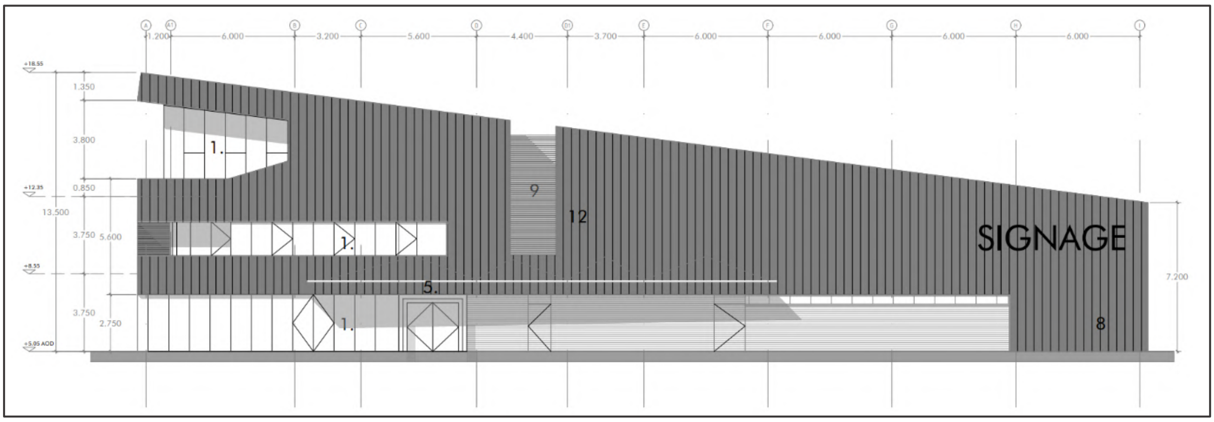

Figure 2.9 Southern Elevation of Typical OMF Building (Extract from Drg. No. GA 200 01)

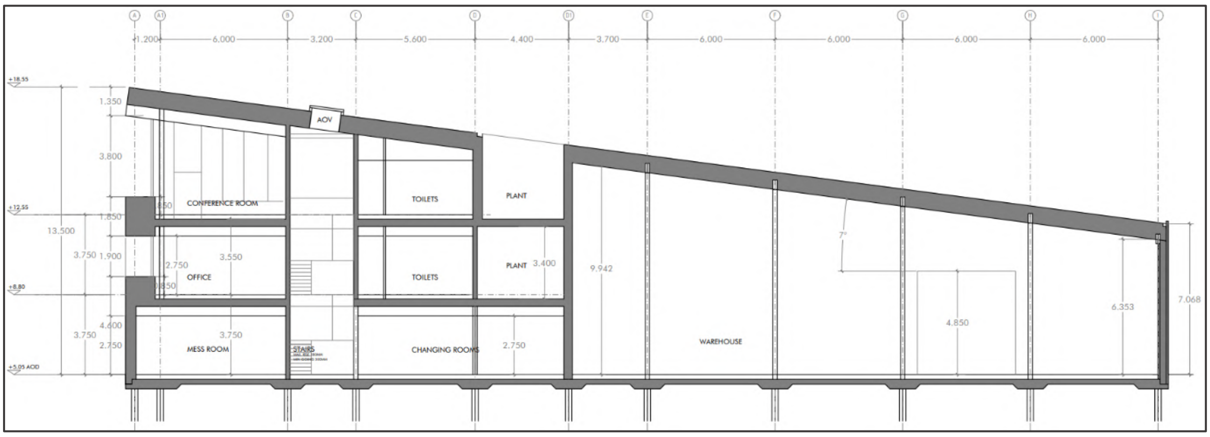

Figure 2.10 Section of Typical OMF Building (Extract from Drg. No. GA 100 01)

Each building is designed to comply with Part M of the Building Regulations so that:

- People can safely and independently approach, gain access and use the building, its facilities and its environs, and
- Elements of the building do not constitute an undue hazard for people, especially for people with vision, hearing or mobility impairments.

Belton Consulting Engineers have prepared a ***Climate Action and Energy Statement*** for the proposed development, submitted under separate cover. The proposed development has been designed to meet or exceed the legislative requirements for energy conservation and sustainability under TGD Part L – Conservation of Fuel and Energy in other buildings (2021) and planning requirements set out in the Louth County Development Plan 2021-2027.

Each building is designed to achieve the Nearly Zero Energy Buildings (NZEB) standard and will therefore have a very high energy performance, at least corresponding to a A2 Building Energy Rating. Solar panels will be installed on the roof.

The design of the buildings is confirmed by the project Fire Consultant as compliant with the requirements of Part B of the Building Regulations. In due course and under the separate code of the Building Regulations an application for a fire safety certificate for each of the three buildings will be submitted to the Building Control Authority.

The quay deck pavement, quayside of the proposed buildings, will be upgraded. The existing pavement will be removed and replaced with a heavy-duty reinforced concrete pavement designed to withstand 50kPa port loading.

2.2.3.2 Parking

Adjacent to the buildings, space is allocated for a total of 76 car parking spaces. Of the carparking proposed to serve the proposed development (76 no. spaces), 15 no. spaces will be fitted for electric vehicle charging; and 6 no. spaces will accommodate disabled parking needs. 60 no. secure cycle parking spaces are provided, with 20 spaces allocated to each of the O+M buildings. Access for vehicles and pedestrians/cyclists is via the existing entrance (that historically served the former Open Hydro building) adjacent to the Port Office Building.

The new access road along the southern boundary will not be put in place until Phase 2 (refer to Section 2.5 for Phasing Plan), following the demolition of the former Open Hydro building. In the interim, a temporary access road will be provided to the Building A carpark through port land, located to the north of the former Open Hydro building and Building A. The indicative route is shown through the landscaped area below.

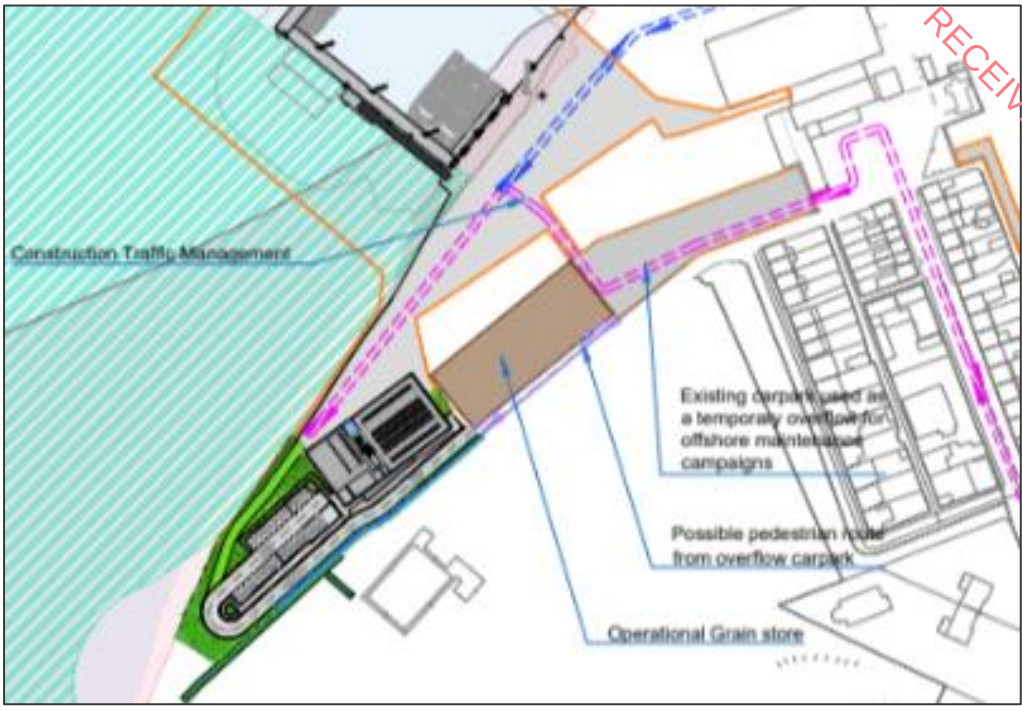

Figure 2.11 Temporary Access Route north of former Open Hydro building and Building A to carpark.

As part of the Phase 1 development, the former Open Hydro carpark will be reinstated (62 no. spaces). This carpark is located at the eastern end of the site, bounded to the east by part of the Port Office Building (the 'Seafarer's Room') and to the south by Anglesey Terrace. These parking spaces will be utilised during the construction and operational stages of Phase 1 (refer to Section 2.5) as follows:- during the Construction Phase, as a compound / parking area, and; during the Operational Phase as additional parking for Building A technicians when on site.

During Phase 2 works (i.e. the demolition of the former Open Hydro building, the construction of Buildings B and C and all associated site and development works), the former Open Hydro carpark may be used for a period as a contractors compound / parking area. When this area needs to be vacated for construction purposes, the proposed surface carpark at the residential site (Shore Road) will be used for construction parking. The technician parking will also relocate to the surface carpark when construction commences. This schedule is indicative and subject to the appointed Contractors programme and sequence of events – Refer to Section 2.5 for further details on Phasing, site compounds and construction parking.

2.2.3.3 Surface Carpark (Shore Road Residential Site)

A surface carpark with 135 no. car parking spaces is proposed at the residential site on Shore Road, with access from the R175 Shore Road. To facilitate this development, the existing house on site and associated outbuildings will be demolished.

Ducting is included for electric vehicles for 20% of the total spaces i.e. 30 spaces. This carpark will be primarily used by technicians servicing the ORE windfarms.

To facilitate safe access and egress to and from the carpark on to the public road (Shore Road), the existing access will be replaced with a new access approx. 6m to the east. The front boundary wall will also be replaced with a new rendered and cap wall of c0.5m height. The low wall provides views from the carpark out to the sea and also facilitates sight lines.

A new pedestrian access route to the O&M facilities buildings from this carpark will be provided through Port lands (east of the laneway to the rear of properties on Euston Street) and across the foreground of the existing port office area. The section of the pedestrian route through port lands will be a secure route not accessible to members of the public. A schematic of the routing arrangement is shown below.

Figure 2.12 Surface Carpark and Pedestrian Access route

As per the Phasing programme detailed in Section 2.5, the surface carpark may be used as a contractor's compound / construction parking during construction. Following demolition and site clearance works, a temporary gravel surface will be installed. Parking for Technician's will also relocate to the surface carpark when construction commences on Phase 2 works or when the former Open hydro carpark needs to be vacated. This schedule is indicative and subject to the appointed Contractors programme and sequence of events.

2.2.3.4 Communications Mast

The existing communications mast (25m mast (top = 30.06m ODM), located at the seaward end of Berth 1, is to be replaced with a 40m communications mast at the location of the decommissioned mast.

The new mast will be suitable for Greenore Port's existing operations, including lighting and CCTV, with future capacity for O+M operator equipment, to facilitate communication with CTV's whilst offshore. It is proposed in an area most likely to benefit from clearest line of sight to offshore wind farms.

An exemplar mast is an SLX5/T, self-supporting lattice tower mast from Data Structures.

Figure 2.13 Location of Existing communications mast

Figure 2.14 Communications Mast

2.2.3.5 Landscaping/Boundary Treatment

A **Landscape Design Statement** prepared by Cunnane Stratton Reynolds Land Planning & Design accompanies this application and provides a more detailed description of the landscape design rationale for the proposed development site.

The design concept developed to create landscaped spaces which respects the setting of the site adjoining Carlingford Lough and Greenore ACA whilst providing modern open space uses for the changing environment of the port lands.

Material finishes throughout each of the character areas have been given careful consideration and is a joint approach between the architects and the landscape architects, creating well functioning and beautiful spaces whilst respecting adjoining properties and architectural features.

There are 3 key areas to the landscaping proposals including the Terrestrial port area i.e. adjacent to the proposed O&M facilities buildings; the public / private realm spaces at the Port Office Entrance, and the new surface car park at the residential site. Each of these areas have a different character, reflecting the existing site, the proposed uses and their surrounding context.

Terrestrial Port Area

The proposed design aims to create a space that is usable and aesthetically pleasing for employees and visitors. A selection of materials has been chosen to link up the different spaces and allows users to easily and safely navigate through the spaces.

Planting which is appropriate for coastal locations has been proposed, including a wildflower meadow mix at the north western end of the site.

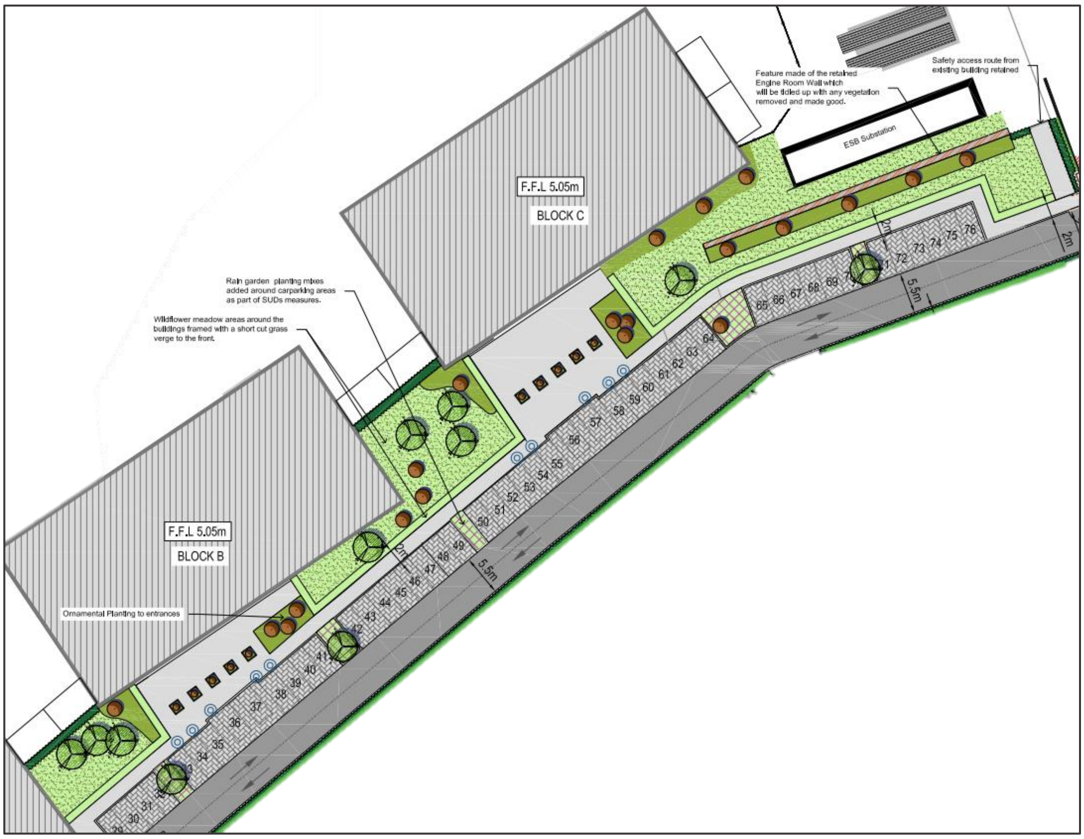

Figure 2.15 Terrestrial Port Area (Extract from Drg. No. 102-B prepared by CSR)

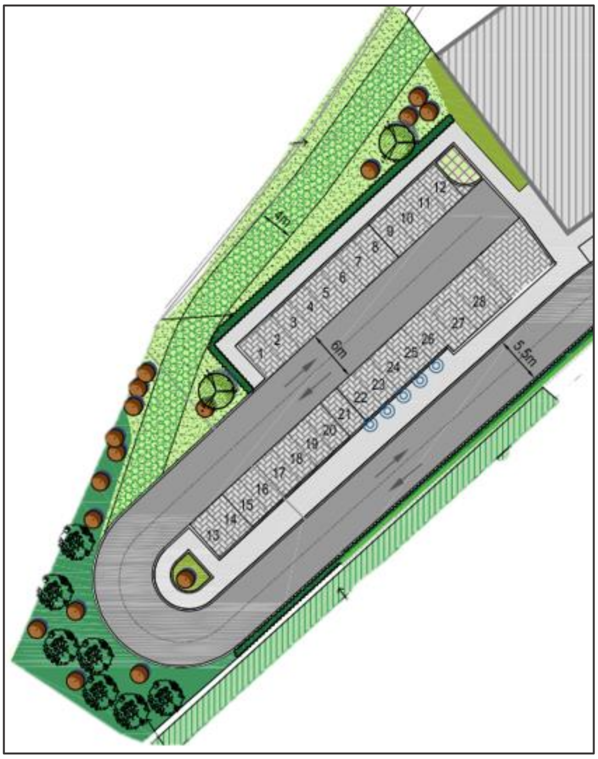

Figure 2.16 Terrestrial Port Area, Western End (Extract from Drg. No. 102-A prepared by CSR)

Port Office Entrance

Works to the public / private realm in the foreground of the existing Greenore Port office building comprise of an upgrade to the public / private realm areas including revisions to existing vehicular and pedestrian access/egress to the proposed O&M Facilities, new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from surface carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA).

The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site.

Material finishes throughout each of the character areas and in this area in particular have been given careful consideration and is a joint approach between ECA, 7L Conservation architects and the landscape architects. The materials chosen for this area are to harmonise with the heritage village public realm but also enhance this particular part of the village.

The new site entrance which forms a book end to the port offices uses the red brick to reflect the brick used in the existing water tower. The new entrance uses brick in a contemporary way with a subtle textural feature at one side to add visual interest. The scale of the entrance adds to a sense of arrival at the site and helps with way finding at the port entrance area of the village. The resulting design has created a well functioning and beautiful space respectful of the ACA.

Figure 2.17 Port Office Entrance Proposals (Extract from Drg. No. 102-B prepared by CSR)

Figure 2.18 New Feature Entrance

Inside the proposed main entrance to the site, it is proposed conserve the existing engine room wall. The works will consist of vegetation removal, the consolidation of the existing wall using traditional lime mortar and masonry techniques, weathering including flaunching and shelter coating. These works will be carried out during spring/summer when more favourable temperatures allow.

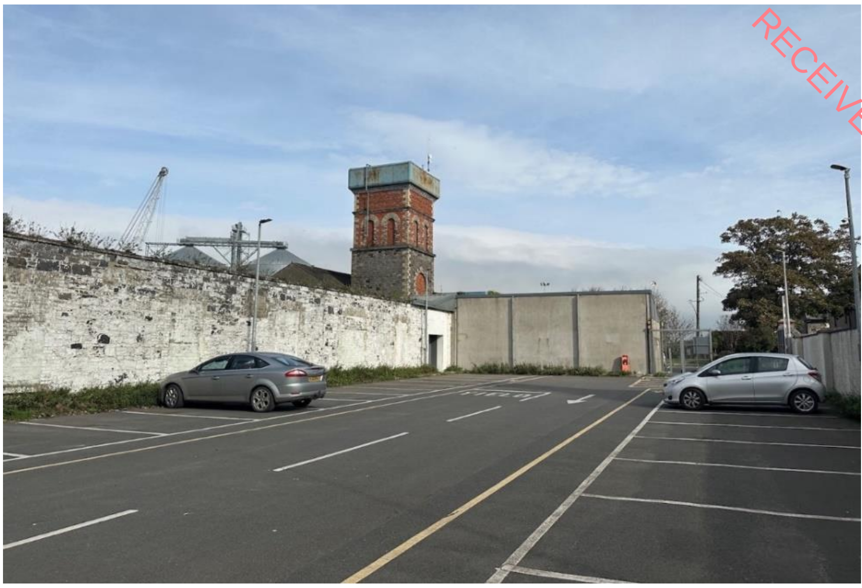

Figure 2.19 Existing Engine Room Wall

Surface carpark, Shore Road

Landscaping of the proposed surface carpark will comprise of native shrubs and trees, with boundary planting to the west and south in particular providing enclosure and screening.

The existing stone wall to the back of the site, at the rear of the houses on Euston Street and along the property boundary with the adjoining residences will be retained. A buffer planting strip is proposed to step back the parking, thus protecting these walls from accidental damage. A concrete post and timber panel fence (1.8m high) is also proposed along the southern boundary providing screening for the adjacent housing.

A new boundary wall on Shore Road is proposed, at a height of 0.5metres is proposed, raised at the outer limits to match in with adjoining boundaries. This wall, finished in a white render and capped, will reflect the character of the adjoining coastal wall boundary of the port yard and the lighthouse.

Figure 2.20 Surface Car Park Proposals including pedestrian path to Euston Street (Extract from Drg. No. 103-A prepared by CSR)

2.2.3.6 Lighting

A Lighting Report and associated drawing prepared by Belton Consulting Engineers accompanies this application. Site lighting for the proposed development has been designed in consultation with the project ecologist. The lighting is designed to achieve the following objectives:-

- to provide sufficient light levels throughout to ensure safe operation of the facility,
- to minimise light spill, and,
- to minimise visual clutter.

External lighting will be provided in the car parking areas, circulation areas, at the main entrance to the O&M buildings, at waste management areas, at vehicular entrance points to the site and along the pedestrian walkways and crossings, and the crew transfer vehicle pontoon. The proposed lighting provides for the following:

- Different luminaire optics throughout the site to achieve the required lux levels whilst minimising light spill on fauna and upwards reflected light (sky glow).
- Lighting levels of less than 3 lux in bat foraging/sensitive areas.
- Glare shields are installed on all luminaires installed close to bat foraging/sensitive areas.

2.2.3.7 Signage

Eoghan Carr Architects has prepared a signage strategy for the development and the following information is extracted from the Design Statement and Drg. No. GA 90 01.

Backlit illuminated totems with individual illuminated letters will be erected at the entrance providing details of the occupier of each of the O&M Buildings. A second totem sign is proposed at the entrance to the proposed surface carpark on Shore Road (See Figure below). The signs will be 2.75m high, 1.5m wide and 250mm deep at the OMF entrance, and 3.2m high at the Shore Road car park entrance.

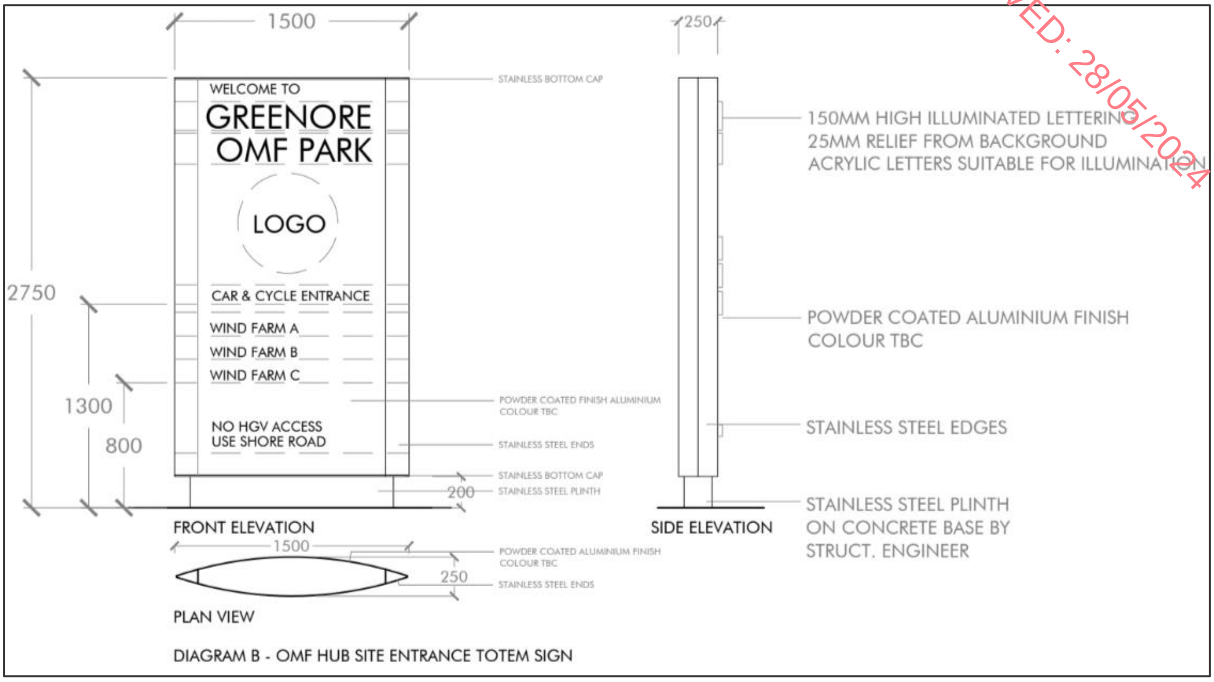

Figure 2.21 OMF Entrance (Euston Street) Totem Sign (Extract from Drg. No. GA 90 01)

External signage will be incorporated on the northern and southern elevations of each of the O&M buildings. The elevational signage will include illuminated lettering, which will be 1m in height. The illuminated lettering will be made from acrylic and fixed to the facade of each building with stainless steel fixings suitable for marine exposure. Figure 2.22 shows the proposed elevational signage. Further details of tenant signage shall be agreed with the planning authority prior to occupation of each building.

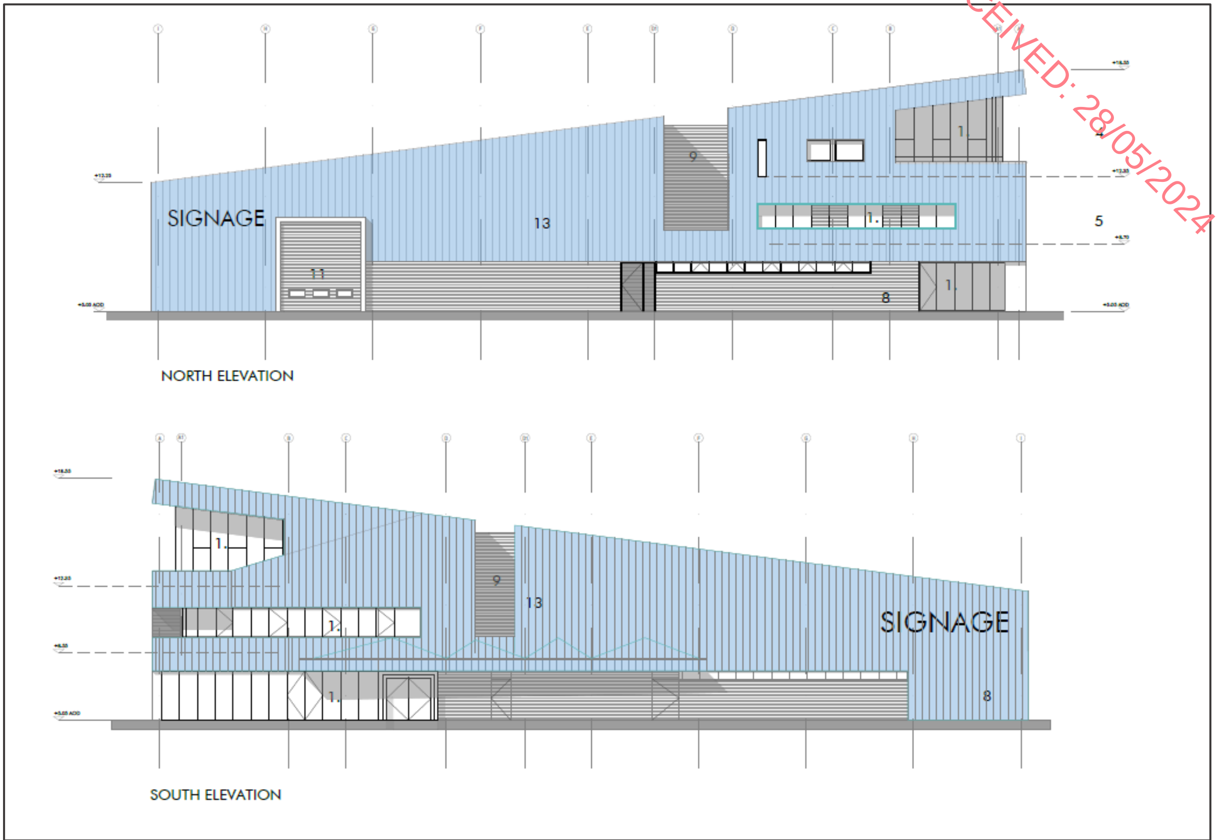

Figure 2.22 Proposed Elevational Signage

Other way finding signage in the form of a low level signage, directional finger signage and gate / quayside signage are proposed across the site. Details of same are provided on Drg. No. GA 90 01 prepared by ECA.

2.2.3.8 Ancillary Works

Site and development works associated with the proposed development include:-

ESB Substation

The new substation is proposed between Building C and the existing Port Office entrance, along the site's southern boundary. The dimensions of the proposed substation are c.27.76m in length, c.5m in width, with a height of c.2.84m.

The load forecast for the facility has been designed to future proof in the event that hybrid/fully electric CTV vessels are used. Hybrid vessels are operational in the UK and the electric motors reduce CO_2 emissions. Advances in technology are occurring in real time and the forecast therefore has a range of 900 kVa to 1,600kVa. Vehicular access to the substation is proposed on the Northwestern elevation via Greenore Ports goods entrance.

The external walls shall be finished to blend in with the surrounding built environment. The finish will be rendered blockwork. The substation shall be fully in line with the ESB specification and requirements.

Waste Management Areas

The total estimated waste generation for the proposed development for the main waste types, based on the AWN (see Chapter 8) waste generation model (WGM) incorporating EPA National Waste reports data, EPA National Waste Statistics Web Resource and floor use per square meter of the proposed development, presented in the Table below, and is based on the uses and areas as advised by the project developer.

Table 2-2 Estimated Waste Generation During Operational Phase Main waste types

Waste Type	Waste Volume (m^3 / week)
Organic Waste	0.44
Confidential Paper	0.13
Glass	0.08
Dry Mixed Recyclables	9.72
Mixed Non-Recyclables	4.19
Total	14.56

The future occupants of each building shall employ suitably permitted/licenced contractors to undertake off-site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contactor handler, transport and reuse/recover/recycle/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

Each O&M building has an adjacent dedicated and secure Waste Storage Area (WSA). The WSA contains segregated waste from the O&M buildings and waste returned from maintenance operations via the CTV's. Each waste receptable is enclosed and self-bunded as required. A mixture of bespoke receptables and standard commercial wheelie bin receptables are provided.

Control of Substances Hazardous To Health (COSSH) stores are provided internally in the building for chemical wastes.

The surface water drainage network will collect runoff from the WSA's and discharge to the network.

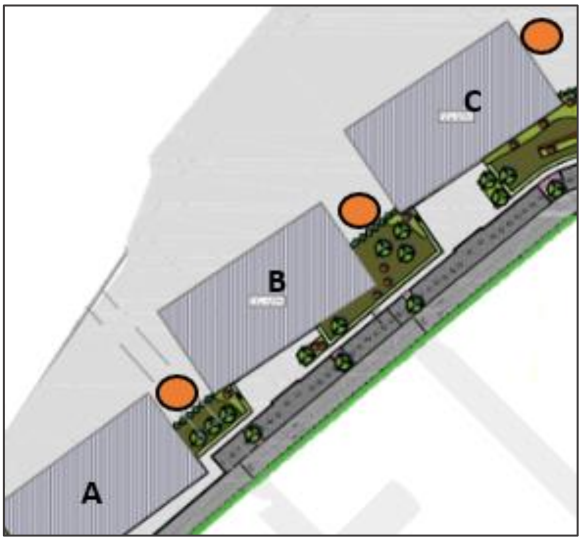

Figure 2.23 WSA locations shown orange – refer to Site Layout Drawing for detail.

Typical receptacles used to store and segregate waste at industrial facilities are outlined in the Table below Supplying these receptacles meets legislative requirements.

Table 2-3 Waste Storage and Segregation

Area/Use	Bins and Equipment Required					
	Mixed Non Recyclables	Dry Mixed Recyclables	Cardboard & Plastic	Glass	Organic	WEEE
Type	1100L Bin(s)	1100L Bin(s)	Baler	240L Bin	240L Bin	WEEE Cage

There are numerous private contractors that provide waste collection in the Louth County Council area. All waste contractors servicing the proposed development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered/permitted/licensed facilities only.

The waste receptacles will be collected directly from the WSA by the waste contractor. Refuse Collection Vehicles (RCVs) will access the buildings using the HGV port entrance located on Shore Road.

Fuel

A fuel store with a capacity of ≥200,000 litres will be provided in a dedicated area that will be maintained and managed by Greenore Port. This quantity of proposed fuel storage is significantly below the applicable threshold of 2,500 tonnes for petroleum products and alternative fuels detailed in Part 2 of Schedule 1 of the Control of Major Accident Hazards (COMAH) Regulations 2015.

The overall volume will be stored in 1-2 bunded tanks and located in a secure area of the site to avoid accidental impact. The tanks will be fitted with overfill prevention, bund alarm and automatic shut off valves to mitigate risk of spills. Surface water will be drained from this area into the proposed network with petrol interceptors included.

CTV fueling infrastructure will be provided at the push on / service berth adjacent to the quay wall. This will be a metered facility monitored and maintained by Greenore Port. Fuel is piped underground to this facility from the fuel store, located north of the new ESB substation. This service berth is discussed in further detail in Section 2.2.3 below.

2.2.4 Nearshore Development

The proposed nearshore development generally comprises capital dredging, development of a pontoon to accommodate Crew Transfer Vessels (CTVs) and improvement works to the existing Berth 3 quay wall. These works will consist of the following:

- Dredging c.45,000m^3 of soft silty sand material and c.1,000m^3 of rock from the existing port berthing area to facilitate navigable access at this location.
- Improvement works to the existing Berth 3 quay wall for a 70m length. This will include a new quay wall face and upgraded deck. The new quay wall shall be a steel pile closed face wall and replace an existing caisson berthing face.
- 220m of new breakwater pontoons, 5-6m wide to accommodate crew transfer vessels (CTVs). The pontoon arrangement shall facilitate 9 no. CTV berths comprising 5 no. 24 pax vessel and 4 no. 12 pax vessels. There is also 2no. layby berths for 12 pax vessels on the outer (southern) side and a push on / service berth adjacent to the quay wall.
- A 40m anti-slip access ramp shall provide access from a newly extended quay wall.

Figure 2.24 General location of Nearshore Development Area (Refer to Site Location Map and Site Layout plan for detailed drawings).

2.2.4.1 Dredging

To facilitate navigable access and suitable berthing for the CTVs it is necessary to carry out c.46,000m^3 of capital dredging between the existing groyne, Berth 2 and proposed Berth 3. Refer to Figure 2-25. The depth in this dredge pocket shall be -4m OD. This depth is suitable for the proposed CTV vessels.

Ground investigations were undertaken by Gavin & Doherty Geosolutions Limited (GDG), with the results presented in the Greenore Port Geotechnical Interpretive Report (GIR) - Refer to Appendix 9.2. The dredge material will comprise of approximately 45,000m^3 of soft dredge arisings (gravel, silt, sand, clay) and 1,000m^3 of rock dredge arising, both with EWC Code 17 05 06.

The existing rock armour supporting the breakwater at the outer edge of the dredging area will be repaired / strengthened during the dredging process, where the need arises. The purpose of this breakwater is twofold, creating a safe wave environment for shipping, which will be of additional benefit to the lighter craft (CTV's) utilising the pontoon. The breakwater also creates a natural 'self-scouring' port and as a result, a regular maintenance dredging programme is not required.

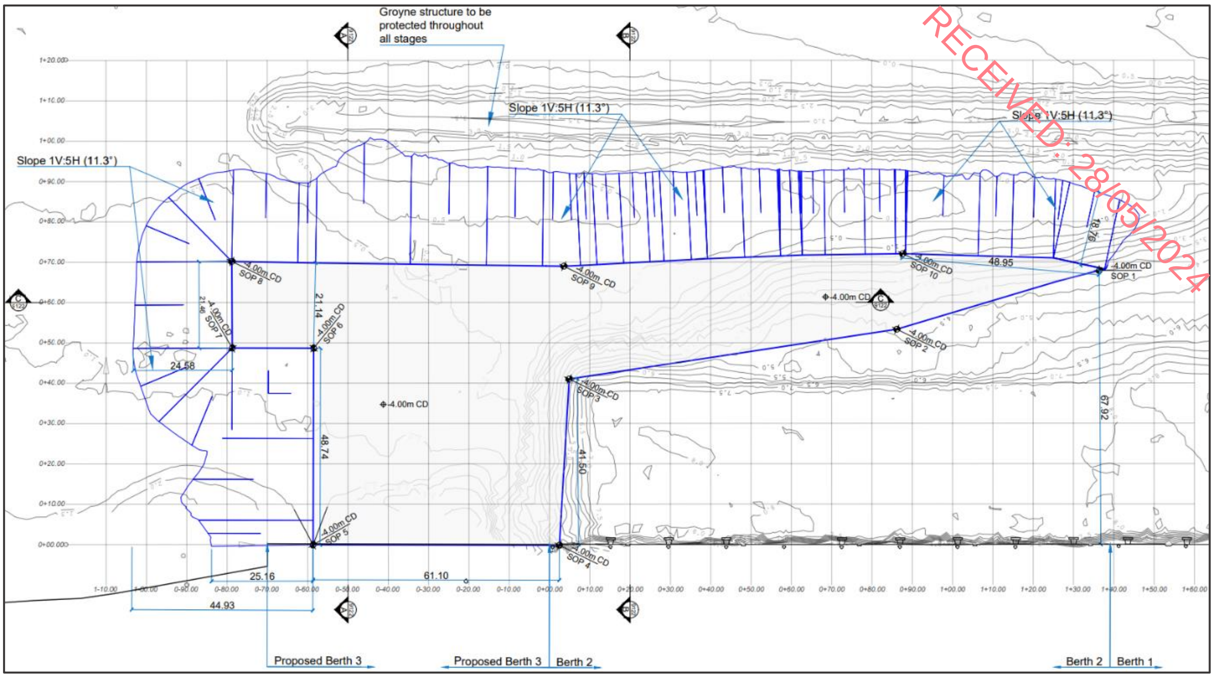

Figure 2.25 Dredge Plan (Extract from Drg. No. D9112)

2.2.4.2 Berth 3 Quay Wall & Quay Deck

The existing Berth 3 is constructed by precast infilled caissons. The proposed development would see the construction of a new quay wall over a length of 70 metres. The design of Berth 3, with a depth of -4m Chart Datum, will be for the use of the proposed O&M facilities development only and is not suitable for cargo. The design preserves the existing caissons in their current position while the existing rock armour will be removed for the extent of the upgrade.

The wall will be a combi-pile wall with a reinforced concrete capping beam, identical to the recently completed Berth 2 refurbishment works (planning ref. 17413). The new quay wall will be in line with the existing Berth 2, approximately 3m from the existing quay edge. The proposed quay wall will tie in with the existing deck level, at approximately +8.1m Chart Datum.

A 40m anti-slip access ramp shall provide access from the new Berth 3 quay deck to the pontoon – refer to Section 2.2.3.4 for details on the pontoon design.

The quay deck pavement shall be heavy-duty reinforced concrete pavement designed to withstand 50kPa port loading.

There is no requirement as part of this development to provide for helicopter access / helipad zone.

2.2.4.3 CTV Berths

The proposed development includes a pontoon system providing for safe berthage for CTV's and safe access and egress for personnel.

The proposed arrangement of the pontoon berthing is based on 9 no. Vessels (5 no. 24 pax design vessel and 4 no. 12 pax design vessels), with 2no. layby berths for 12 pax design vessels on the outer (southern) side.

A ‘push on’ berth located next to the Berth 3 quay wall and will be used by CTV’s for loading / unloading heavy parts, access to fuel and foulwater pump out.

The push on berth provides access to a 3t static crane mounted on the quayside (see Figure 2.26). The 3t crane is required for loading replacement components / plant for transfer to the offshore windfarms by CTV’s.

Figure 2.26 Typical quayside cargo crane at ‘push on’ berth

Fuel (diesel) is provided by means of purpose built, marine fuelling station mounted on the pontoon within a bunded housing (Figure 2.27). No fuel is stored on the pontoon and is instead piped underground to this facility from the landside fuel store. Access to the fuel pump is restricted to authorised card holders. The system is equipped with automatic cut offs and manual stops to mitigate potential for fuel spills. Emergency spill and firefighting equipment is provided on the fuel berth.

Figure 2.27 Fuel pump

A black/grey water pump out facility (Figure 2.28) provides pump out from CTV’s to a quayside manhole. Effluent then travels by gravity to the landside foul water network.

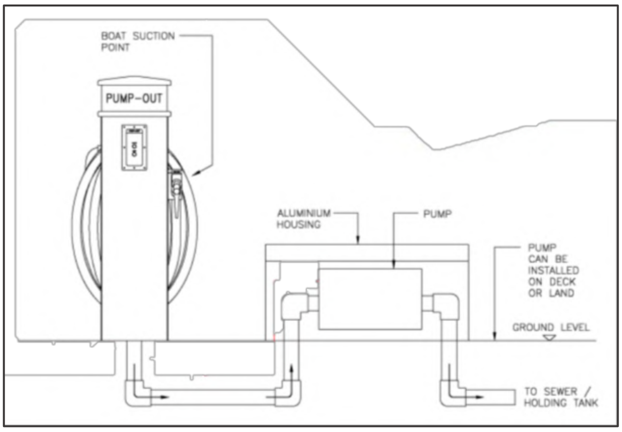

Figure 2.28 Typical foul water pump out

2.2.4.4 Pontoon Design

The design of the proposed pontoon structures has been guided by a dive survey completed by ADCO and Hydraulic modelling undertaken by RPS.

220m of new breakwater pontoons, 5-6m wide will be provided to accommodate CTVs. A ca. 40m shallow gradient access ramp, with anti-slip properties, connected to the new Berth 3 quay wall cope, provides access onto a landing pontoon. This ramp provides safe access and egress for personnel in addition to providing a duct route for on pontoon services.

Figure 2.29 Proposed Pontoon Structure

The outer pontoons provide additional shelter to the vessels from northerly and south-westerly winds in addition to berthing facilities. These are concrete breakwater pontoons. They shall be of a high freeboard design and secured in location by vertical pile guides.

The inner pontoons (fingers) provide individual berths. These will likely be steel pontoons with the same freeboard and vertical guides. The spacing of these fingers provides some flexibility to cater for various CTV dimensions.

Figure 2.30 Similar pontoons installed at Dublin Port

LED lighting bollards provide safe walkway illumination of min 20 lux measured 0.5m from deck level. The lighting is cowled to avoid light pollution and mitigate any hazard to navigation. Low level lighting shall be installed on the access ramp also.

Each berth is serviced by a service bollard with access to shore power and potable water. EV charging will be provisioned where practicable for future installation.

Figure 2.31 Typical service bollard

A static 1t crane is located at each berth for lifting crew bags and small parts. The crane shall have suitable jib length to reach over the gunnel of work vessel and place a 1t pallet in the centre of the vessel. These shall be located on the pontoons. The number and position of arms will be dependent on the final vessel configuration.

The pontoons and fingers will be equipped with mooring bollards suitable to the final vessel configuration. Fenders/rubbing strips will be designed to avoid conflict with beltings/fender strips typical to CTV's. Safety equipment will include ladders, grab rails and emergency bollards. Emergency bollards will contain throw lines, ring buoys and fire fighting equipment. Navigation lights subject to

CIL sanction will likely include 2 nr. 4m high demountable navigation lights at either end of the outer pontoon. These are expected to be a 1nm light with 2m separation with solar power backup.

2.2.4.5 Piling

It is estimated that proposed development will include a total of 34 no. tubular piles for the construction of the quay wall and the pontoons. This includes 24 piles for the Quay wall and 10 no. piles for the pontoon. The following Table sets out the number of piles for both the quay wall and the pontoon construction which are within the SAC and SPA.

Table 2-4 Number and position of Piles

	Total no. of Piles	No. of Piles in SAC	No. of Piles in SPA
Pontoon	10	1	2
Quay Wall	24	24	3

The methodology for installing the piles is outlined below, as per the Outline CEMP-

Quay Wall: The quay wall consists of a piled face and concrete beam (cope) across the top of the piles. The quay wall is tied back to a sheet piled/concrete anchor wall via steel tie rods. The remaining ground is back filled and topped with a heavy-duty concrete pavement. Each of these elements is described in further detail in the Outline CEMP.

Breakwater Pontoon Piling; Piling will require boring into rock, pitching and setting in place of steel piles from floating and elevated platforms. A jackup barge and crane barge will be mobilised to the site by road/sea. Rotary piling equipment will be driven onto the jackup barge at the existing berth. At each pile location the jackup barge, near high water, the barge will lower its legs to the seabed and elevate the working platform approximately 2m above the tide.

Supported by an attendant crane barge the piling plant will oscillate a temporary casing to the seabed and key into rock. It will then use a series of buckets and boring tools to progress a socket within the casing to the designed pile toe level. The attendant crane barge will then pitch the steel pile into position, its verticality supported by the temporary casing. Once checked, the annulus of the pile will be concreted to the base of the temporary casing. Once sufficiently cured, the casing will be removed, and the pile cut to the design level.

2.2.5 Drainage

An **Engineering Planning Report** prepared by Clifton Scannell Emerson Associates, Consulting Engineers accompanies this application and should be referenced for a comprehensive description of the proposed surface water, foul water and water supply strategies. Further details are also provided within Chapter 7 Material Assets – Built Services of this EIAR.

Surface water, wastewater drainage and water supply for the proposed development is designed to comply with the Irish Water code of practice, standard details, policies and guidelines and the requirements of Louth County Council. A Confirmation of Feasibility has been received from Irish Water and is included with this application, as an Appendix to the Engineering Planning Report.

2.2.5.1 Wastewater

The port has an existing foul drainage network in place comprising of a foul collection tank and foul lines servicing buildings in the port. This includes an existing 150mm connection to the foul collection tank from the former Open Hydro building.

The foul collection tank is located under the floor of an existing port warehouse north of the port office and it stores foul effluent from the port and the village. The collection tank is an Uisce Eireann asset, and they are given access to the site to allow tankers enter and empty the chamber for off-site disposal to Dundalk Wastewater Treatment Plant (WWTP).

A new network of foul sewers will be installed to serve the proposed development, discharging to the existing collection tank. There will be no direct or indirect foul water discharge into Carlingford Lough. The proposed wastewater network is presented on Drawing No. 2536 prepared by CSEA.

2.2.5.2 Surface Water

The port currently has an existing stormwater drainage network in place. This serves as a drainage network for both yard surface water and roof water from buildings. The system drains via gravity to a bypass separator and discharges via one existing outfall into Carlingford Lough.

The proposed surface water drainage is designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), Water Services Guidelines for Planning Authorities (Draft – 2018) and The SuDS Manual (CIRIA, 2015).

The proposed surface water drainage system designed for this development includes a number of Sustainable Urban Drainage Systems (SuDS) measures incorporated to reduce run-off volumes and improve run-off water quality. The design of the attenuation storage system has been carried out for the 1 in 100-year event with a 20% allowance for climate change. There are two separate drainage proposals for the proposed development, one for the O&M facility and a separate system for the Surface carpark.

Terrestrial Port Area

The proposed surface water drainage from the O&M site will use the existing outfall into Carlingford Lough. There is existing capacity sufficient to cater for the proposed new development.

The surface catchment area will increase in comparison with the existing situation, however, for the O&M facility site, as the outfall is directly to sea, full attenuation for a 100 year return storm is not required. This is as per the Greater Dublin Strategic Drainage Study, Section 6.6, Vol.2. Instead, the principal issue is water quality not quantity. A bypass separator will be installed to intercept pollutants such as petroleum and oil before the Surface water outfalls to sea.

The proposed Stormtech Attenuation system is proposed to be installed to north of Building B. The surface water network has been designed to take account of high tides where discharge rates will be limited at the outfall. To provide for this, the design approach assumes no outfall from the site for a period of 6 hours. The attenuation storage system will comprise of underground Arch-type attenuation storage units, i.e., stormtech systems or similar approved. The stormtech units will be fully wrapped in impermeable liner around base and sides of excavation required for the installation of the arch type units attributed to the proposed Stormtech attenuation system. The proposed wastewater network is presented on Drawing No. 2536 prepared by CSEA.

Permeable paving is proposed in all parking bay areas to promote infiltration to the groundwater where suitable. However, at locations where infiltration rate is very low, a proposed perforated pipe will convey the excess runoff back to the positive drainage network. Grasscrete will be used for in sections of the site where fire tender access is required.

Residential Site, Shore Road (Surface Carpark)

Permeable paving is proposed in all parking bay areas to promote infiltration to the groundwater where suitable. However, at locations where infiltration rate is very low, a proposed perforated pipe will convey the excess runoff back to the positive drainage network.

Surface water drainage will discharge by a series of filter drains into an underground stone-filled reservoir. This system has been designed using the results of the soakaway tests in accordance with BRE 365, 2016. These results are included in the Engineering Report by CSEA included with this application.

It is proposed to limit the surface water discharge to the equivalent Qbar value to 2.13 l/s/ha in compliance with the Greater Dublin Strategic Drainage Study (GDSDS), Water Services Guidelines for Planning Authorities (Draft – 2018) and CIRIA SuDS Manual, 2015. A “Hydrobrake Optimum” (downstream of the attenuation unit) vortex flow control devices to restrict the flows to the amounts calculated.

A bypass interceptor will be installed to capture pollutants such as petroleum and oil and prevent their entry to the public drainage system or groundwater or groundwater where an infiltration system is utilised.

Surface water will discharge to the public surface water pipe on Shore Road. The proposed surface water network is presented on Drawing No. 2507 prepared by CSEA.

2.2.5.3 Water Supply

There is an existing 100mm diameter watermain parallel to the southern boundary of the site and a network of pipes at the Port Office entrance coming from Greenore village. There is also a significant watermain network within the Port serving the existing infrastructure and quayside operations.

A pre-connection enquiry (PCE) form was submitted to Irish Water which addressed the design population, and the proposed water demand applicable to the development. The average water demand for the development was calculated as 0.39 litres/sec whilst peak water demand was calculated as 1.95 litres/sec. It is proposed to use HDPE watermain size of 100mm to service the three buildings. Each proposed building will have a separate flow meter/ boundary box as per IW standards.

Irish Water have issued their Confirmation of Feasibility letter for the above and it is included with this application.

2.2.5.4 Flooding

Coastal flooding from Carlingford Lough is the main source of flooding at the site. The site is predominantly located within flood Zones C and B. However, some elements of the proposed development fall within flood zone A, including the western extent of the terrestrial port area and the eastern extents of the Shore Rod residential site.

A Site Specific Flood Risk Assessment (SSFRA) has been carried out by McCarthy Browne and accompanies this planning application under separate cover. This SSFRA confirms the following land levels for each of the Flood Zones Areas:-

- Flood Zone A comprises lands with elevations less than +4.25M OD Malin
- Flood Zone B comprises lands with elevations between +4.25M OD Malin and +4.47m OD Malin
- Flood Zone A comprises lands with elevations greater than +4.47M OD Malin

S/N	Flood zone	Elevation reference(mOD)	Colour code
1	A	<4.25	
2	B	Between 4.25 and 4.47	
3	C	>4.47	

Figure 2.32 Flood Zone Map (Extracted from Site Specific Flood Risk Assessment)

The proposed development proposes to raise ground levels and finished floor levels in the areas concerned as follows:

- The O&M buildings (warehouses and offices) are to be no lower than 5.05m OD, with 5.27m OD for the substation
- All amenity spaces, storage and parking areas to be no lower than 4.25m OD Malin
- The quayside facility, although a water compatible development, is recommended to be no lower than 4.25m OD while matching the existing quay wall level.

As outlined in the SSFRA, the site does not act as a flood storage zone and the proposed development will not add any new hardstanding areas within the port. The carpark area will be constructed with permeable paving. Surface water will also be managed through design to limit discharge and avoid outfall during extreme high tide events.

2.3 Hours of Operation & Staffing

The O&M facility will have some level of operation 24 hours per day, seven days a week.

On a typical week day, Monday to Friday 8.00 to 18.00, there will be c. 45 persons on site per building. Cumulatively this equates to c. 135 employees when all 3 buildings are occupied. This includes office, warehouse, control room staff and technicians. A nominal figure has been included for visitors to the site. Refer to Table 2.4.

During the summer months (min. June – August), or periods of better weather, the programme of maintenance works on an Offshore Renewable Energy (ORE) facility intensifies requiring additional technicians on site daily, increasing from c.15 technicians to c. 30 technicians per building. This brings the cumulative total to c.180 staff daily.

Every 2-4 years, biennial maintenance works are undertaken. Again, these works are undertaken in the summer months (min. June – August), or periods of better weather. The nature of this work requires additional technicians on site daily, up to c.60 technicians per building. The total number of staff daily during these periods will be c.225.

Refer to Table 2.4.

The five main user types are described in further detail below.

- **Office staff** - Office staff will work during normal office hours 08:00 – 18:00, Monday to Friday. Each building will have up to 8 office staff.
- **Warehouse staff** - 2-3 staff are expected to be based in each warehouse. These staff will carry out minor maintenance on plant and equipment and ensure spare parts shelves are stocked and prepared for operations. It is expected that warehouse staff will predominantly work normal office hours, 08:00 – 18:00, Monday - Friday. 24-hour access will be required to warehouses.
- **Control room staff** - Control rooms may be manned on a 24-hour basis by 2-3 staff on a shift basis. A sophisticated SCADA (supervisory control and data acquisition) system enables the Control Room Staff to monitor the Offshore Wind Farms in real time. This provides information on the output of the wind turbine generators and all the related system parameters.
- **Technicians** – On arrival, technicians may receive a work briefing and prepare equipment for the sea. They will then change into sea going gear and assist in the transfer of small equipment and gear bags to the vessel by trolley and forklift from the warehouse. Technicians will typically work

in 12hr shifts with CTV operation approximately between 06:00 and 21:00. This will be weather and travel time dependent. Scheduling of CTV departures and arrivals will be operator dependent and controlled by Greenore Port. It is unlikely that CTV movement will occur simultaneously. It is estimated that CTV's will typically operate at 60-70% capacity with 1-2 CTVs per building (per operator) during the winter months – this equates to c. 30 technicians per facility, and cumulatively up to c. 90 technicians daily.

Annual maintenance will be programmed to avail of better weather during the summer months (minimum June to August). During these months, 2-3 CTVs per building (per operator) will operate with c. 45 technicians per facility (cumulatively c. 135 technicians) daily.

Biannual maintenance, which may occur every 2-4 years, may require additional CTV fleet. During these periods, the number of technicians required per operator is c. 60 technicians (cumulatively 180 technicians). Due to availability of resources, it is unlikely that these maintenance works will be undertaken by more than one of the operators at any one time. However for the purposes of a robust assessment, the assessments completed for this application have assumed the worst case scenario where these biennial maintenance works occur concurrently.

- **Visitors** - Due to the nature of business and operations, this will be a secure facility. The offices will have a public facing aspect, but it is not expected that general public will have any requirement to visit the offices. Visitors will be business to business clients and attendance will be infrequent. 1 parking space provided per building.

Table 2-5 Staff Levels

Maximum Staff Levels				
	Building A	**Building B**	**Building C**	**Total**
Office	8	8	8	24
Warehouse	3	3	3	9
Control Room	3	3	3	9
Technicians	30	30	30	90
Visitors	1	1	1	3
Daily Staff Levels	**45**	**45**	**45**	**135**
Staff Levels During Annual Maintenance Events (+15 technicians per building)	**60**	**60**	**60**	**180**
Staff Levels During Biannual Maintenance Events (+30 technicians for one building)	**75**	**75**	**75**	**225**

2.4 Demolition and Construction Phases

This application is accompanied by an Outline Construction Environmental Management Plan (CEMP) and a Resource Waste Management Plan (prepared by AWN and appended to Chapter 8). Both reports should be read in conjunction with this chapter for a comprehensive description of the construction phase.

2.4.1 Phasing

Table 2.5 sets out the proposed phases of development.

The current indicative phasing suggests that the project will be split over 2 phases, linked to the delivery of future ORE projects and the associated ORESS Auctions (Offshore Renewable Energy Support Scheme).

These phases are based upon the information available at this time and for the avoidance of doubt, it is not proposed or intended that the applicant / contractor(s) are bound by these proposals which may change depending on the timing and circumstances pertaining at the time of construction.

For EIA purposes, Phase 1 is assessed with current baseline. Phase 2 is assessed with Phase 1 included as part of the baseline.

Table 2-6 Phases of Development

Phase	Infrastructure	Duration of Works	Anticipated Completion
1	Building A and adjacent carpark (28 no. spaces), re-commissioning of 'Open Hydro' carpark spaces' (60 no. spaces); full extent of capital dredging, 70m quay wall at Berth 3, pontoon to cater for four crew transfer vessels, and the replacement of the communications mast. Associated site and development works, including drainage, lighting and landscaping related to the above elements will be completed in this phase. Demolition of dwelling house at Residential Site (Shore Road) and provision of contractor's compound / carpark with pedestrian access through port lands to the O+M site.	16 months	Q1 2026 for handover to tenant
2	Demolition of existing former Open Hydro building and ESB substation and construction of Buildings B and C, new access road including landscaping and parking areas, substation, Public / private realm upgrade at port entrance, pontoon enlarged to accommodate 5 additional berths for crew transfer vessels, surface carpark and pedestrian access. Associated site and development works, including pavement upgrade quayside of Buildings A, B and C, drainage, lighting and landscaping related to the above elements will be completed in this phase.	20 months	2029[1]

[1] Assuming tenants secured from ORESS 2.2 auction.

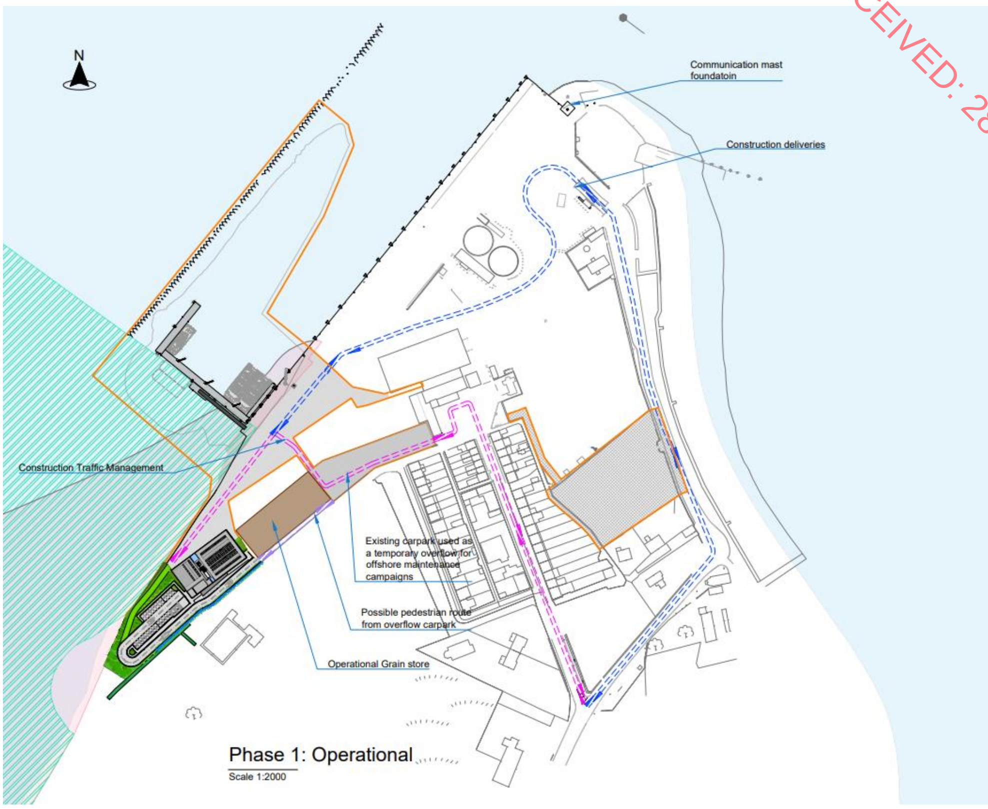

Figure 2.33 Proposed Phasing Plan Phase 1 (Extract from Drg. No. D9210, prepared by McCarthy Browne)

The principal stages of the construction stage are;

i. Mobilisation
ii. Quay Wall
iii. Nearshore Works
    a. Dredging
    b. Pontoon Piles
    c. Breakwater Pontoons
iv. Buildings
    a. Building A
    b. Building B
    c. Building C
v. Surface Carpark
vi. Public Realm

The following is the approx. duration attached to the individual elements that will make up Phases 1 and 2:

Phase 1 Overall Timeline - 16 months

- Dredging – 2.5 months
- Quay wall – 8 months

- Pontoon – 3.5 months
- Building A – 16 months
- Demolition of vacant dwelling at Residential Site – 0.5 months
- Communications Mast -1 month
- Ancillary site and development works and landscaping

Phase 2 Overall Timeline: 20 months

- Pontoon (part) – 5 months
- Demolition Open Hydro – 1 month
- Building B and C – 16 months
- Substation – 3.5 months
- Fuel Storage – 1 month
- Access control/fencing – 1 month
- Port Entrance upgrades – 2 months
    - Demolition of 'Sea Farer's Room' (part of port office building) – 1 week
    - Construction – 2 months
- Surface Carpark and pedestrian access – 4 months
- Demolition of ESB Substation/Switch room
- Ancillary site and development works and landscaping

2.4.2 Outline Construction and Environmental Management Plan

An Outline *Construction and Environmental Management Plan* (CEMP) has been prepared by McCarthy Browne and accompanies this application. The Outline CEMP contains detail on the construction programme outlined above and construction related activities detailed in the sections below.

Assumptions have been made in the Outline CEMPP based on the information available at the time of writing and for the avoidance of doubt, it is not proposed or intended that the developer / contractor is bound by these proposals which may change depending on the timing and circumstances pertaining at the time of construction.

On receipt of a grant of permission, and on appointment, the contractor(s) will update the Outline CEMP to comply with and implement the requirements of the EIAR (monitoring and mitigation), the MAC and any conditions imposed as part of the granted planning approval. The Contractors CEMP can be submitted to the Planning Authority prior to commencement.

2.4.3 Site Compound

A site layout plan will be designed and implemented by the contractor. This will include contractors' compound, welfare, site parking and offices. The location of the contractor's compound will vary through the course of the development, subject to the Contractors programme and marshalling – these details will be outlined in the Contractors CEMP, to be completed post a grant of planning and upon their appointment.

For Phase 1, it is envisaged that the main compound will likely be located in part of the existing former Open Hydro carpark. When Phase 2 commences, and the former Open Hydro carpark is no longer available, the surface carpark on Shore Road will be used. Additional temporary compounds may be made available within the port boundaries.

The compound is expected to avail of existing utilities on the site including water, electricity and foul connections. On completion of the works, all compound areas will be completed in accordance with the permitted development or returned to its former condition.

2.4.4 Construction Personnel

A peak of 70 construction workers may be on site at any one time. An average of 30 construction workers are estimated to be on site during construction phases.

2.4.5 Access and Parking

Access to the works will be in compliance with the Port's existing traffic management plan. All heavy construction traffic will avoid the village, entering and departing via the existing Port weighbridge / heavy goods entrance off Shore Road.

Sufficient parking will be made available within the contractor's compounds / applicant's lands for all workers. The location of parking will vary throughout the development, subject to the Contractors programme and marshalling – these details will be outlined in the Contractors CEMP, to be completed post a grant of planning and upon their appointment.

It is envisaged that during Phase 1, construction workers will use the former Open Hydro carpark and during Phase 2, when this is no longer available, the proposed surface carpark site will be used. A temporary gravel finish to the proposed carpark will be in place, with the pedestrian access route to the site provided.

2.4.6 Marine traffic

Greenore Port will notify Port users of works within the port and notify The Marine Survey Office as necessary. Navigation marks and lighting will be established to warn marine users of any works potentially interfering with navigation.

2.4.7 Construction Hours

Construction works, except for dredging and pile driving works, will generally be limited to the hours 0700 – 2000 Monday to Friday and 0700 – 1600 hours on Saturday. Some works have to be undertaken at low tide and their construction hours will be linked to tides (for example works associated with the pontoon construction and quay wall).

Pile driving works will be limited to 0800-1800 Monday to Friday and 0800 - 1600 hours on Saturday. It is not envisaged that works will take place on public holidays.

Dredging, due to the nature of the activity, is undertaken on a 24 hour basis to achieve the maximum production rates within tidal envelopes Dredging activities will occur for approximately 8-10 weeks.

If works are required outside of these hours, in exceptional circumstances, the planning authority will be notified in advance.

2.4.8 Demolitions

The extent of the demolition works are outlined in Section 2.2.1 of this Chapter.

The vacant dwelling house at the residential site on Shore Road will be demolished as part of the Phase 1 programme. This will be used as contractor's compound and parking area. When the Phase 2 works commence and the former Open Hydro carpark is no longer available, part of the Shore Road surface carpark site will made available for staff parking for Building A (Refer to Section 2.2.2).

The former Open Hydro building will remain in situ and operational (storage of port commodities) during Phase 1, with its demolition proposed as part of the Phase 2 works.

The substation and part of the port office building will be demolished in phase 2. Part of the concrete quay deck pavement will be removed to facilitate the Phase 1 development (Building A) with the remainder being removed in Phase 2.

Material not suitable for reuse on site will be removed to licenced facilities for recycle or disposal.

2.4.9 Earthworks

2.4.9.1 Site investigations

Pre-existing near shore and terrestrial site investigation information has been studied for this development and was used to define targeted additional site investigations.

A sample of existing SI on the site is listed below.

- IGSL, September 2023
- Causeway Geotechnical, May 2020,
- Ground Investigations Ireland, March 2020
- Causeway Geotechnical, March 2019
- Ground Investigations Ireland, February 2018
- Ground Investigations Ireland, May 2015
- RPS Group (Topaz Fuel Storage Terminal), November 2011
- Glover Site Investigations, May 1999
- KT. Cullen & Co (Topaz Fuel Storage Terminal), December 1996

Additional site investigations included:

- Land based ground investigations by IGSL presented in Ground Investigation Report (Factual), November 2023
- MERC, Nearshore particle size analysis, September 2023

All site investigation data has been reviewed and presented in Ground Investigation Report by GDG, Report Nr. 23181-R-001 dated January 2024.

2.4.9.2 Ground Conditions

The nearshore development area of the works is described as medium dense to dense grey fine to coarse slightly silty sandy Gravel interbedded with loose to medium dense gravelly Sand. Some thick layers of cobbles and boulders were also recorded. The stratum is underlaid by very stiff grey/brown SILT/CLAY with some gravel and occasional shells content. A strata of silty sandy Gravel overlays moderately strong grey fine grained Carboniferous Limestone. It is expected that the majority of all dredge will take place in the layers above limestone.

The land development area i.e. the developed port area includes Concrete, Made Ground and Hardcore Fill. This is followed by dense-to-dense grey fine to coarse slightly silty sandy Gravel interbedded with loose to medium dense gravelly Sand. The presence of thick layers of cobbles and boulders were also recoded within these layers. The stratum is underlaid by very stiff grey/brown SILT/CLAY with some gravel and occasional shells content over bedrock.

It is noted from pre-existing site investigations that petroleum hydrocarbons were present in a localised area of the development site. These investigations were commissioned as part of the development of an exit strategy by the lessor from the site. Recent investigations found no traces of hydrocarbons remaining but did find traces of asbestos fibres.

Figure 2.34 Google maps extract from July 2013 showing former Topaz site outlined in blue.

A HazWasteOnline Waste Classification Report based on 2023 IGSL sampling has confirmed sample soils in all but one as ‘Non-Hazardous’. One sample (BH 04 at depth 1m) has been identified ‘Hazardous’ owing to the presence of asbestos fibres.

The asbestos demolition report, appended to the Outline CEMP, showed no asbestos within the former Open Hydro building, the ‘Sea farer’s room or the substation. Low risk asbestos has been identified in the dwelling house. All asbestos will be removed and disposed of by a registered contractor under licence.

2.4.9.3 Invasive Species

No invasive species have been observed on the site.

2.4.9.4 Bulk Excavation

Bulk excavation will take place for dredge, quay wall construction, pavement upgrades, foundations and surface parking area construction. Dredging is detailed in Section 2.3.3.1. Excavated material will be stockpiled for use as engineering fill, landscaping and other uses throughout the site. The following expected excavation volumes are anticipated.

Table 2-7 Excavation volumes

Material type	Excavation (m3)	Backfill (m3)
Topsoil	1,925	540
Soil excavation	5,300	3,600
Total	**7,225**	**4,140**

2.4.9.5 Pavement upgrades

The areas seaward of the proposed OMF buildings will receive a new heavy-duty pavement. To construct the pavement an excavation of approximately 500mm will be required for the extents of the new pavement structure.

A new stormwater attenuation tank will be constructed under the proposed pavement.

Areas to the landward side of the proposed OMF buildings will receive hard and soft landscaping including formation of access roads. This will require the excavation of approximately 200mm for the extent of the new surfacing.

2.4.9.6 Foundations

It is anticipated that footings under the proposed buildings will be strip footing type supplemented where necessary by driven piles. This will be relevant for all buildings and substations. A new floor slab will be constructed between these footings with a FFL of 5.05m.

A concrete footing will also be required for the proposed communications mast.

2.4.9.7 Piling

Arisings from bored piling will consist of rock, sands and gravels. These will be stockpiled for classification and disposal off site.

2.4.9.8 Services

Trenching techniques will be employed for services installations. Where necessary, trenches will require temporary support or battering. Underground surface water tanks will be formed by open excavation, where possible.

2.4.9.9 Residential Site, Shore Road (Surface Car park)

Following site clearance, including the demolition of existing unoccupied house and clearance of scrub / vegetation, bulk excavation of topsoil will take place at the proposed parking area. This soil will be stockpiled for reuse in new planted areas within the carpark and throughout the development site. Additional excavations will take place for pavement sub-base and proposed attenuation areas under the proposed pavement.

A bituminous surface will be applied to the parking area in Phase 2, with a temporary gravel / stone surface applied during Phase 1 to facilitate contractor's compound and parking.

2.4.9.10 Waste

It is confirmed in the Environmental Risk Assessment and Waste Characterisation Report that the bulk of the excavated material is suitable for removal to an inert waste facility and/or a soil and stone recovery facility. Remaining materials will be disposed at non-hazardous licenced facilities. This is documented further in the Outline CEMP submitted with this application.

2.4.10 Nearshore Works

2.4.10.1 Quay wall construction

The quay wall consists of a piled face and concrete beam (cope) across the top of the piles. The quay wall is tied back to a sheet piled/concrete anchor wall via steel tie rods. Suitable arisings will be reused in backfilling operations above the tie rod and between the quay wall and existing caissons, topped with a heavy-duty concrete pavement. Each of these elements is described in further detail in the CEMP.

2.4.10.2 Dredging

Dredging will be carried out using a backhoe dredger mounted on pontoons. The dredger will deposit the dredge material into a hopper barge which will be towed to the quayside. Material will be dug out of the hopper barge by an excavator standing on the quay side and placed in a temporary bund for onward transfer to a licenced disposal facility by heavy Goods Vehicles with a carrying capacity of 20 tonnes.

The construction programme (included in the Outline CEMP by McCarthy Browne and submitted under separate cover) allocates approx. 8 -10 weeks to the dredging phase. A peak of 120 HGV movements per working day will be required to service the dredging operation. This will be timed to avoid concurrent busy periods for the port. It is estimated that a haulage contractor would dispose of the material over 12 hours per day Monday – Friday and over 6 hours on Saturdays.

2.4.10.3 Pontoon Installation

Piling will require boring into rock, pitching and setting in place of steel piles from floating and elevated platforms. A jackup barge and crane barge will be mobilised to the site ~~by road/sea~~. Rotary piling equipment will be driven onto the jackup barge at the existing berth. At each pile location the jackup barge will lower its legs to the seabed and elevate the working platform above the tide.

Supported by an attendant crane barge the piling plant will oscillate a temporary casing to the seabed and key into rock. It will then use a series of bucket and boring tools to progress a socket within the casing to the designed pile toe level. The attendant crane barge will then pitch the steel pile into position, its verticality supported by the temporary casing. Once checked, the annulus of the pile will be concreted to the base of the temporary casing. Once sufficiently cured, the casing will be removed and the pile cut to the design level.

Pontoons will be manufactured off site. The pontoons will arrive in segments of up to 70t each if arriving by road. They will be lifted into the water using the harbour cranes on site and fixed in position by manual labour using workboats and small tools. The access ramp will arrive in similar fashion and be bolted in place. A team of technicians will complete the installation of fixtures and fittings including electrical cabling and service bollards.
The pontoon piling is on a phased basis. Phase 1 will cater for 4 berths + 2 layover berths. The second phase of pontoons and associated piles will coincide with the tenancy of Phase 2 (Buildings B & C).

2.4.11 Plant

A list of the plant required for the proposed development is included in the Outline CEMP by McCarthy Browne, including but not limited to excavators, pile driving rig and piling plant, jackup barge and pontoon working platform, dredging barge, crane, harbour crane, rock breaker and crusher. Further details are available in the CEMP including a description of the purpose / use of each piece of plant equipment and the stage / works that the equipment will be utilised.

2.5 Materials Arising and Waste

2.5.1 Demolition Works

The following table from Chapter 8 Material Assets Waste sets out the breakdown of the materials arising from the demolition works and outlines the predicted on site reuse, recycle and disposal rates for the dredge material. If suitable, excavated material may be re-used within the development, for example it is proposed to crush up to 40% of the concrete and re use in the proposed pavement areas.

Table 2-8 Predicted on and off-site reuse, recycle and disposal rates for demolition waste. (Refer to Table 8.1 Waste)

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	10.0	0	0	85	8.5	15	1.5
Concrete, Bricks, Tiles, Ceramics	2047.2	40	818.9	55	1126.0	5	102.4
Plasterboard	3.0	0	0	80	2.4	20	0.6
Asphalts	75.0	0	0	25	18.8	75	56.3
Metals	74.7	2	1.5	90	67.3	8	6.0
Timber	2.0	10	0.2	40	0.8	50	1.0
Total	2212		821		1224		168

The selection of waste contractors and waste facilities is subject to appropriate selection criteria including proximity, competency, capacity and serviceability. The applicant has identified the following licenced and authorised sites to take the predicted waste but reserves their right to deposit at any suitably licensed facility if these sites are unavailable for use when required or a more suitably placed waste or recovery facility becomes operational in the future.

- Dundalk Landfill & Civic Waste Facility - Dundalk Town Council, Newry Road, Dundalk, Louth (Permit No. W0034-02)
- Integrated Materials Solutions Limited Partnership, Hollywood Great, Nags Head, The Naul, Dublin (Permit No. W0129-02) – Glass, Concrete, Bricks, Tiles, Ceramics, Asphalts
- Rilta Environmental Ltd, 14A1 Grants Road, Greenogue Business Park, Rathcoole, Co. Dublin (Licence No. W0185-01)
- Clashford Recovery Facilities Ltd., Naul Townland, Naul, Meath
- North City Operations Depot, St. Margaret's Road, Ballymun, Dublin 11, Dublin (Licence No. W0302-01)
- Allied Recycling, Clonmellon Industrial Estate, Clonmellon, Co. Westmeath (Permit No. WFP-WH-2022-0002-00) - Plasterboard
- Haughey Metals, Dundalk, Co. Louth (Permit no. WL-LN 09 13) – Metals

2.5.1 Dredging

The dredge material will comprise of soft dredge arisings (gravel, silt, sand, clay) and rock dredge arising, both with EWC Code 17 05 06. The following is an estimated breakdown of the dredge material.

Table 2-9 Breakdown of Dredge Volumes

Material	Volume (cubic meters)	EWC Code
Soft Dredge Arisings	45,000	17 05 06
Rock dredge arisings	1,000	17 05 06

It is envisaged that all soft dredge arisings will be removed for appropriate offsite reuse, recovery, recycling and / or disposal due to limited opportunities to re-use on site. The Environmental Risk Assessment and Waste Characterisation Report confirms that the bulk of the excavated material is suitable for removal to an inert waste facility and/or a soil and stone recovery facility. Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011-2020) and EPA approval will be obtained prior to moving material as a by-product.

Remaining materials will be disposed at non-hazardous licenced facilities.

There is a number of licensed, permitted and registered waste facilities to take the dredge material (EWC Code 17 05 06). The selection of waste contractors and waste facilities is subject to appropriate selection criteria including proximity, competency, capacity and serviceability. The applicant has identified the following sites but reserves their right to deposit at any suitably licensed facility if these sites are unavailable for use when required or a more suitably placed waste or recovery facility becomes operational in the future.

- Clashford Recovery Facilities Ltd, The Naul, Co. Meath (Permit No. W0265-01)
- Integrated Materials Solutions Limited Partnership, Hollywood Great, Nags Head, The Naul, Dublin (Permit No. W0129-02)

This is documented further in the Outline CEMP by McCarthy Browne and a Construction and Demolition Waste Management Plan.

Rock will be crushed and re-used on site.

2.5.2 Construction

The construction of the proposed development will involve the following materials and quantities.

Table 2-10 Construction Materials and Deliveries to Site

Material	Unit	Volume	HGV Deliveries to Site
Piling plant			2
Drainage & ducting			3
Stone	m^3	3700	444
Precast piles	t	405	20
Ready-mix concrete	m^3	3100	384
Steel reinforcement**	t	415	0
External brick	m^3	130	16
Insulated cladding	m^2	2700	11
Roofing materials	m^2	3500	17
Glazing	m^2	650	12
Paving	m^2	1200	3
Bitumen surfacing	m^3	25	70
Internal fit out			12
Solar panelling	m^2	650	40
Mechanical & electrical fittings			30
Miscellaneous			2
Total			1068

Waste materials likely to be generated during the Construction phase of the proposed development are summarised in the Table below, taken from Table 8.2 of this EIAR.

Table 2-11 Predicted on and off-site reuse, recycle and disposal rates for construction waste.

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	32.8	10	3.3	80	26.3	10	3.3
Timber	27.9	40	11.1	55	15.3	5	1.4
Plasterboard	9.9	30	3.0	60	6.0	10	1.0
Metals	8.0	5	0.4	90	7.2	5	0.4
Concrete	6.0	30	1.8	65	3.9	5	0.3
Other	14.9	20	3.0	60	9.0	20	3.0
Total	**99.5**		**22.6**		**67.5**		**9.4**

2.6 Health and Safety

The appointed contractor and Project Supervisor Construction Stage (PSCS) will be responsible for managing all aspects of health and safety pertaining to the construction works in line with the requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013, and other relevant Irish and EU safety legislation at all times.

2.7 Monitoring

2.7.1 Community Liaison

The appointed Main Contractor will be required to follow best practice as outlined in 'The Code of Considerate Practice'. This is an initiative set up by the construction industry in 1997. It is designed to encourage best practice, beyond statutory requirements, focusing on the community, the environment and the workforce. The Considerate Constructors Scheme experience in Ireland has been that early positive and proactive engagement with businesses and residents impacted by construction is the best approach.

2.7.2 Integrated Pest Management

The Main Contractor will take all necessary steps to ensure that pests - rodents, birds, insects and plants are controlled at all times.

Control measures will be undertaken prior to commencement of any works on the site. Poison where used, will comply with any relevant Health and Safety requirements and to eliminate any danger to children, household pets and other wildlife. Old and disused service pipes and voids will be removed or filled to avoid the potential for pests to infest the site.

2.7.3 Environmental

The monitoring proposed in Chapters 4 to 17 of this EIAR will be carried out during the demolition and construction phases. This monitoring is integrated to ensure that there will be no likely significant impact during development of the site.

A bespoke site Construction Environmental Management Plan (CEMP) will be prepared by the appointed contractor prior to work commencing on site. The main purpose of a CEMP is to provide a mechanism for implementation of the various mitigation and monitoring measures which are described in the EIAR. The CEMP demonstrates the applicant's commitment to implementing the proposed development in such a way as to avoid or minimise the potential environmental effects arising from construction activities. All personnel will be required to understand and implement the requirements of the plan.

Aspects that will be addressed within the CEMP will include but are not limited to, waste and materials management; noise and vibration; dust and air quality; traffic and vehicle management; pollution incident control; and protection of vegetation and fauna. A summary of the mitigation measures to be incorporated into the CEMP is provided in Chapter 16 of the EIAR

2.8 Commissioning

The testing and commissioning of services (drainage, watermain, gas, electricity) will be completed in accordance with relevant codes of practice as set out in **Chapter 7** of the EIAR.

2.9 Decommissioning

The design life of the scheme is greater than 60 years. The proposed development is designed to support offshore wind infrastructure in the Irish Sea, which typically has a lifespan of 25-35 years.

However, technological advances and improvements in engineering practices will potentially lead to longer operational lifespans in the future and it is generally possible to extend the lifetime of ORE infrastructure by 'repowering' (i.e. replacing wind turbines and/or foundations with those of a newer specification or design). This would enable the continued supply of renewable electricity and contribute to Ireland's renewable energy targets. The proposed OMF will support the lifetime of the offshore infrastructure and the decommissioning phase of the offshore infrastructure. If the lifespan of the offshore wind infrastructure is extended, the OMF development will continue to be used.

When (if) the offshore wind infrastructure is decommissioned, the OMF development is likely to be repurposed for an alternative port related use.

It is noted that the MAC Consent for the proposed development has a term of 45 years. A new MAC will be sought at the requisite time, and all other appropriate consents, for the nature of the development to be continued or re-purposed.

Thus, for the EIA process, the development is considered permanent, and a decommissioning phase is not considered in this report.

2.10 Conclusion

This chapter sets out the development parameters for the proposed development including an overview of the Architectural, Landscape and Engineering strategy. An overview of the phasing for construction has also been provided, and further information can be found in the Outline CMEP prepared by McCarthy Browne.

CHAPTER 3

ALTERNATIVES

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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3 Alternatives

3.1 Introduction

The requirement to consider alternatives within an Environmental Impact Assessment Report (EIAR) is set out in Annex IV (2) of the EIA Directive (2014/52/EU) and in Schedule 6 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which state;

> *"A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment"*.

Reasonable alternatives may include project design proposals, location, size and scale, which are relevant to the proposed development and its specific characteristics. The Regulations require that an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects be presented in the EIAR.

The Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports states:

> *"The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."*

The Guidelines also state that the range of alternatives considered may include the 'do-nothing' alternative.

Accordingly, this chapter of the EIAR provides an outline of the main alternatives examined during the design phase. It sets out the main reasons for choosing the development as proposed, taking into account and providing a comparison on the environmental effects. The assessment of alternatives is considered under the following headings:

i. Do Nothing Alternative
ii. Alternative Use
iii. Alternative Locations
iv. Alternative Project Design
v. Alternative Processes

Notwithstanding the above, pursuant to Section 3.4.1 of the 2022 EPA Guidelines, the consideration of alternatives also needs to be cognisant of the fact that *"in some instances some of the alternatives described below will not be applicable – e.g. there may be no relevant 'alternative location'…"* The Guidelines are also instructive in stating: *"Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR… It should be borne in mind that the* *amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics'"*.

3.2 Consideration of Alternatives

3.2.1 Do Nothing Alternative

The 'Do-nothing' alternative is a general description of the evolution of the key environmental factors of the site and environs if the proposed project did not proceed. Each Chapter of this EIAR includes a description of the 'Do Nothing' alternative and should be referenced in conjunction with this Chapter.

3.2.1.1 Do Nothing – Actual

Under a 'Do-nothing' scenario, the proposed development site would remain in its current condition, serving largely as (open) storage for the existing Greenore Port operations. However, it is anticipated that this would be short term in duration having regard to the national and regional planning policies encouraging the development of Irish ports, especially for the support and development of the forthcoming ORE industry of the Irish east coast.

Under this alternative scenario, the impacts of the proposed development would not arise; the operational and construction phase would not generate additional traffic movements on land and on sea and no additional noise pollution would impact the local residents and fauna.

The impact of this approach would be to not make efficient use of an established use at a serviced site and consequently the opportunity to generate significant employment opportunities would be lost.

Under this scenario, the potential future tenants would seek an alternative site for their operations and maintenance base. There would be no certainty with regard to the location and there would be a risk that the employment opportunities generated by this development would be permanently lost from Co. Louth.

The following Table summarises the effect of the 'Do Nothing' alternative described above. All of the predicted effects are determined likely to occur. It is noted that the duration of effects under this scenario are considered at least short-term (1-7 years), this reflects a reasonable timeframe for a further application for development to come forward on the site, in the absence of this subject proposal.

Table 3.1 Do Nothing Description of Effects (Actual)

Aspect	Quality of Effect	Significance	Context	Duration
Population & Human Health	Negative	Profound	County	Short-term
Landscape & Visual	Negative	Moderate	Local	Short-term
Material Assets: Traffic & Transport	Positive	Moderate	Local	Short-term
Material Assets: Built Services	Neutral	N/A	Local	Short-term
Material Assets: Waste	Positive	Moderate	County	Short-term
Land & Soils	Neutral	N/A	Local	Short-term
Water & Hydrology	Neutral	N/A	Local	Short-term
Biodiversity	Neutral	N/A	Local	Short-term
Coastal Processes	Neutral	N/A	Local	Short-term
Noise & Vibration	Positive	Moderate	Local	Short-term
Air Quality	Neutral - Negative	Moderate	Local	Short-term
Climate	Neutral - Negative	Moderate	Local	Short-term
Cultural Heritage: Archaeology	Neutral	N/A	Local	Short-term
Cultural Heritage: Built Heritage	Neutral	N/A	Local	Short-term

In conclusion, the 'Do-Nothing' scenario is an inappropriate and unsustainable alternative that would result in the inefficient use of a strategically located and serviced existing port. The 'Do-Nothing' scenario would prevent the delivery of the strategic planning objectives for the area. With the mitigation measures proposed in this EIAR and having regard to the findings that no significant effects on the environment are expected with such measures in place, the comparative environmental effects are not considered sufficient to rule out the proposed development.

3.2.1.2 Do Nothing – Extant Permissions

There are two extant planning permissions at Greenore Port for the extension and modification of an existing Warehouse (LCC Planning Ref 20268/ABP Ref 307862) and a new Warehouse (LCC Planning Ref Planning Ref 20543/ABP Ref 310184). As these are valid permissions the respective developments must be considered as a possible scenario under the 'Do Nothing' Scenario.

Under this alternative scenario, the impacts of the proposed development would not occur since only one of the developments can be implemented. The implementation of either of the extant permissions would equally generate additional traffic movements and noise pollution during the construction and operational phase which would impact the local residents and fauna.

The development of either extant permission would likely generate additional jobs but at a small scale and significant employment opportunities for the rural community in Louth would be lost.

From a visual perspective, the development of either of the two extant permissions would have a negative impact on the visual amenity of Greenore village due to the design, height, façade materiality, general massing and lack of landscaping – Refer to Figure 3-1.

Equally to the Actual Do-Nothing scenario, the potential future tenants would have to seek an alternative site for their operations and maintenance base. There would be no certainty with regard to the location and there would be a risk that the employment opportunities generated by this development would be permanently lost from Co. Louth.

Table 3.2 summarises the effect of the 'Do Nothing' alternative described above. All of the predicted effects are determined to be likely to occur. It is noted that the duration of effects under this scenario are considered at least short-term (1-7 years), this reflects a reasonable timeframe for a further application for development to come forward on the site, in the absence of this subject proposal.

Figure 3-1 Comparison of Extant Permission Reg Ref 20268 (ABP Ref. 307862-20) and proposed development

Table 3.2 Do Nothing Description of Effects (Extant Permission)

Aspect	Quality of Effect	Significance	Context	Duration
Population & Human Health	Negative	Profound	County	Short-term
Landscape & Visual	Negative	Moderate	Local	Short-term
Material Assets: Traffic & Transport	Neutral	Moderate	Local	Short-term
Material Assets: Built Services	Neutral	N/A	Local	Short-term
Material Assets: Waste	Negative	Moderate	County	Short-term
Land & Soils	Negative	Moderate	Local	Short-term
Water & Hydrology	Negative	Moderate	Local	Short-term
Biodiversity	Negative	Moderate	Local	Short-term
Coastal Processes	Neutral	N/A	Local	Short-term
Noise & Vibration	Negative	Moderate	Local	Short-term
Air Quality	Positive	Slight	Local	Short-term
Climate	Negative	Moderate	Local	Short-term
Cultural Heritage: Archaeology	Neutral	N/A	Local	Short-term
Cultural Heritage: Built Heritage	Negative	Moderate	County	Short-term

In conclusion, the scenario of implementing the extant permission is an intensified use and visually intrusive development at the subject site but in keeping with the development of a strategically located and serviced existing port. This development did not require the preparation of an EIAR, therefore mitigation is limited to standard measures which will have its implications for the effects on various environmental effects.

3.2.2 Alternative Locations

The proposed development can, by nature of the requirement for quayside facilities and berthing for vessels, only be developed at port locations.

Ports serve as indispensable hubs in the ongoing expansion of offshore wind energy sector and the energy transition. They fulfil key functions in construction, operations & maintenance (O&M). To offer these services, ports must invest substantially in infrastructure enhancements and expansions. While this presents a challenge, it also offers a unique opportunity for ports to actively contribute to the energy transition and grow sustainable business paths.

The development of ports for the land uses proposed has been identified at a national scale in Government's *Offshore Renewable Energy Future Framework Policy* (2024). The role of the port and O&M Facilities is clearly identified in the as one of the components of an ORE system.

> *"f) Ports*
>
> ***Port facilities are required during various project stages including installation, operations and maintenance, and decommissioning**. **Distinct infrastructures are required** depending on the technology, particularly in the case of fixed bottom compared to floating wind. Extensive resources are required to build, store, repair, and tow out machinery to project sites. This will*

*include **physical space and buildings to carry out activities both in onshore facilities** and in offshore wet storage, access to various vessels, and proximity to other components of the supply chain."*
(Emphasis Added. Source: Offshore Renewable Energy Future Framework Policy Statement, Page 14)

Greenore Port is ideally placed to provide this critical operations and maintenance service for planned wind farms off the East Coast including the following locations which already have the benefit of a MAC and or have been successful during the first ORESS Auction in June 2023[1].

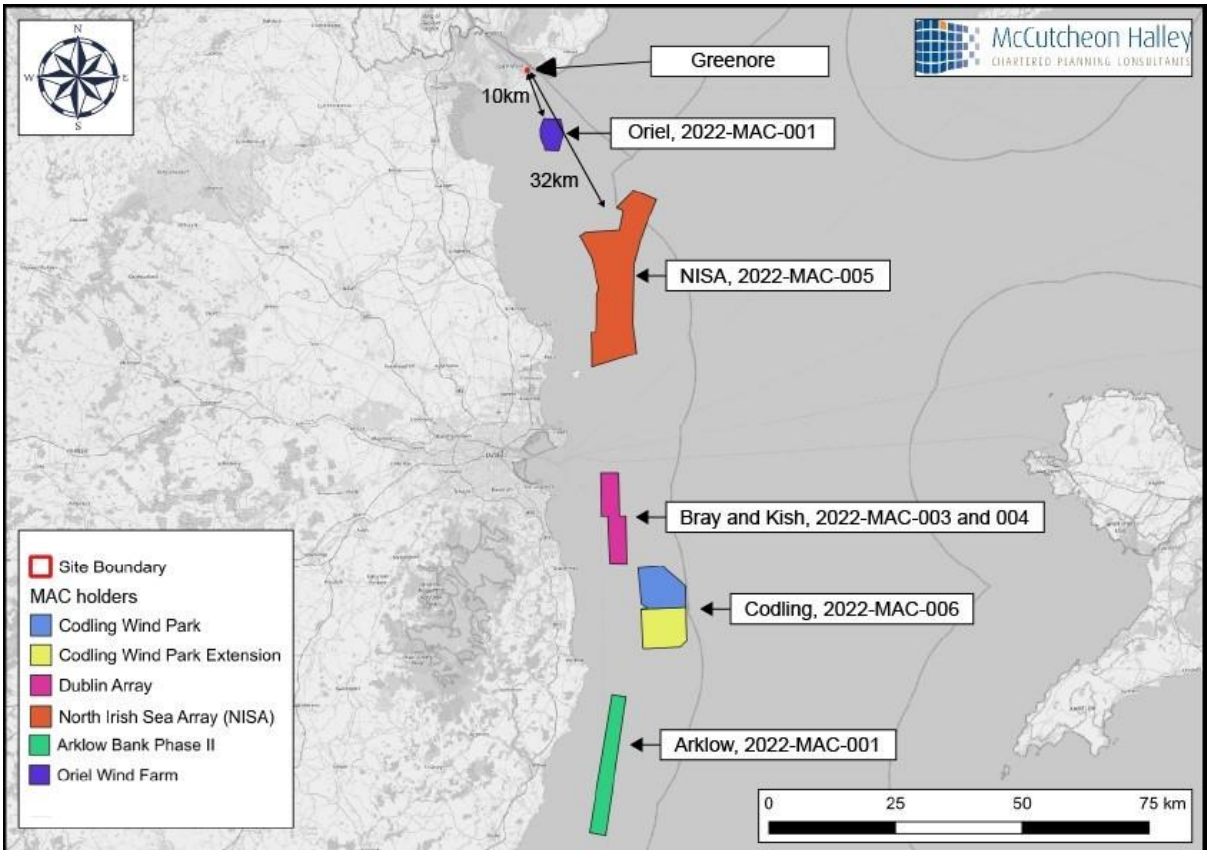

Figure 3-2 MAC Areas for Offshore Windfarm projects off the Irish East Coast

The proposed development will be developed by the applicant, Greenore Port and leased out to future ORE operators, such as those identified in Figure 3-2.

Location alternatives within the site boundary are considered in the alternative design section 3.2.4.

[1] In June 2023, the first ORESS Auction took place. Any project that had previously been awarded a MAC was eligible to partake in this Auction, known as ORESS 1. Four projects were successful, three on the east coast including North Irish Sea Array, Dublin Array, Codling Wind Park and Sceirde Rocks off the coast of Galway. The successful projects will now proceed to planning. Projects which were unsuccessful in the ORESS 1 auction, who already hold a MAC, can compete in the future ORESS auctions, or proceed on basis of securing Corporate Power Purchase Agreement similar to the agreements that many existing onshore windfarms operate under.

3.2.3 Alternative Uses

The primary determinant of suitable uses is established in the site's zoning. Under the Louth County Development Plan 2021 – 2027, the site is identified within the Settlement Boundary for Greenore. There are no land use zonings for the site or the wider village area. Greenore is categorised as a 'Rural Node' / Level 5 settlement in the LCDP. It is also within Rural Policy Zone 2 area which is an "Area under strong urban influence."

The guidance and policy context within Chapters 5, 9, and 13 of the Plan support the development of the Port whilst also ensuring that any development would be sensitive to the surrounding environment. Development at Greenore Pot is subject to Policy Objective **PO EE 27**:

> *"To recognise that the Port facilities at Drogheda, Greenore, Dundalk, and Clogherhead are an important economic resource and to **support any improvements or expansion to these Port facilities** at Drogheda, Greenore and Clogherhead and the consolidation of Dundalk Port, subject to the preparation of a Masterplan and appropriate environmental considerations."(emp. added)*

In the absence of zoning for the site and having regard to PO EE 27, there are no potential alternative land use scenarios for the proposed development site that are not related to the improvement/expansion of a port facility.

3.2.4 Alternative Design

This section describes the main alternatives examined during the design phase and sets out the main reasons for choosing the proposed design.

The project team have undertaken extensive consultations with potential future tenants to understand their requirements for an Operations and Maintenance Facility. Based on these discussions and input, three different layouts and development concepts have been prepared and assessed from a commercial and environmental perspective. Furthermore, the design evolved during the design phase in response to input and advice from the EIA team, results of consultation with Louth County Council at pre-planning stage and feedback from public consultation.

The following sections first summarise the proposed design and then describe the alternative designs considered and the main reasons for choosing the proposed design.

3.2.4.1 Option 1 – Separate Warehouse and Office Units for 3 Operators

In Layout Option 1, it is proposed to situate all building units at the quay side in the southwestern part of the port lands. The layout provides for 3 no separate units for 3 separate Operators. Each OMF Unit consist of one office and one warehouse building which are arranged next to each other, comprising an overall GFA of c. 2,000sqm for each unit. The office and warehouse units are accessed via a new proposed access road along the southern boundary of the site and ancillary parking is provided at each unit with additional 135 parking spaces at Shore Road. Access from the Shore Road Car park is proposed via the existing pedestrian lane at the back of the houses along Euston Street. The proposed pontoon infrastructure is located at the quayside south of berth two and extends into the near shore area up to the existing groyne.

Table 3.3 Development Breakdown Option 1

Overall Development Breakdown	
No. of Potential Operators	3
Offices	Three separate units with circa. 1,200sqm of office space each
Warehousing/workshops	Three separate warehouse units of circa. 800sqm each
Parking	65 spaces adjacent to Quay serving each Office Warehouse unit. 135 spaces within satellite parking area circa 100m to closest unit via pedestrian route to rear of housing on Euston Street.
Pontoons	10 CTV berths

Figure 3-3 Site Layout Option 1

Figure 3-4 CGI Option 1

3.2.4.2 Option 2 – Warehouse and Office Facilities separated but each for 4+ Operators

Layout Option 2 was designed to provide for separated office and warehouse facilities to be shared by future tenants.

The option comprises one warehouse building, located at the quay, incorporating the existing Open Hydro Warehouse with extensions to both sides of the building, providing for overall c. 3,200sqm warehouse space to be used by 4 or more possible tenants. The warehouse is accessed by a new access road running north of the building with parking provided at both ends of the warehouse. Partly between the proposed OMF warehouse and the existing port office entrance and the majority of parking at the southwestern side of the new warehouse. Additional 135 parking spaces are provided at Shore Road with access to the warehouse and HQ office via the existing pedestrian lane at the back of the houses along Euston Street.

Office space is provided in the form of one Headquarter Office building located at the so called "Horsefield", a green field located at the junction of Euston Street and Shore Road at the south of the core village. The office was designed as one building with c. 4,400sqm to be shared by all future tenants.

The proposed main pontoon infrastructure is located quayside south of berth two, extending c. 96m into the near shore area up to the existing groyne. Depending on the number of future tenants, additional satellite pontoon berths for CTV arrival could be provided between berth one of Greenore Port and the Ferry terminal, on the east side of Greenore Point (see Figure 3-7).

Table 3.4 Development Breakdown Option 2

Overall Development Breakdown	
No. of Potential Operators	4+
Offices	Standalone building with circa.4,400sq.m of office floorspace
Warehousing/workshops	Single large internally divided warehouse unit of circa. 3,200sq.m in total.
Parking	135 spaces adjacent to Quay and 135 spaces within satellite parking area circa 100m from closest unit and 50m from Office facility via pedestrian route to rear of housing on Euston Street.
Pontoons	12 at O&M site, up to 10 satellite berths between berth 1 and the ferry terminal.

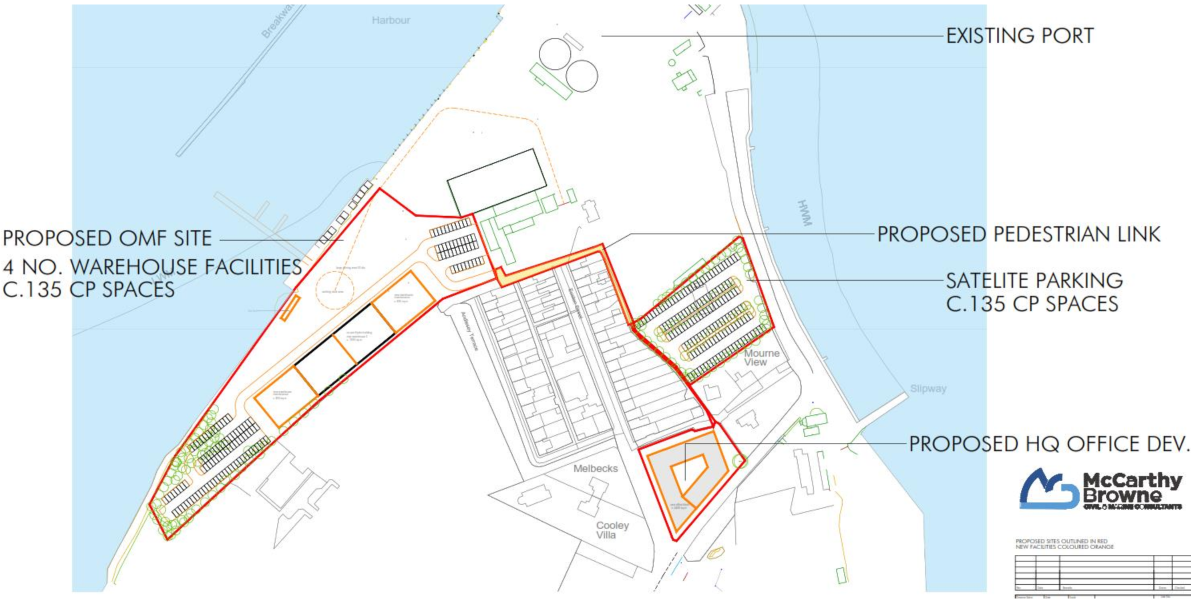

Figure 3-5 Site Layout Option 2

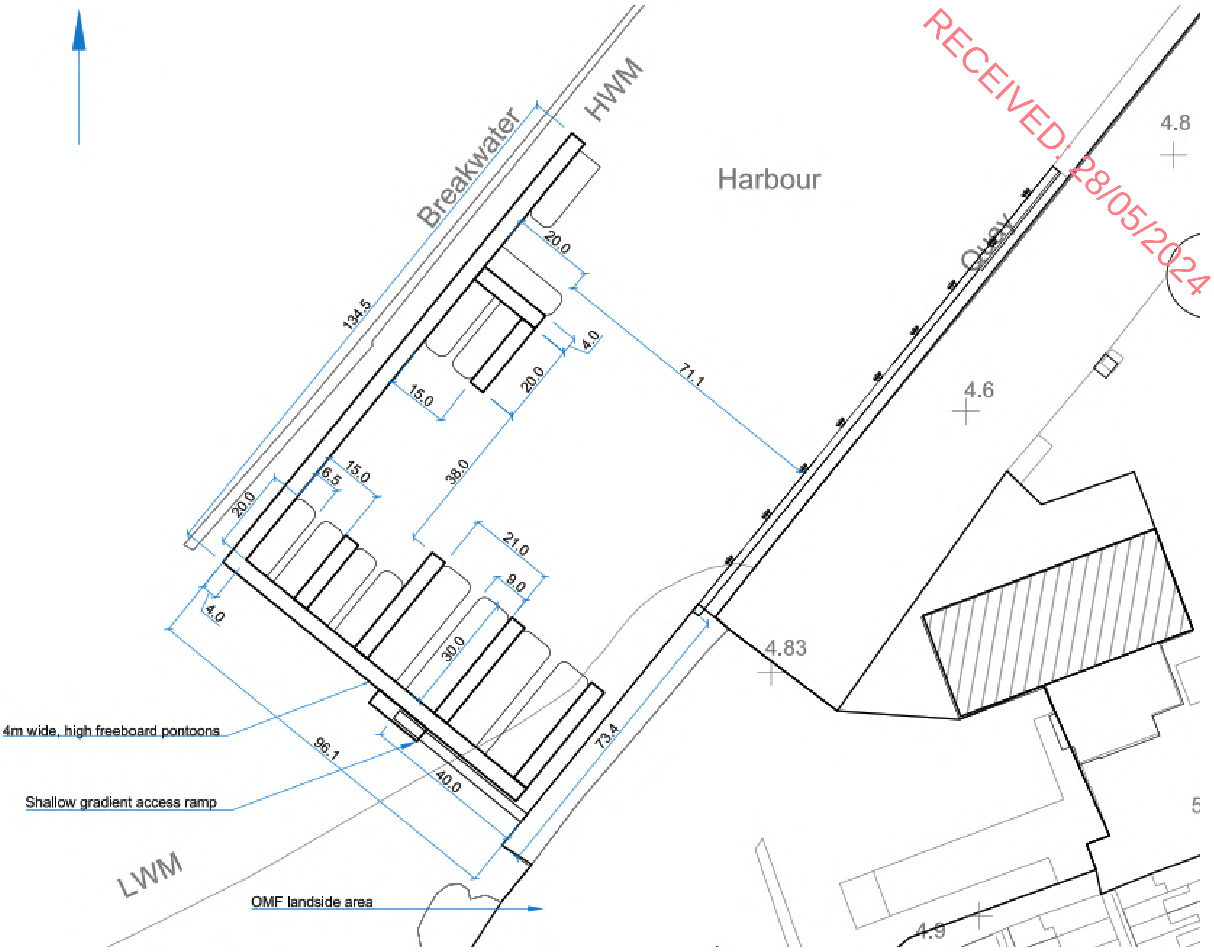

Figure 3-6 Pontoon Design Option 2

Figure 3-7 CGI Option 2

3.2.4.3 Option 3 – Combined Office and Warehouse Buildings for each Operator (selected option)

The layout of Option 3 (the selected option) provides for one combined office and warehouse unit for each of 3 future tenants.

The units are located on the quay and were designed as the most compact buildings, which blend into the landscape thanks to its carefully selected materiality. The setting of the buildings was determined by the least visual impact to the surrounding sensitive receptors and maximum distance from Carlingford Lough. The units are accessed form a new access road proposed along the southern boundary of the site with ancillary parking for each of the units and additional 135 parking spaces at Shore Road with access to the facilities via a new pedestrian link though the port lands.

The proposed main pontoon infrastructure is located quayside south of berth two, extending c. 83m into the near shore area, leaving a distance of c. 17 m to the existing groyne. The pontoon provides for 9 CTV berths with 2 potential layover berths.

Layout option 3 went through a number of alternative design iterations to arrive at the final version as presented. The proposed OMF building location were originally located closer to the western boundary of the site and closer to the quay. However, to reduce the visual impact for the Golf Course, the buildings were shifted further northwest, and for environmental reasons away from Carlingford Lough towards the southern site boundary. Separation distances are nevertheless provided with excess, as the new access road provides for a larger separation as with the existing Open Hydro Building or the extant permissions. The final iteration of Option 3 also included enhancements to the public/private realm at the port office entrance, including the new feature entrance wall and materials matching and supporting the value of the ACA.

Table 3.5 Development Breakdown Option 3

Overall Development Breakdown	
No. of Potential Operators	3
Offices	Three separate units combining office and warehouse in one shell with circa. 900 sqm of office space and ancillary welfare and plant facilities each.
Warehousing/workshops	Three separate units combining office and warehouse in one shell with circa. 760sqm warehouse space each.
Parking	76 spaces adjacent to Quay and 135 spaces within satellite parking area circa 100m to closest unit via pedestrian route through the Port's lands.
Pontoons	9 + 2 Layover Berths

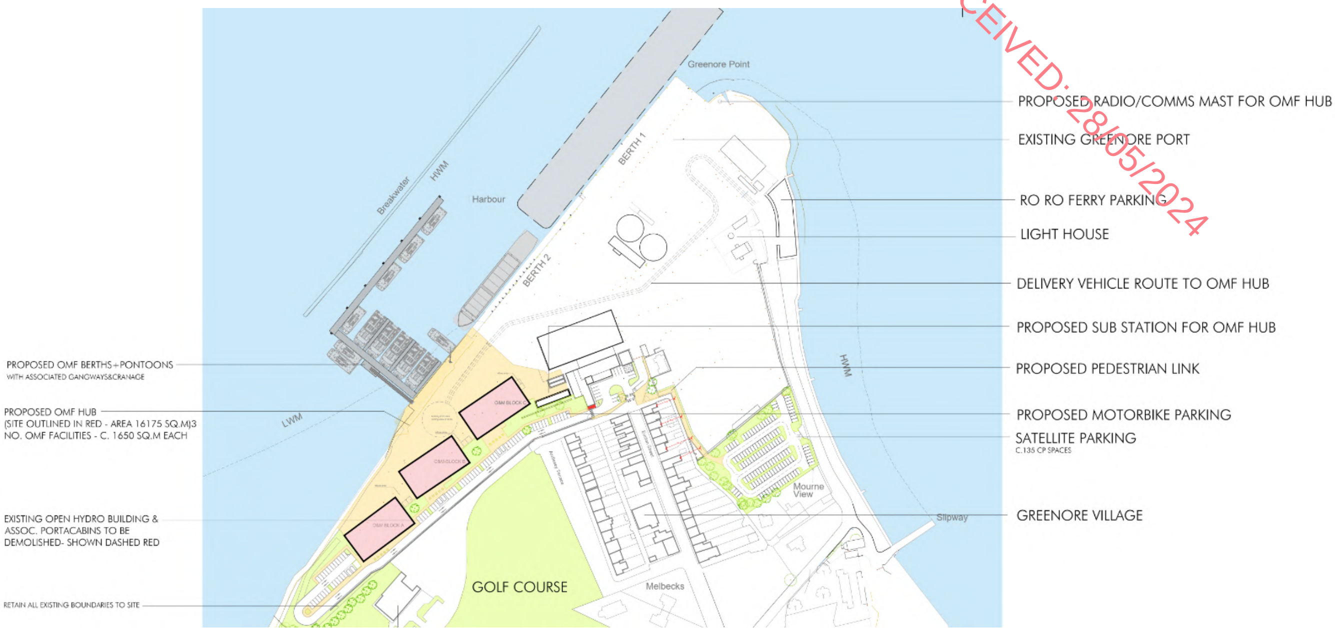

Figure 3-8 Site Layout Option 3

Figure 3-9 CGI Option 3

3.2.4.4 Assessment of Options

3.2.4.4.1 Design and Visual Impact

Option 3, compared to Options 1 and 2 is considered to provide the least intrusive visual appearance of the 3 options. Since office and warehouse functions are combined under one roof and the buildings are aligned in orientation with significant gaps between the buildings, the overall design integrates best into the landscape, appearing less puzzled, and allowing views from the village through the buildings towards the Mourne Mountains instead of blocking it entirely (Options 1 and 2).

While Option 2 provides for a landmark building at the southern entrance to the village, the massing of the proposed warehouse, compared to the more compressed and fragmented design of Options 1 and 3 is considered to appear intrusive and overbearing for the village and Golf Course.

3.2.4.4.2 Traffic and Transport

The nature of the proposed development would generate a significant amount of additional jobs at the development site and would therefore generate additional traffic of employees travelling to work. All Options proposed car parking in the same locations at Shore Road and at the quayside. It is therefore considered traffic flows for all options would be similar.

It is to note, that Option 2 would provide for a larger facility providing space for 4 tenants compared to Options 1 and 3 with 3 facilities. It is therefore considered, that Option 2 would generate more additional traffic during construction and operational phase.

3.2.4.4.3 Built Services

All considered Options have additional infrastructure requirements. Since Option 2 provides for a larger facility the requirements are potentially more comprehensive than compared to Option 1 and 3.

3.2.4.4.4 Noise & Vibration

All Options require demolition works, the construction of new buildings and surfaces, pontoon infrastructure, and dredging which will generate Noise and Vibration. However, in Option 1 and 3 the majority of works are located within the operation boundary of the existing port at the quay, whereas Option 3 also includes a significant amount of the construction works for the new office building south of the Greenore village. Therefore, the location of noise and vibration generation would be wider, and potentially more sensitive receptors could be impacted.

Options 1 and 2 propose to facilitate access between the surface car park at shore road and the OMF office and warehouse facilities via an existing pedestrian lane at the back of the houses along Euston Street. Whereas Option 3 provides the access via a dedicated lane through the port lands, separate from the existing lane. It therefore reduces the noise impacts of employees traveling from the car park to the OMF site on the residential properties at Euston Street and also reduces the impact of overseeing of these properties.

3.2.4.4.5 Water and Hydrology

All Options include the construction of marine side infrastructure (quay wall and pontoons). However, as Option 2 proposes an additional satellite pontoon infrastructure, the impact of Options 1 and 3 are likely smaller due to a smaller pontoon size adjacent to the existing port operations at Berth 1 and 2. Furthermore, the location of option 2 is located at a greenfield site which is considered having an impact on surface water percolation and would put additional pressure on local surface water sewage systems and add to the local risk for flooding.

3.2.4.4.6 Soils

All Options include dredging and earthworks for the construction of the proposed development. Additionally, all Options propose and additional car park at a vacant residential site at Shore Road.

In Options 1 and 3 all OMF buildings are located at the quay side within the existing port operations boundary. The main development area is currently used for (open) storage and the development of the proposed OMF facility would provide for a much cleaner use at this part of the port lands with significant importance for the energy transformation of the country.

In addition to the quay side, Option 3 requires the inclusion of the so called "Horsefield" at the junction Shore Road/Euston Street which is currently a greenfield site. The land requirement is therefore higher as for Options 1 and 3 and requires additional sealing of surfaces.

3.2.4.4.7 Waste

All Options require dredging and the demolition of a single vacant dwelling on a site at Shore Road to facilitate the provision of additional surface carparking. Furthermore, all options require the demolition of the existing ESB Substation and associated switch room to provide for an upgraded substation.

Options 1 and 3 require the demolition of the existing Open Hydro Warehouse on site to facilitate the proposed development, whereas Option 2 proposed to retain the warehouse and implement extensions to the facades in the northeast and southwest. Generally, the retention and upgrading of existing buildings provides for the more sustainable development compared to a demolition. However, considering option 3, the warehouse would require extensions to both sides. Nevertheless, to facilitate these development works, a large quantum of the structure would have to be demolished to allow for seamless merging of the existing and proposed extensions.

During the construction and operation of the facilities it is considered likely that Option 2 would generate a higher volume of waste due to its larger size.

3.2.4.4.8 Biodiversity

It is considered that the potential impacts of options 1 and 3 on biodiversity are identical due to the similar massing and location of the proposal, while Option 2 would require additional land and nearshore to be included in the development and therefore have a potentially more significant impact on biodiversity.

3.2.4.4.9 Air Quality and Climate

All options provide the development of significant new infrastructure. However, all options would be built to a modern NZEB standard so it is considered the impact of either would not significantly differ.

3.2.4.4.10 Cultural Heritage

Option 1 and 2 require the demolition of the industrial heritage structures including the engine room wall of the historical railway station on site. Option 3 is designed to include the historical wall into the landscaping proposals. The heritage value of the wall is not impacted by Option 3 and is safeguarded for the future.

Furthermore, the proposed office building in Option 2 is located within the Greenore ACA. This building is of modern design, and it could negatively effect the existing heritage value of the village that is protected under the ACA.

3.2.4.4.11 Summary

Option 3 was chosen over the other options 1 and 2 due to the fact that it concerns the least possible impact on the environment when compared to Options 1 and 2. This option has a number of environmental benefits when compared to the other alternatives considered. More specifically:

- It will result in the least possible visual impact to the local residents and amenities due to the compact building form of the proposed units and the careful design of the materiality.
- Least impact on the heritage of Greenore Village and safeguarding of heritage features for the future.
- The proposed pedestrian access link from the surface car park at Shore Road is an improved design to avoid noise and overseeing impacts on local residents of shore road.

A detailed description of the proposed development as per Option 3 is provided in Chapter 2 of this EIAR.

3.2.5 Alternative Processes

This is commercial office and warehouse development and therefore the consideration of alternative processes to be considered relates to the methods of construction to be used in the development.

The alternatives have been considered and the Outline Construction Environmental Management Plan (CEMP) details the construction processes likely to be employed and which have been assumed for the purposes of this EIAR.

3.2.5.1 Disposal of Dredge Material

To facilitate navigable access and suitable berthing for the CTVs it is necessary to carry out dredging between the existing groyne, Berth 2, and proposed Berth 3. The declared depth of this dredge pocket is -4m CD, resulting in dredge material of c.45,000m^3 soft dredge (gravel, silt, sand, clay) and c1,000m^3 rock arisings.

Processing on land or dump at sea were considered as options for the dredge material.

If processed on land the material may be classed as by-product under Regulation 27 (By-products), as amended, of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020, (Previously Article 27 of the European Communities (Waste Directive)). The material may therefore achieve a higher ranking in the Waste Hierarchy (Prevention > Re-use > Recycling > Recovery > Disposal) as per EU Waste Framework Directive, (2008/98/EC). Disposal via dump at sea was therefore excluded from consideration in this application.

3.2.5.2 Helicopter Use

Consideration was given to whether the installation of a helipad, which would allow technicians to fly to the ORE site by helicopter, and drone transport would be a feasible addition to the sea transfer with crew transfer vessels. However, this option was ruled out as it is not essential for future tenants.

3.3 Difficulties Encountered

There were no difficulties encountered in the preparation of the alternatives assessment for the proposed development.

3.4 Proposed Preferred Alternative

On the basis of the foregoing, it is considered that all reasonable alternatives to the project are considered, and no alternatives have been overlooked which would significantly reduce or further minimise environmental effects.

The multidisciplinary design and EIAR team have placed respecting the existing environment and achieving environmental enhancements at the centre of the design development process.

This chapter demonstrates that the proposed preferred alternative performs better than other alternatives considered. The preferred alternative protects and enhances biodiversity locally, ensures safety in accessing and navigating the site, mitigates the visual impact of the proposed development through the application of a high-quality architectural response, enhances employment opportunities and contributes to climate change mitigation efforts.

CHAPTER 4

POPULATION & HUMAN HEALTH

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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4 Population & Human Health

4.1 Introduction

According to the European Commission's Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (2017), human health is; *"a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."*

The Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022) advise that "*in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc.*"

This chapter addresses the likely significant environmental impacts of the proposed development on population and human health. It is noted that other chapters of the EIAR also deal with likely significant environmental effects on population and human health arising from Landscape & visual (Chapter 5), Material Assets – Traffic & Transport (Chapter 6), Water & Hydrology (Chapter 10), Noise & Vibration (Chapter 13), Air Quality (Chapter 14) and Climate (Chapter 15), and the risk of major accidents and/or disasters and those chapters should be referenced in conjunction with this chapter of the EIAR.

4.2 Expertise & Qualifications

This chapter was prepared by Paula Galvin of McCutcheon Halley Chartered Planning Consultants. Paula holds an MSc in Spatial Planning, a BA in Geography, a Diploma in Environmental Impact Assessment (EIA) Management and a Diploma in Planning and Environmental Law. She has practised as both a planning and environmental consultant for over 15 years and has directed the preparation of Environmental Impact Assessment Reports (EIARs) for a range of development types including residential, commercial, industrial and renewable energy.

4.3 Proposed Development

A full description of the proposed development is provided in **Chapter 2** of this EIAR. The following is a summary of the proposed works:

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and at 'Barbara's Field' (A91DD42), Shore Road, Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. Where rock is encountered (estimate max of 1,000m^3), it will be reused on site.

Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 of the development.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA). The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine shed wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary,, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

The proposed scheme is distributed over several individual plots, as shown in Figure 4.1.

4.4 Methodology

4.4.1 Site Visit

To inform this assessment, the application area and surrounds were visited on several occasions between 2022 and 2024. The purpose of the site walkover was to identify the characteristics of the subject land and surrounding area to appraise the likely and significant potential impact upon human receptors. Ordnance Survey maps and aerial photography were also examined to assist in this process.

4.4.2 Relevant Legislation & Guidance

This chapter has been prepared having regard to the legislation and guidance outlined in Chapter 1 of this EIAR. The impact assessment section follows the terminology (where applicable) used in the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022), as set out in **Chapter 1** of this EIAR.

Publications and other data sources consulted include:

- National Planning Framework, Ireland 2040 – Our Plan (Government of Ireland, 2018)
- National Marine Planning Framework 2021
- Offshore Renewable Energy Future Framework Policy Statement 2024
- National Ports Policy 2013
- Climate Action Plan 2024
- Our Rural Future – Rural Development Policy 2021-2025
- Action Plan for Jobs (2012-2022)
- Eastern and Midlands Regional Authority Regional Spatial and Economic Strategy 2019-2031;
- Louth County Development Plan 2021-2027;
- Louth County Council website
- Employment Density Guide (3rd Edition) prepared by Bilfinger GVA and the Homes and Communities Agency (November 2015);
- Central Statistics Office (CSO) website www.cso.ie;
- GeoDirectory-GeoFindIT App;
- Pobal website https://maps.pobal.ie/; and
- Health and Safety Authority website https://hsa.ie;

- Tusla Child and Family Agency Website https://www.tusla.ie/

Additionally, reports prepared by McCutcheon Halley Planning Consultants included with this application under separate cover were consulted, as follows:

- Planning Statement (McCutcheon Halley Chartered Planning Consultants)
- Greenore Port Masterplan 2024 (McCutcheon Halley Chartered Planning Consultants)

4.4.3 Site Surveys

A site survey was undertaken on 13th October 2023 and a full walkover of the site was undertaken. The application site and surroundings were visited to examine the receiving environment insofar as people and communities are concerned and in particular to identify the people most likely to be affected by the project.

4.4.4 Consultation

Pre-planning Consultation was undertaken with Louth County Council in May 2024, at the offices of Louth County Council on May 10th and online on May 20th.

The applicant held a public open day on May 16th where members of the public were invited to attend at a local café in the village of Greenore. Details of the proposed development were displayed on the walls. Members of the Design, Environmental and Ecology Teams were in attendance with the applicant to meet with visitors and discuss the project.

Local Stakeholders were also met in the preparation of this application including direct engagement between the applicant and / or the Design Team with representatives from the following stakeholders:-

- Aquaculture Farm Operators
- Greenore Golf Club
- Lough Users
- Greenore Port Operational Management Team

4.5 Difficulties Encountered

There were no significant difficulties encountered in compiling the information contained in this chapter.

4.6 Baseline Environment

4.6.1 The Site

The proposed scheme is distributed over several individual plots, including:-

- **'Terrestrial Port Area'**, (c.1.9ha) including a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.

- **'Nearshore Environment'** (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
- **'Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
- **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

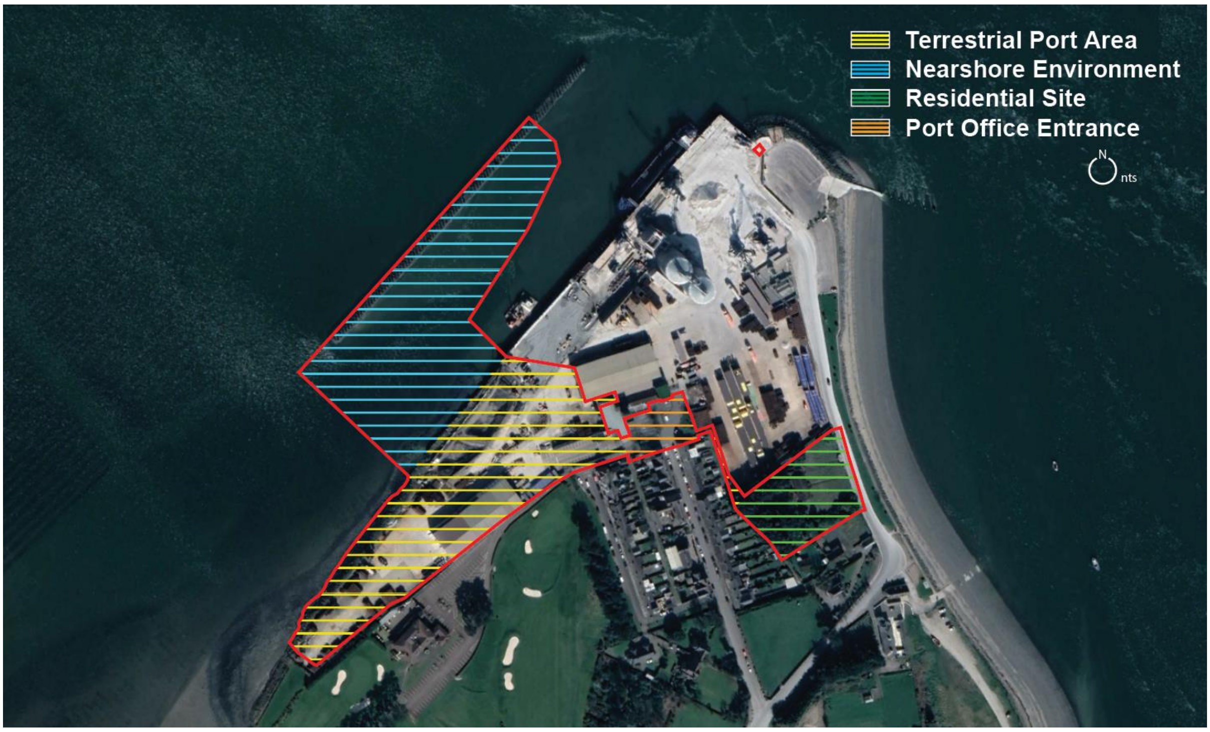

Figure 4-1 General Location Plan

The site is situated within and immediately adjoining Greenore Port. It is bounded to the east by established harbour related development in Greenore Port; to the south and west by Greenore village and Greenore Golf Club and to the north and west by Carlingford Lough.

4.6.2 Land Use Zoning and Development Objectives

Under the Louth County Development Plan 2021 – 2027 (LCDP), the site is identified within the Settlement Boundary for Greenore. There are no land use zonings for the site or the wider village area.

Greenore is categorized as a 'Rural Node' / Level 5 settlement in the LCDP. It is also within Rural Policy Zone 2 area which is an "Area under strong urban influence."

See Figure below.

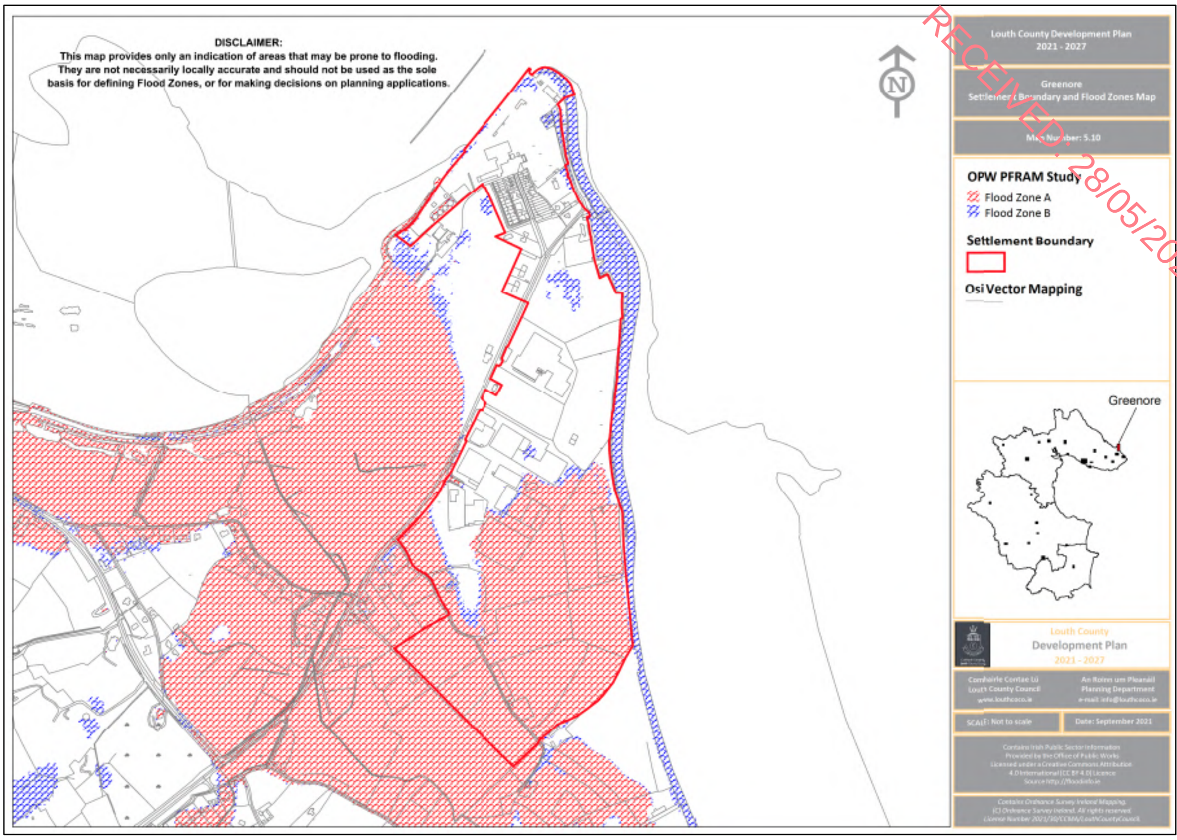

Figure 4-2 Greenore Settlement Boundary (Source: Map 5.10 from the LCDP 2021-2027)

The Plan recognises the importance of ports in enabling economic growth and providing international connectivity, with specific references made to Greenore Port in both the narrative and associated policy objectives.

With regard to the role of Greenore Port, section 5.10 of the Plan provides a strong narrative on the importance of Greenore Port to the economic growth and development of the County. This narrative is supported by policy objective EE26.

Policy Objective	
EE 26	To support the development and growth of the maritime economy and balance the competing demands for available space along the coast by different users and encourage co-location and co-existence of activities and infrastructure while having regard to appropriate environmental considerations.

The guidance and policy context within Chapters 5, 9, and 13 of the Plan support the development of the Port whilst also ensuring that any development would be sensitive to the surrounding environment.

Development within the settlement boundary is subject to policy objective PO EE 27 –

Policy Objective	
EE 27	To recognise that the Port facilities at Drogheda, Greenore, Dundalk, and Clogherhead are an important economic resource and to support any improvements or expansion to these Port facilities at Drogheda, Greenore and Clogherhead and the consolidation of Dundalk Port, subject to the preparation of a Masterplan and appropriate environmental considerations.

Greenore Village is designated as an Architectural Conservation Area (ACA). This designation extends to include the public / private realm in front of the Port office building but does not include the terrestrial port area or the residential site on Shore Road – See Figure below.

Figure 4-3 Greenore ACA (Source: LCDP 2021-2027, Google Map, Edited by MHP)

4.6.3 Existing and Surrounding Environment

Site context is described in detail in Chapter 1 of this EIAR. The following summary describes the existing and surrounding context relevant to this chapter.

Land uses in the vicinity of the site comprise a mix of industrial, commercial, residential, tourism and agricultural uses.

Greenore Port is the second largest port in the County, and is Ireland's only privately owned commercial port. It provides marine and logistical support for sectors including, agricultural feed, construction, renewable energy, livestock exports and manufacturing industries.

It is the only deep-water port on the east coast outside of Dublin Port. The port provides a range of services including general cargo handling, pilotage and customs. Today, the main commodities handled at the Port are bulk animal feed, fertiliser, coal, steel, timber and general cargo. There are 2 no. active berths - the outer berth (Berth 1), which accommodates vessels up to 200m, and the inner berth (Berth 2), which accommodates vessels up to 110m. It can handle ships of up to 200m length, 32m beam, 8.5m draught and 60,000 tonnes deadweight. Prominent structures within the wider port include mobile cranes and a gantry crane ranging between c. 34m to 60m as well as numerous storage buildings.

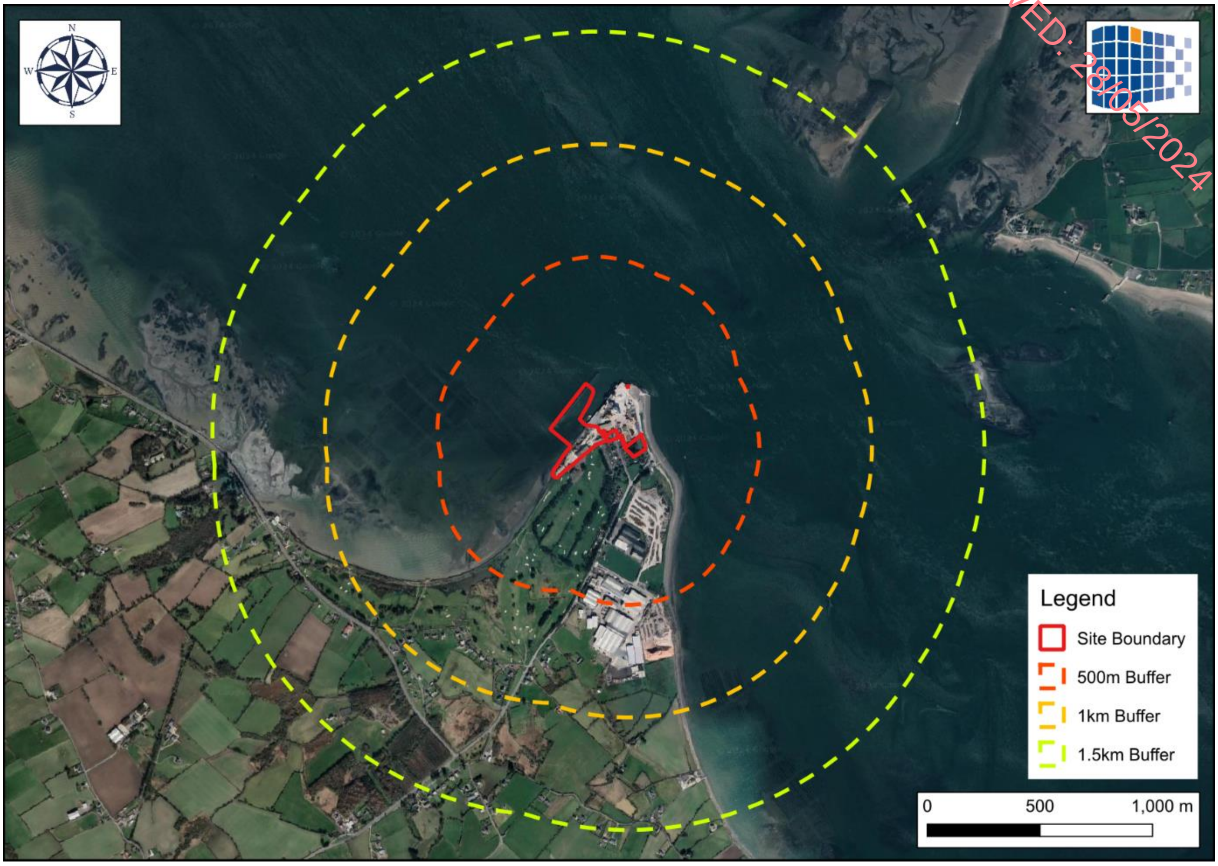

Figure 4-4 Site Location Map and surrounding Context (Source: Google Map, Edited by MHP)

Adjoining the main application site area to the south is an existing golf course – Greenore Golf Club. Greenore Gold Club is more than 125 years old, founded in 1896 and its history is intrinsically linked with the development of the Port. It is an 18 hole course, comprising a mix of links and heathland terrain. The clubhouse facility is located at the south western end of the site, proximate to the proposed Building A.

Greenore Village is located at the eastern end of the terrestrial port area and south of the port office entrance / new entrance. The village comprises two residential streets including Euston Street and Anglesey Terrace. There are approximately 42 dwellings on these streets, and 2 no. café buildings, with one including a railway / maritime museum on Euston Street.

The main application site, comprising the terrestrial port area, nearshore environment is bounded to the north/northwest by Carlingford Lough. This site is east of an existing oyster farm of Carlingford Oyster Company.

The 'residential site' is bounded to the north by existing Port lands, to the east by Shore Road. Lands to the west comprise of the rear gardens of houses along Euston Street, with an unmanaged pedestrian lane separating the site and the housing. The southern boundary comprises of a mix of unmanaged hedging / planting, with two dwellings beyond.

Further to the southeast, the Greenore Coast Guard is located c. 0.3km away from the subject site. The Teeling warehouse and storage facility are located at approx. 0.4km southeast of the Site, with Hanlon Transport Limited depot further south.

Figure 4-5 Site Location and surrounding context (Source: Bing Map, Edited by MHP)

4.6.4 Study Area

For the purpose of this assessment, the Study Area was chosen based on the designated Electoral Division (ED) Areas within 5km radius of the application site. There are no guidelines which stipulate the zone of influence of the study area. Professional judgement is used and the rationale for selecting this radius is based on the need to understand the capacity of the existing demographic and employment profile in the local area.

There are 3 no. EDs within this zone of influence and the application area are located in the 'Greenore' ED, 'Carlingford' ED and 'Rathcor' ED, as shown in the Figure below.

The Study Area is largely rural, but includes the settlements of Greenore and Carlingford.

Figure 4-6 Study Area and ED Area (Source: Google Maps, Edited by MHP)

4.6.4.1 Population

According to Census 2022 results, the study area population is 4,954 no. people, see Table below. This represents a 4.1% (195 people) increase in population in the period between 2016 and 2022; this is slightly lower than the growth rate in Louth County in the same period (6.9%).

Table 4-1 Population 2011-2022 with % change (Source: CSO)

Census	2011	2016	2022	16-22 % increase
Ireland	4,588,252	4,761,865	5,149,139	8.1%
Louth	122,897	128,884	139,703	6.9%
Study Area	4,322	4,759	4,954	4.1%

Of the Study Area population, 80% (3,470 persons) live within the settlements of Greenore and Carlingford (1,250 persons and 2,220 persons respectively). The remainder of the study area population is rural.

The age profile of the population within the study area is an important parameter as it provides a good insight into the potential labour force, amenities and other facilities and future housing demand (See Table below).

Regarding the Census 2022, there were 123 people aged 50+ (35.8%) in the study area, which is slightly higher than the rate in County Louth (32.3%). Older people in the study area (aged 65+) totalled 807 persons (16.3%), which is broadly consistent with County Louth (14.2%). At a more local level, the population aged 65+ in Greenore ED represented 17.5% of the population (390 persons). This is higher than the study area and the county.

The average age of those residing in the study area was 39 years, slightly higher than County Louth (38.2 years) and relatively similar with the State with 38.8 years, respectively in 2022.

Table 4-2 Population by Age Cohort (Source: CSO 2022)

Age Cohorts	Louth		Study Area	
	Population	Percentage	Population	Percentage
0-4 years	8,260	4.9%	279	5.6%
5-9 years	9,848	5.0%	353	7.1%
10-14 years	10,986	5.1%	426	8.6%
15-19 years	9,974	5.1%	352	7.1%
20-24 years	8,394	7.7%	275	5.6%
25-29 years	7,219	10.0%	195	3.9%
30-34 years	8,468	10.0%	219	4.4%
35-39 years	9,998	8.7%	335	6.8%
40-44 years	11,126	7.8%	397	8.0%
45-49 years	10,325	6.4%	349	7.0%
50-54 years	9,794	5.9%	370	7.5%
55-59 years	8,333	5.3%	307	6.2%
60-64 years	7,080	4.7%	290	5.9%
65-69 years	6,078	3.9%	261	5.3%
70-74 years	5,155	3.3%	224	4.5%
75-79 years	4,074	2.6%	149	3.0%
80-84 years	2,550	1.8%	97	2.0%
85+ years	2,041	1.9%	76	1.5%
Total	**139,703**	**100.0%**	**4954**	**100.0%**

4.6.4.2 Household

The State and County average household size was 2.74[1]. Within the study area, there are 1,688 households where the household size was somewhat larger at 2.93 (see Table below).

Table 4-3 Household (Source: CSO 2022)

Study Area	Total Population	Total Households	Average Household Sizes
Study Area	4,954	1,688	2.93
Louth	139,703	49,424	2.83
State	5,149,139	1,841,152	2.74

[1] Average household size is calculated by the number of persons in private households and number of private households.

4.6.4.3 Deprivation Index

The Pobal Deprivation Index is Ireland's most widely used social gradient metric, which scores areas in terms of affluence or disadvantage. The index uses information from Ireland's census, such as employment, age profile and educational attainment, to calculate this score. The map below shows the level of affluence and deprivation at the Small Area level, according to the Pobal HP Relative Deprivation Index. Scores range from -35 (Extremely Disadvantaged) to +35 (Extremely Affluent). The overall score for Louth County following the 2022 Census was 1.51. The Study Area varies recorded similar levels, ranging from 1.51 for Greenore ED ('Marginally Above Average') to -1.42 for Carlingford ED and -1.49 for Rathcor ED, 'Marginally Below Average'.

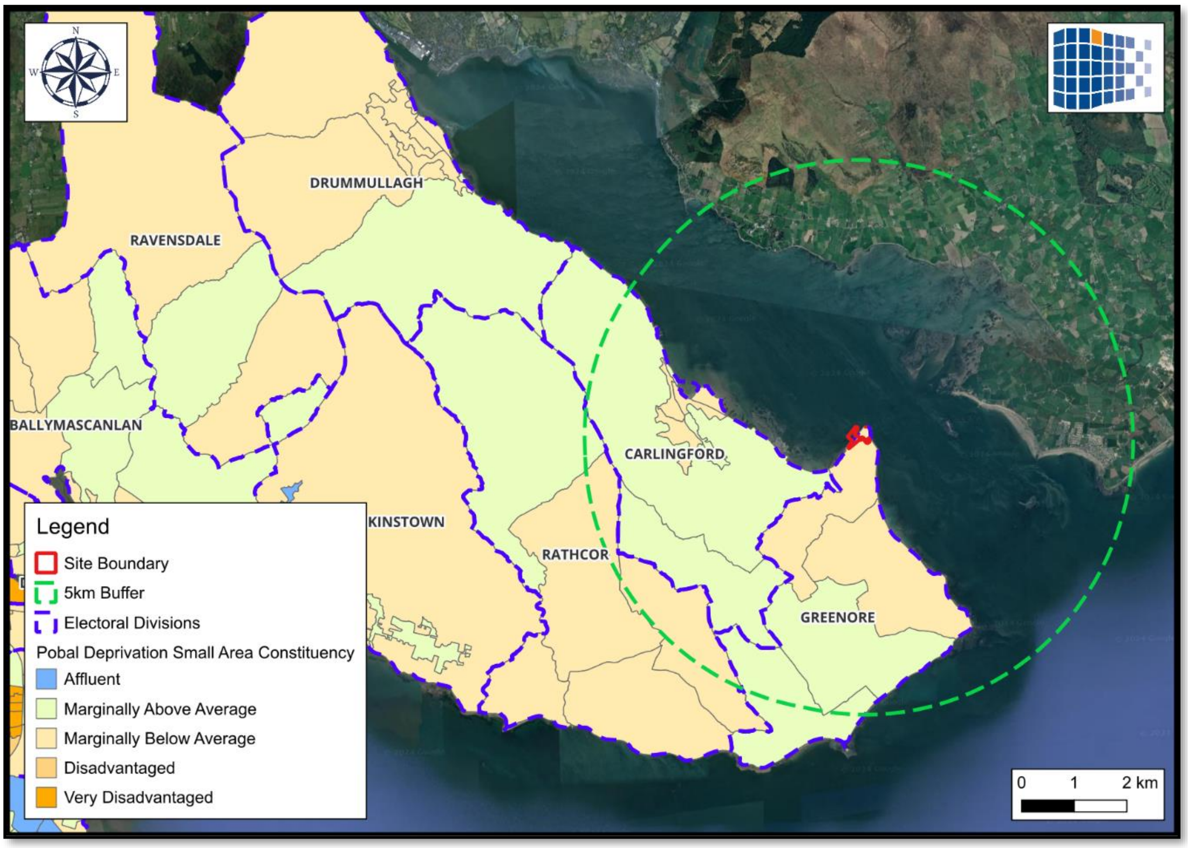

Figure 4-7 Pobal HP Deprivation Indices 2022 – Electoral Division (Source: Pobal & Google Map, Edited by MHP)

4.6.4.4 Education

The level of educational attainment for the study area population and the County is shown in the Table below**.** Census 2022 recorded 3,287 no. persons aged 15 years and over within the study area. Of those respondents, 16.9% (557 persons) had completed lower secondary and 18.6% had completed upper secondary school. A further 30.1% in the Study area have attained a tertiary-level qualification, which is slightly higher than the County level (28.3%).

Table 4-4 Education Status (Aged 15+)in Study Area & County Louth (Source: CSO, 2022)

Education Level (Aged 15+)	Study Area	%	Louth County	%
No formal education	78	2.4%	2,940	3.3%
Primary education	207	6.3%	7,873	8.8%
Lower secondary	557	16.9%	13,699	15.2%
Upper secondary	611	18.6%	16,686	18.6%
Technical or vocational qualification	268	8.2%	7,255	8.1%
Advanced certificate/Completed apprenticeship	222	6.8%	5,125	5.7%
Higher certificate	182	5.5%	5,064	5.6%
Ordinary bachelor degree or national diploma	282	8.6%	7,090	7.9%
Honours bachelor degree, professional qualification or both	395	12.0%	10,490	11.7%
Postgraduate diploma or degree	279	8.5%	7,296	8.1%
Doctorate(Ph.D) or higher	33	1.0%	565	0.6%
Not stated	173	5.3%	5,807	6.5%
Total	3,287	100.0%	89,890	100.0%

4.6.4.5 Employment

The daytime population includes everybody who indicated they worked or studied in the area, along with persons in that area who do not work or study (and so are there during the day). Together, this data would have provided further insight into existing employment opportunities in the area, showing clusters of employment.

The majority of the population within the study area are within the working age cohort (15-64 years), being 54% of the population. The table below shows that economic activity of the residential population in the study area is broadly in line with the county and the state average.

Table 4-5 Population aged 15 years and over by principal economic status (Source: CSO)

Economic Status	Study Area	%	Louth County	%	State	%
At work	2,090	54%	59,140	53%	2,320,297	56%
Looking for first regular job	27	1%	1,265	1%	34,526	1%
Short term unemployed	53	1%	2,157	2%	176,276	4%
Long term unemployed	105	3%	3,820	3%		
Student	434	11%	12,583	11%	459,275	11%
Looking after home/family	316	8%	7,888	7%	272,318	7%
Retired	683	18%	17,245	16%	657,790	16%
Unable to work due to permanent sickness or disability	164	4%	5,740	5%	189,308	5%
Other	24	1%	771	1%	27,062	1%

Economic Status	Study Area	%	Louth County	%	State	%
Total	3,896	100%	110,609	100%	4,136,852	100%

Census 2022 also indicates data for persons at work or unemployed by occupation (see Table below). The data reveals the main occupations in the study area were Professional Occupations (16.5%) and Skilled Trades Occupations (15.4%), followed by Associated Professional and Technical occupations (11.4%) and Administrative and Secretarial Occupations (10.4%). With County Louth, these were also the main occupation types, with 17.2% recorded in Professional Occupations, 12.1% in Skilled Trades Occupations and 10.3% for Associated Professional and Technical Occupations.

Table 4-6 Occupation in Study Area and County Louth (Source: CSO 2022)

Occupations	Study Area	%	Louth County	%
Managers, Directors and Senior Officials	200	8.9%	4,709	7.2%
Professional Occupations	372	16.5%	11,188	17.2%
Associate Professional and Technical Occupations	256	11.4%	6,729	10.3%
Administrative and Secretarial Occupations	234	10.4%	6,093	9.4%
Skilled Trades Occupations	346	15.4%	7,874	12.1%
Caring, Leisure and Other Service Occupations	185	8.2%	5,614	8.6%
Sales and Customer Service Occupations	116	5.2%	5,074	7.8%
Process, Plant and Machine Operatives	177	7.9%	4,973	7.6%
Elementary Occupations	183	8.1%	5,699	8.8%
Not stated	179	8.0%	7,164	11.0%
Total	2,248	100.0%	65,117	100.0%

A breakdown of CSO data for persons at work by industry is provided in the Table below. The largest proportion of persons at work are employed in 'Commerce and trade' in the study area (22.4%), followed by 'Professional services' (21.7%) and 'Transport and communications' (12.1%). The largest proportion of the County is 'Commerce and trade' and 'Professional service' (both 25.3%).

Table 4-7 Persons at work by industry in Study Area and County Louth (Source: CSO 2022)

Industry	Study Area	%	Louth County	%
Agriculture, forestry and fishing	86	4.1%	1,194	2.0%
Building and construction	144	6.9%	3,454	5.8%
Manufacturing industries	216	10.3%	7,076	12.0%
Commerce and trade	468	22.4%	14,939	25.3%
Transport and communications	253	12.1%	4,812	8.1%
Public administration	117	5.6%	3,226	5.5%
Professional services	453	21.7%	14,962	25.3%
Other	353	16.9%	9,477	16.0%
Total	**2090**	**100.0%**	**59,140**	**100.0%**

According to CSO published data, approximately 63% of locals work in Dundalk, followed by approx. 27% in Dublin City and suburbs, Counties Dublin & Meath, and approx. 8% in Drogheda, County Louth & Meath (see Tables below).

Table 4-8 Place of work from Study Area

Place of work	People	%
Dublin city and suburbs, Counties Dublin & Meath	154	28%
Drogheda, Counties Louth & Meath	47	8%
Dundalk, Co. Louth	357	64%
Total	558	100%

In addition, the average journey time of persons at work in Louth is 28.9 minutes, and approximately 53.9% of the total working population travels to work within a journey time below 30 minutes, as shown below.

Table 4-9 Travelling time of person at work in Co. Louth (Source: CSO 2022)

Travelling time of persons at work	People	%
Journey time < 15 mins	13,993	26.3%
Journey time 15 mins - < 30 mins	14,647	27.6%
Journey time 30 mins - < 45 mins	7,948	15.0%
Journey time 45 mins - < 60 mins	3,026	5.7%
Journey time 60 mins and over	7,418	14.0%
Journey time not stated	6,089	11.5%
Total	53,121	100%
Average	= 28.9 mins	

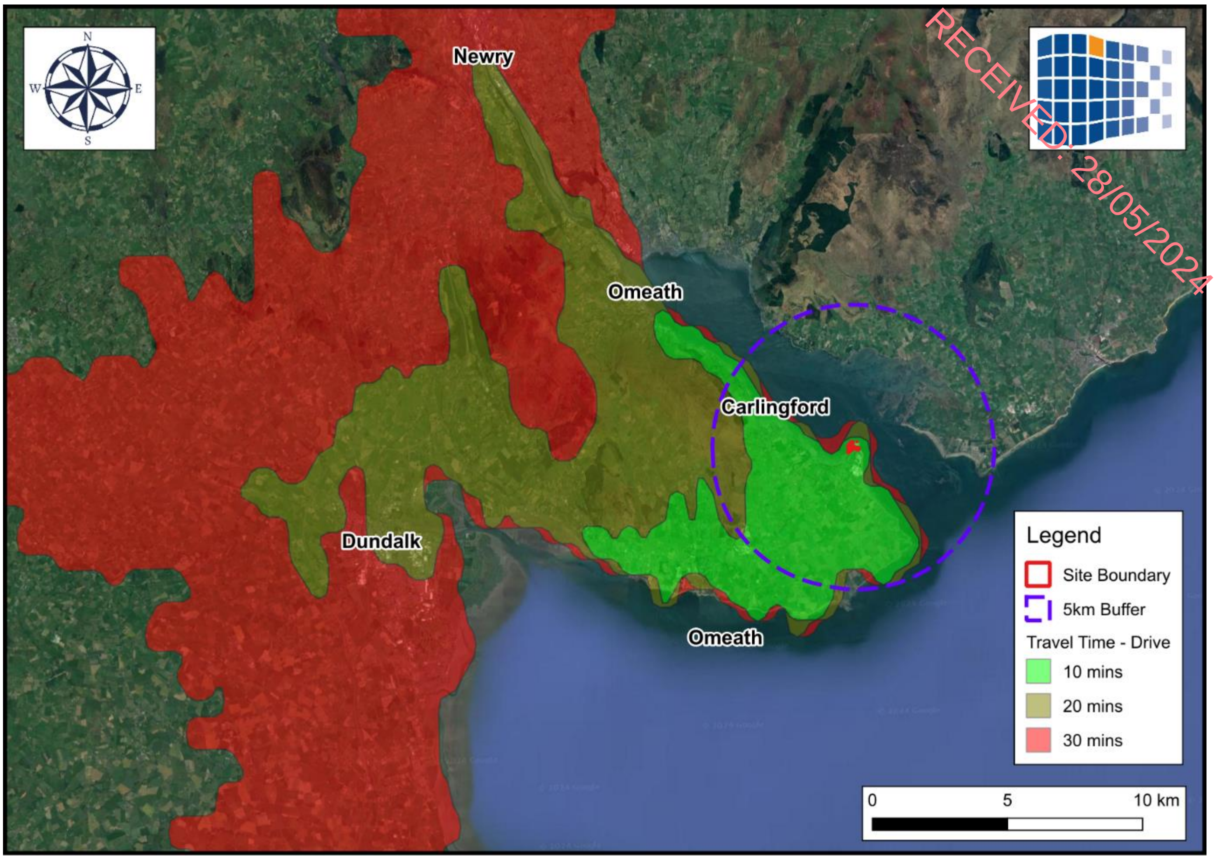

Figure 4-8 Travel Time Map by Driving (Source: Google Map, Edited by MHP)

4.6.5 Sensitive Receptors

The EPA Advice Notes (2015) identify receptors as neighbouring landowners, local communities and other parties which are likely to be directly affected by the project.

The site is a brownfield site, and includes a vacant residential dwelling. For the purpose of this Chapter, the primary sensitive receptors are the communities and properties identified in the following sections. They comprise receptors from the following categories:

i. Existing Residential;
ii. Existing Commercial;
iii. Social, Community and Leisure users; and
iv. Users of the public road network surrounding the site

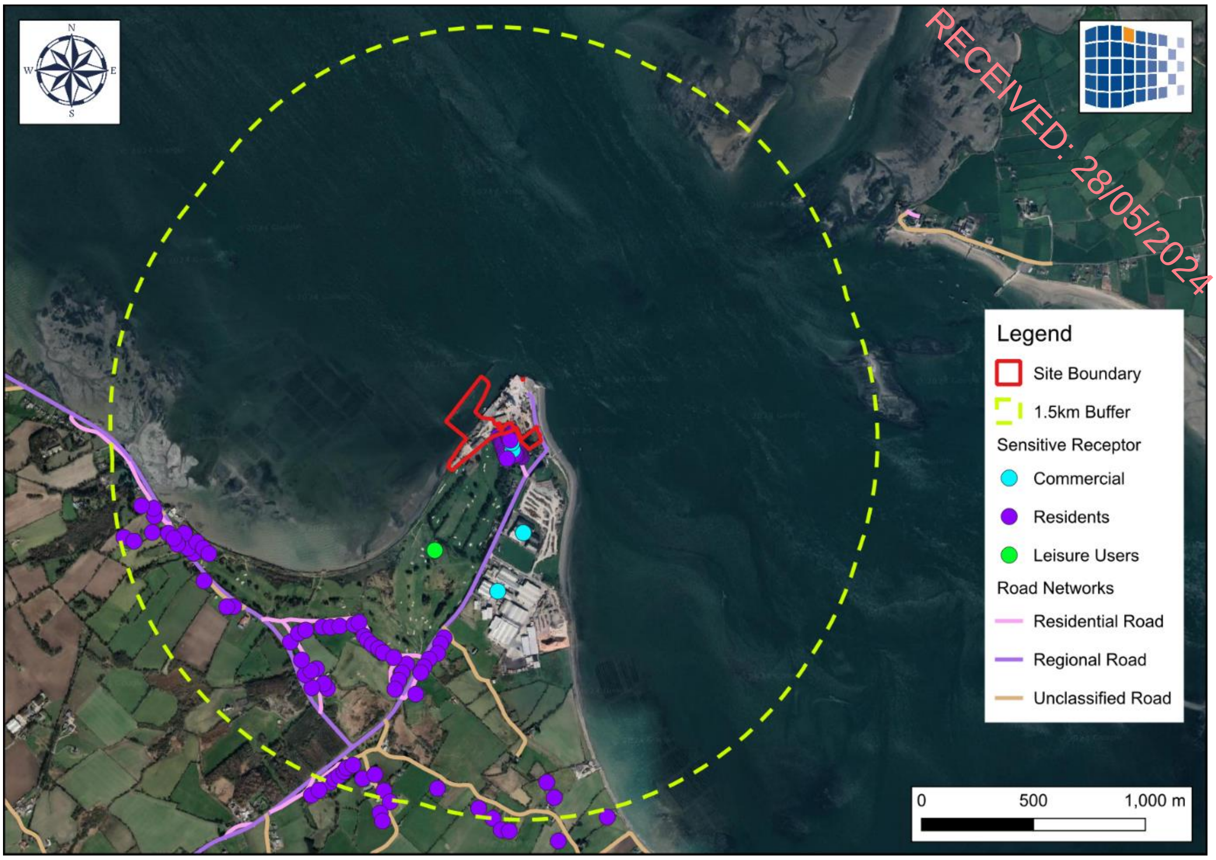

Figure 9: Sensitive Receptor Map (Source: Google Map, edited by MHP)

4.6.5.1 Village Residents

Greenore village is adjacent to the existing port. There are three rows of residential dwellings, with c.42 dwellings located along Euston Street and Anglesey Terrace. Dwellings on Euston Street comprise c. 18 dwellings on the eastern side and 9 on the western side, interspersed with some commercial premises. There are 15 dwellings on Anglesey Terrace broken into 3 blocks.

Figure 4-10 Euston Street (top) and Anglesey Terrace (underneath)

The main settlement within the wider context is Carlingford, which is approx. 2.6km west of the site and has a population of c.1,528 (Census 2022).

4.6.5.2 Shore Road Residents

There are a number of dwellings on Shore Road, to the south of the 'Residential site', and adjacent to the Coast Guard station which are identified as receptors as they are likely to be affected during the construction phase and also the operation of the Carpark on Shore Road.

4.6.5.3 Other Residents

There are other residents in the Village located at the southern end of Euston Street and Anglesey Terrace and on the R175 approach which are identified as receptors.

4.6.5.4 Greenore Golf Club

Greenore Gold Club is a neighbouring landowner, sharing a boundary with the terrestrial port site. The clubhouse facility is located at the south western end of the site, proximate to the proposed Building A.

4.6.5.5 Greenore Commercial Port and Other Pilots / Lough Users

Greenore Port is an active commercial port and the Lough is used by many other pilots for both commercial and recreational uses. As part of the design process, the applicant engaged and consulted extensively with a range of relevant stakeholders including local pilots for the lough and the existing port operational team. A vessel simulation modelling exercise was undertaken to ensure the configuration of the maritime development and proposed vessels did not negatively interact with existing operations.

Figure 4-11 Existing view of Greenore Port

4.6.5.6 Other Commercial & Industrial Premises

There are 2 cafés along Euston Street, one which includes a lifestyle shop and the other a railway / maritime museum. Both are, located on Euston Street.

Beyond this there are a number of established industrial / warehousing premises located on Shore Road, on the approach to Euston Street. These include Teelings Whiskey and Hanlon Transport Ltd.

4.6.5.7 Aquaculture Activity

Aquaculture includes the culture or farming of fish, aquatic invertebrates, aquatic plants or any aquatic form of food suitable for the nutrition of fish. The vast majority of aquaculture activity takes place in the nearshore environment. Carlingford Lough is an important area for production of bottom (sub-tidally) grown mussels (*Mytilus edulis*) as well as Pacific oysters (Crassostrea gigas), the latter being grown on off-bottom trestles on the intertidal foreshore. Farming activity takes place within both the Northern Ireland and Republic of Ireland jurisdictions and agreement between both administrations has facilitated aquaculture licensing by Department of Agriculture, Food and Marine and the Department of Agriculture, Environment and Rural Affairs (NI).

Both mussels and oysters are produced to serve domestic as well as export markets and are destined for fresh markets; while some proportion of both mussel and oyster production also enters the processing / value added sector within Ireland for domestic and export consumption.

There are several aquaculture sites located in Carlingford Lough. In the Republic of Ireland sector of the lough, there are licensed aquaculture sites immediately adjacent to Greenore port. Pacific oyster culture takes place on the intertidal foreshore within 100m of the proposed project site, to the east.

Bottom mussel culture takes place approximately 500m east of the port area and extends for much of the southern side of the lough.

In the Northern Ireland sector, there are bottom mussel as well as oyster culture sites to the north of Greenore port and the proposed project area, on the northern side of the navigable channel. The closest of these is circa 950m directly opposite the project area, where mussels are cultured on the seabed.

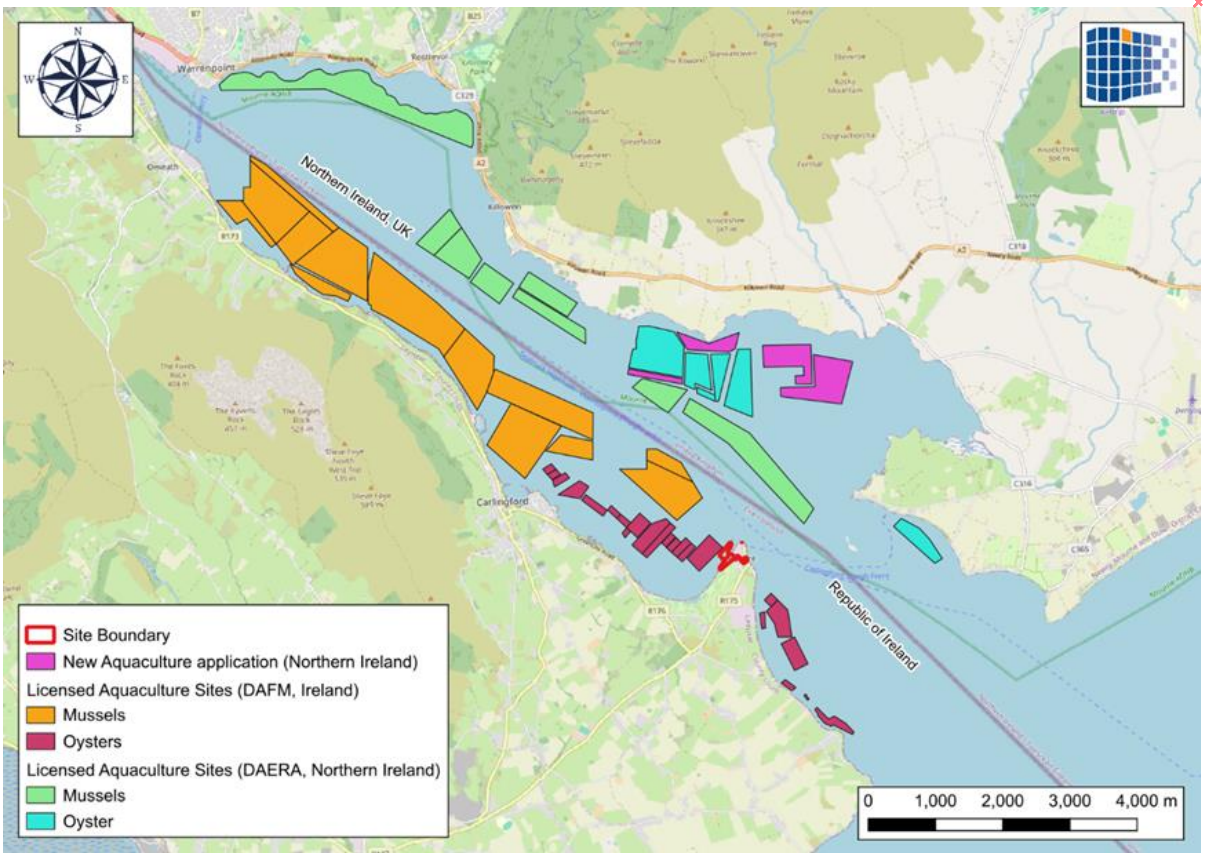

Figure 4-12 Aquaculture Licenses Carlingford Lough

4.6.5.8 Carlingford Lough Ferry (Greenore – Greencastle)

The Carlingford Lough ferry route between Greenore and Greencastle departs / arrives from Greenore, with the ferry slip located at the Greenore Point. The ferry accommodates a range of vehicle types, including cars, vans, camper vans, caravans, minibuses, and coaches. The service departs hourly from each terminal throughout the year and every half hour during summer.

4.6.5.9 Tourism activities

There are several tourism activities in the area. These are considered collectively as a sensitive receptor.

Table 4-10 Tourism Activities in Carlingford & Greenore

Activities	Description	Distance
Greenore Victorian Railway Village	This is the village south adjacent to the site	Adjacent to the Site
Greenore Golf Club	The course is a superb 18-hole flat semi-links, with a good mix of traditional links and heathland terrain, set in beautiful surroundings with splendid views of Carlingford Lough, Slieve Foy and the Mourne mountains.	Adjacent to the Site
Cooley Peninsula Scenic Drive	It is an area of diverse landscape and spectacular scenery. Bounded by Carlingford Lough and Dundalk Bay, it covers an area of roughly 60 square miles of mountain ranges, flat fertile plains, wide valleys, forests and long beaches. The peninsula's previous occupants left an assortment of relics for us to ponder and wonder at including neolithic tombs, ringforts, castles, early Christian sites, medieval buildings and more. Refer to Figure below.	Various Routes and the closest location is at the Port.
Carlingford Oyster Festival	Offering a four day fun-filled festival for the whole family is packed with traditional children's activities including Magic Show, Face Painting, the ever popular Teddy Bear's Picnic, Free Kayaking in the Harbour, Children's Funfair & Bouncing Castles.	Various Locations and the closest location is 1.2km southwest of the Site.
Carlingford Adventure	Carlingford Adventure Centre provides visitors with over 30 fun filled outdoor activities on Carlingford Lough and the slopes of Slieve Foye. The Carlingford Adventure Centre is situated on Tholsel Street in the heart of Medieval Carlingford and just a short distance from their Water Sports Centre on the harbour and the Outdoor Adventure Arena on the side of Slieve Foye Mountain.	3.3km west of the Site.
Carlingford Bird Watching	"Most of Louth's best birdwatching sites are situated on the coast. Carlingford in Louth offers exactly that for your bird watching interests. Focusing on Carlingford Lough and travel southwards via Dundalk harbour, Lurgangreen and Clogherhead to the Boyne estuary. The headlands are all good for migrants in spring and autumn, while the sea bays and wetlands are best in winter, when sea ducks, dabbling ducks, waders and gulls are most common." - Breffni Martin, BirdWatch Ireland."	Various Locations and the closest location is at the Port.
Trail and Scenic Routes	The Cooley Peninsula has more than 10 Loop Walks, where the featured walks no. 10 Carlingfor Sli na Slainte is the loop walk towards Greenore Port.	Various Route and the closest route ist 800m south of the Site.
Carlingford Lough	Carlingford Lough provides an array of recreational activities to cater to the preferences of visitors. Boating activities are prevalent throughout Carlingford Lough, encompassing a spectrum from dinghy and yacht racing to cruising, sailing, and powerboat training. The area boasts ample moorings and boating facilities, accessible at Rostrevor, Warrenpoint, Greencastle, and The Albert Basin (the primary water-based recreation resource in Newry). Carlingford Marina, situated just west of Carlingford, offers a 300-berth marina, boatyard, café, and eight self-catering apartments. Within the town, Carlingford Sailing Club is established, while the Carlingford Sail Training Centre maintains floating moorings outside the harbour. In Killowen, County Down (NI), the yacht club	0 – 10km from the subject site

Activities	Description	Distance
	features a clubhouse, boat storage, and a slipway, having also hosted significant sailing events Carlingford Lough hosts 10 designated access points to the "Southeast Coast Canoe Trail" which stretches more than 50 nautical miles along the southeast coast of Northern Ireland into County Louth in the Republic Numerous water sports and adventure centres line the lough's shores, including Carlingford Adventure Centre, Rostrevor Swimming and Boating Club, and East Coast Adventure Centre, which operates a Watersports Centre from Warrenpoint Baths under lease from Newry, Mourne, and Down District Council	

Figure 4-13 Carlingford and Cooley Peninsula Scenic Drive Map (Source: Carlingford & Cooley Peninsula.ie)

4.6.6 Human Health

The consideration of potential impacts on human health is examined separately in Chapters 5 – 12 of this EIAR. Where relevant, each of these chapters identify the sensitive receptors of greatest interest to their respective topics and in the case of Air Quality, Noise and Traffic, this includes the populations living in residential locations in close proximity to construction or operational activities are identified as sensitive receptors.

4.7 The 'Do Nothing' Scenario

Under a 'Do-nothing' scenario, the existing port would likely continue as its current use. The existing area would remain operational for the purposes of port use. Any intensification of activities will be controlled by the port's existing health and safety procedures and no negative impacts are predicted in relation to land based activities and the effect would be neutral.

There are two extant planning permissions at Greenore Port for the extension and modification of an existing Warehouse (LCC Planning Ref 20268/ABP Ref 307862) and a new Warehouse (LCC Planning Ref Planning Ref 20543/ABP Ref 310184). As these are valid permissions the respective developments must be considered as a possible scenario under the 'Do Nothing' Scenario.

The development of either extant planning permission is considered to result in increasing port activity as the port could accommodate larger volumes of bulk goods, in line with the permissions approved.

In the event that the proposed development does not proceed, an opportunity to develop the port as a flagship Headquarter facility supporting the Offshore renewable energy industry combined with diversification of port uses and providing a 'cleaner' future for the port is missed.

4.8 Potential Significant Effects

This section describes the environmental effects that are likely to arise during the construction and operation of the proposed development. **Section 4.9** sets out the mitigation measures required to alleviate identified effects.

Potential Impacts are considered under the following headings in line with the Guidelines set out in section 4.4:

- Marine and Land Use
- Population
- Employment and Economic Activity
- Residential Amenity and Community Facilities
- Human Health & Safety
- Local Amenity + Tourism

All other environmental aspects relating to the human environment which could have an adverse effect on the local population such as soils, geology & hydrogeology, water and ecology have been addressed in the relevant chapters of this EIAR.

4.8.1 Demolition & Construction Phase

The potential impacts of the proposal during the demolition and construction phase of the development are outlined below.

4.8.1.1 Marine and Land Use

The proposed development is an upgrade to an existing operational port. During both the construction and operational phases, the development site would not result in a change of marine / land use at this location. Additionally, given that the proposed development represents a 'lighter' port activity than the existing operations, the surrounding amenities will not be significantly impacted by the proposed development.

There will be no severance of land, loss of rights of way, nearshore access, or amenities as a result of the proposed development. Development at this site also aligns with the National Planning Framework (NPF) policy objective (NPO 11), which seeks to favour development that can encourage more people and generate more jobs and activity within existing cities, towns and villages. The impact is likely and will have a permanent significant positive effect that will achieve local and wider county, regional and national objectives.

The impact associated with the upgrade during the Construction Phase shall be **minor**, **neutral**, **local**, and **short-term**.

It is not anticipated that there will be an impact on settlement patterns as a result of the construction phase of the proposal. It is anticipated that of the projected 70 construction staff, they will not generate a temporary increase in population locally and thus settlement patterns during this period, as employees will travel to site from their existing place of residence. The likely impact on settlement patterns is thus **neutral**.

4.8.1.2 Population

It is estimated that during peak construction in construction phases 1 and 2, there will be approximately 70 no. people employed. Phase 1 will take approximately 16 months to complete and phase 2 approximately 20 months. It is not anticipated that this will generate a temporary increase in population locally during this period as employees will travel to the site from their existing place of residence.

No significant impact on population in this regard is identified and the likely impact on the population is thus **neutral**.

4.8.1.3 Employment & Economy

A key characteristic of the proposed development in terms of its potential economic impact relates to its capital value. The construction phase will provide a boost for the local construction sector in terms of employment generation and capital spend on materials and construction labour costs. It is expected that during peak activities (approximately 70 no. people will be working directly on the construction site), capital spend on materials and construction labour costs, and it will generate additional spending in the local economy (including local cafes) as a consequence of the presence of construction staff during the construction phase.

The construction staff will comprise of managerial, technical, skilled and unskilled workers. As far as practicable local labour will be employed.

In addition to direct employment on-site, there will be substantial off-site employment and economic associated with the supply of construction materials and provision of services such as professional firms supplying financial, architectural, engineering, legal and a range of other professional services to the project.

The overall predicted impacts associated with the construction phase on the working population and local economy are **likely** and will have a **positive, temporary/short-term, not significant** effect.

4.8.1.4 Residential Amenity and Community Facilities

The anticipated likely significant effects in the absence of mitigation on residential amenities and community facilities including Greenore Golf Club relate to disruption due to increased construction traffic movements on the local road network, noise, dust and visual impact arising from plant and construction activities (e.g. cranes, hoarding etc) necessary to complete the development.

The construction phase will cause a certain amount of loss of amenity, disruption, nuisance and inconvenience to the local community, particularly the receptors closest to the development i.e. the Village and Shore Road Residents and Greenore Golf Club.

Potential effects on human health arising during the construction phase of the project relate generally to quality of life including air quality, climate, noise, water and hydrology, waste, potential disruption of services and the risk of major accidents/disasters.

The level of disturbance and impacts are predicted to be commensurate with the normal disturbance associated with the construction industry where a site is efficiently and properly managed having regard to neighbouring activities.

In the absence of mitigation, the anticipated impact on residential amenity would be **local** and of **temporary to short-term** duration with a **moderate** significance.

4.8.1.5 Human Health & Safety

During the demolition and construction phase, health & Safety risks will arise from construction activities, including operation of plant and machinery. A construction related accident could pose a potential health and safety risk to construction workers, port employees or visitors to the port site. Construction safety will therefore be closely controlled by the Contractor and implementation of construction safety arrangements.

Furthermore, the Applicant is an experienced port operator who has managed many construction phases in the past, and during this period no major accidents or fatalities have occurred. The construction site cannot be freely accessed by members of the public and unauthorised access would be considered trespassing on private property.

On this basis, risk of health and safety related accidents are **unlikely** during the demolition and construction phase of the proposed development, no significant impacts on population and human health are identified. With best practice health & safety procedures in place, construction activities will have a **negligible**, **neutral**, **short-term** impact on health and safety.

Measures to address such human health considerations will be mitigated through the implementation of a Contractor's Construction and Environmental Management Plan (CEMP) and will be subject to Regulations and the relevant Health and Safety codes.

This EIAR also deals with the potential effects on human health during the construction phase, including the more specific topics of air, traffic, water, and noise.

4.8.1.6 Local Amenity and Tourism

Given that construction of the marine infrastructure of the proposed development is scheduled during the winter and limited to the immediate port environs, recreational users of Carlingford Lough are unlikely to experience disruptions. The CTV operators' adherence to robust safety management procedures will ensure safe operations, thereby minimising any adverse effects on recreational users.

The construction of the proposed development including the dredging campaign could lead to increased sedimentation rates and contamination/pollution of the water body. In the absence of mitigation, the anticipated impact on the local shellfish aquaculture industry would be negative, local and of temporary to short-term duration with a moderate significance.

As set out before, the construction of the proposed development will not have an impact on the operation of the existing ferry, heritage value of the village, surrounding landscape and sea scape.

No significant impact on tourism associated with the Construction Phase is identified.

4.8.2 Operational Phase

The potential impacts of the proposal during the operational phase of the development are outlined below:

4.8.2.1 Marine and Land Use

The proposed development is an addition to an existing operational port. During both the construction and operational phases, the development site would not result in a change of land use at this location. Additionally, given that the proposed development represents a 'lighter' port activity than the existing operations, the surrounding amenities will not be significantly impacted by the proposed development.

The impact associated with the upgrade during the Construction Phase shall be **minor**, **neutral**, **local**, and **short-term**.

The proposed development will contribute to the establishment of appropriate enterprise and employment uses at the established and strategically well located Greenore Port.

It will deliver the construction of 3 new warehouse and ancillary office space with a cumulative gross floor area (GFA) of 5010 sq.m. The design of the building incorporates energy efficiency measures that will ensure the occupied spaces (offices) meet the requirements of Near Zero Energy Building (NZEB) regulations set out in TGD Part L 2021. High standards of architectural design, in tandem with a comprehensive landscape strategy has sought to ensure the best use of land, and ensure the development makes a positive contribution to this attractive port setting.

It is anticipated that delivery of a high-quality commercial development in a highly landscaped setting at this location will result in **a likely significant positive impact** with a **permanent** duration.

4.8.2.2 Population

The proposed development will generate up to 225 new jobs. It is not anticipated that this will generate any marked increase in population locally, as it is envisaged that employees will likely travel to the site from their existing place of residence. The likely impact on the population is thus neutral.

The demographic trends of the study area are provided in Sections 4.5.6-4.5.12 above. The proposed development will provide a positive long-term impact in terms of providing additional employment.

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4.8.2.3 Employment & Economy

The proposed development will support continued sustainable economic growth and quality jobs for the region, consistent with the objectives of the Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region and the Louth County Development Plan 2021 – 2027.

The proposed Operations and Maintenance Facility will provide for up to 225 new jobs in a future proof and sustainable industry, thus creates high quality work opportunities for the local and regional population, the majority of which are in the working age cohort.

Development of this new facility will also support ambitions for planned longer term growth in Ireland and there should thus be an indirect positive effect on population and employment generation.

The employment generated by the proposed development will contribute to the professional and skilled trades and engineering jobs in the locality. The overall effect on employment locally and regionally is moderately positive and permanent.

The employees will generate additional spending within the area which will likely have a local permanent moderate positive impact on local economic activity generated through the multiplier effect.

The impact of the operational phase will at least extend to County Louth in terms of the requirement for labour, goods and services. The effect is **likely** and will be **permanently significantly positive**.

The daytime increase in working population is likely to have a **permanent moderate positive effect** on local retail services providers, due to the presence of employees on site and the increased expenditure on convenience goods.

4.8.2.4 Residential Amenity and Community Facilities

The operation of the proposed development has limited capacity to impact on residential amenities and community facilities.

Included in the design of the proposed development, consideration was given to the location and route of the pedestrian access from the Shoe Road carpark to the proposed buildings. This was routed through existing port lands, as opposed to an existing lane at the rear of Euston Street, to provide a separation between the pedestrian route and the existing residences, and reducing possible effects of noise or lighting spill.

Visual, traffic, noise and dust effects are considered in Chapters 5, 6, 13 and 14 respectively. These chapters conclude that there will be no significant effects on residential amenities or community facilities attributed to the operational phase.

4.8.2.5 Human Health & Safety

Port Operations

The main health and safety risks during the operational phase of the proposed redevelopment arise from the operation of plant and machinery.

Health and Safety activities for port operations are guided by national Health & Safety legislation. The occupants will appoint a safety officer who will be responsible for ensuring compliance with these safety procedures.

The project design has taken cognisance of necessary health and safety requirement for port operations and has minimised any increased health and safety risk associated with the development. In addition, the Port's existing Health & Safety procedures will be reviewed to take account of the increased operations at this location. Consequently, increased port operations will have **negligible**, **neutral** permanent impact on health and safety.

The risk of accidents / unplanned events is addressed through the Building Regulations (Fire Safety) and is therefore addressed through primary mitigation in the design process. Residual risks of fire and road traffic accidents will be managed by emergency services as per their standard procedures.

Measures to address such human health considerations will be subject to Regulations and the relevant Health and Safety codes.

The potential for effects on human health during the operational phase is also dealt with in this EIAR under the more specific topics by which they might be caused including air, traffic, water and noise.

Sea & Road Traffic

There is a potential enhanced risk of accidents related to the increase in road and sea freight traffic. The design of the proposed redevelopment and implementation of existing road and sea traffic management operational procedures will ensure that increased traffic has no negative impact on health and safety.

Consequently, in relation to sea and road traffic, the operational phase of the proposed redevelopment will have a **negligible**, **neutral** permanent impact on health and safety

4.8.2.6 Local Amenity and Tourism

No significant impact on tourism associated with the Operational Phase is identified.

As set out above, the proposed development will not have an impact on the operation of the existing ferry, heritage value of the village, surrounding landscape and sea scape and will continue to attract people to visit the area.

During the operational stage collisions of CTV with other commercial or recreational lough users pose safety hazards to health and safety, vessels, and infrastructure. Accidents resulting from such collisions could lead to injuries, damage to property, and environmental consequences. The Navigation Impact Assessment confirms that the proposed CTV construction and operation at Greenore is unlikely to result in collisions, the effect is therefor is **negligible**, **negative** and **permanent.**

The presence of a new pontoon and port activities might introduce invasive alien species from vessels to the area and may cause spillage or other forms of pollution which could affect the local shellfish aquaculture. The Risk Assessment for shellfish aquaculture prepared with regard to the proposed development identifies these potential impacts as unlikely thus the impact on tourism and the local amenity is **negligible**, **neutral** and **permanent.**

The proposal provides for a flagship landside development that is critical for the support of the offshore renewable energy industry. Therefore, it will provide for a much cleaner use of port lands.

There is also a growing potential for tourism and education within the perimeter of offshore wind farm areas. Offshore renewable energy developers are typically willing to provide opportunities to show their farms to the public which can be expected to be facilitated from the OMF port at Greenore.

Overall the Operational Phase will have a **long-term, slight, positive** impact on tourism both **locally** and **nationally.**

4.8.3 Cumulative Effects

Potential cumulative impacts may arise from the proposed development at Greenore Port when combined with other existing and/or approved projects. In accordance with the European Commission Guidance on the preparation of the Environmental Impact Assessment Report (2017) and EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022).

A review of relevant, large scale, recent planning applications was conducted in order to identify sites with the potential for cumulative impacts. Planned and approved projects and plans with the potential for cumulative impacts have been identified in Appendix 1.1 Cumulative Assessment - Projects and Plans. There are several developments in the vicinity of the study area comprising residential, commercial and infrastructure schemes. Extant permissions of the port are not relevant for this section as it's not feasible to implement previously granted developments in combination with the subject scheme.

A number of minor developments have been granted permission within the surrounding area, these are typically associated with extensions or alterations to single buildings.

Larger developments require a construction management plan to mitigate effects of the construction phases. Subject to adherence to measures contained in the individual plans, the cumulative effect is likely, short term and not significant.

4.8.4 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 4-11 Summary of Demolition and Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Construction Employees contributing to local economy	Positive	Moderate	Local/National	Likely	Short-term	Direct
Economic opportunities associated with the supply of construction materials and provision of services	Positive	Moderate	Local/National	Likely	Short-term	Direct
Disruption due to increased construction traffic movements on the local road network	Negative	Moderate	Local	Likely	Short-term	Direct
Construction Effects on human health	Negative	Moderate	Local	Likely	Temporary	Direct
Visual Impact	Neutral adverse	Not Significant – Significant	Local	Likely	Medium-term	Not applicable

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 4-12 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Employees contributing to local economy	Positive	Moderate	Local/National	Likely	Medium-term	Direct
Creation of additional Jobs in a rural environment	Positive	Significant	Local	Likely	Permanent	Direct
Delivery of a high-quality commercial development	Positive	Significant	Local	Likely	Permanent	Direct

4.9 Mitigation

4.9.1 Incorporated Design Mitigation

The proposed development complies with the Building Regulations which provide for the safety and welfare of people in and about buildings. The Building Regulations cover matters such as structure, fire safety, sound, ventilation, conservation of fuel and energy, and access, all of which safeguard users of the buildings and the health of occupants. The design also incorporates the principles of universal design and the requirements of Part M of the Building Regulations so that the development will be readily accessible to all, regardless of age, ability or disability.

The integration of energy efficient measures into the design will provide for a healthy work environment for employees, less dependence on fossil fuels and associated improved air quality. The inclusion of landscaping elements and a highly accessible layout of the scheme including segregated and safety improved pedestrian walkways will provide for a high quality work place for future employees and the enhancements of the public realm and design of the overall layout will improve the setting of the wider village.

4.9.2 Demolition & Construction Phase Mitigation

The following mitigation measures are recommended:

- **Construction and Environmental Management Plan (CEMP)**: The appointed contractor(s) will update the Outline CEMP submitted with the application and submit to Louth County Council prior to the commencement of development.
    - o The CEMP will comply with all appropriate legal and best practice guidance for construction sites.

  - The purpose of a CEMP is to provide a mechanism for the implementation of the various mitigation measures which are described in this EIAR and to incorporate relevant conditions attached to a grant of permission. The CEMP requires that these measures will be checked, maintained to ensure adequate environmental protection. The CEMP also requires that records will be kept and reviewed as required to by the project team and that the records will be available on site for review by the planning authority.
  - All construction personnel will be required to understand and implement the requirements of the Contractor's CEMP and shall be required to comply with all legal requirements and best practice guidance for construction sites.
  - All mitigation and monitoring measures included in the Summary of Mitigation and Monitoring Measures in Chapter 19 of this EIAR will be included in the CEMP and adhered to.
- **Community Liaison Officer**: The contractor will appoint a liaison officer to ensure that any issues from the local community are dealt with promptly and efficiently during construction. These details will be included in the contractor's CEMP.
- **Construction Working Hours**, except for dredging and pile driving works, will generally be limited to the hours 0700 – 2000 Monday to Friday and 0700 – 1600 hours on Saturday. Some works have to be undertaken at low tide and their construction hours will be linked to tides (for example works associated with the pontoon construction and quay wall).
  - Pile driving works will be limited to 0800-1800 Monday to Friday and 0800 - 1600 hours on Saturday. It is not envisaged that works will take place on public holidays.
  - Dredging, due to the nature of the activity, is undertaken on a 24 hour basis to achieve the maximum production rates within tidal envelopes Dredging activities will occur for approximately 8-10 weeks.
  - If works are required outside of these hours, in exceptional circumstances, the planning authority will be notified in advance
- Project supervisors for the construction phase (PSCS) will be appointed in accordance with the Health, Safety and Welfare at Work (Construction Regulations) 2013, and a Preliminary Health and Safety Plan will be formulated during the detailed design stage which will address health and safety issues from the design stages, through to the completion of the construction phase.
- The Resource Waste Management Plan (RWMP) will be updated by the Contractor, as necessary, as per mitigation outlined in Chapter 8.
- **Aquaculture Protection:** All suitable and appropriate mitigation measures included in Table 4 of the Risk Assessment for Shellfish Aquaculture, given below, are recommended to be deployed during the dredging works and included in the Contractor(s) CEMP.

Source	Available range of mitigations
Dredging: local resuspension of sediments and increased sedimentation rates on intertidal / subtidal foreshore.	• Planning of excavation to avail of minimal tidal dispersion effects • Use of closing backhoe bucket, in areas of soft sediment, to minimise spillage • Avoidance of side-casting of excavate prior to barge loading • Deployment of turbidity monitoring and recording buoys with automated real time alarms • Deployment of buoy mounted oxygen monitoring and recording sensors with automated real time alarms • Aerial monitoring of sediment dispersion/dredging plume conducted by drone surveillance once per week on peak flood and ebb when dredging. • Management of unloading/transhipment to avoid spillage • All suitable and appropriate mitigations to be included in the **Construction Environmental Management Plan**
Dredging: Transport of sediments, particularly of finer fractions, and release of contaminants to other areas, resulting in an increase in contaminant levels, most notably TBT/DBT	• Use of closing backhoe bucket, in areas of soft sediment, to minimise spillage • Planning of excavation to avail of minimal tidal dispersion effects • Avoidance of side-casting of excavate prior to barge loading • Deployment of turbidity monitoring and recording buoys with automated real time alarms • Aerial monitoring of sediment dispersion/dredging plume conducted by drone surveillance once per week on peak flood and ebb when dredging. • Management of unloading/transhipment to avoid spillage • All suitable and appropriate mitigations to be included in the **Construction Environmental Management Plan**
Dredging: release of nutrients, consumption of oxygen resulting in reduced oxygen saturation of the water body	• Planning of excavation to avail of minimal tidal dispersion effects • Use of closing backhoe bucket, in areas of soft sediment, to minimise spillage • Avoidance of side-casting of excavate prior to barge loading • Deployment of turbidity monitoring and recording buoys with automated real time alarms • Deployment of buoy mounted oxygen monitoring and recording sensors with automated real time alarms • Aerial monitoring of sediment dispersion/dredging plume conducted by drone surveillance once per week on peak flood and ebb when dredging. • Management of unloading/transhipment to avoid spillage • All suitable and appropriate mitigations to be included in the **Construction Environmental Management Plan**
Dredging and installation of quay wall extension and floating pontoons: contamination/pollution of water body by hydrocarbons/liquid contaminants	Prepare protocol for the management of hydrocarbons and cement. For cement, specifically this should detail measures to: • Assess where any wastewater associated with the use of cement will run and the most appropriate way to dispose of it. • Ensure that appropriate measures are in place to avoid the potential for the run-off of cement into the marine area. Further ensure there is no potential for the run-off of cement into stormwater drains or that drains and gutters in the vicinity have been blocked off. • Use spill mats to contain any spills • Use sandbags or diversion booms to direct the any run-off to an appropriate safe location away from marine areas. • Set up a designated Washdown Area away from marine areas or with potential to run-off to it. • Ensure proper management in the event of an accidental spill. For hydrocarbons, mitigations should require: • All hydrocarbons to be stored in bunded containers at least 20m away from marine areas. • All plant and machinery and vessels should be regularly checked for leaks (fuel, oil and coolant).

	• Drip trays will be used underneath any mobile plant and drums whilst in use on site. • All machinery and vessels to have an on-board spill kit. • A hydrocarbon oil boom to be available at all times onsite in the event of it needing to be deployed. • If required, generators to be on a hydrocarbon mat at all times.

4.9.3 Operational Phase Mitigation

The proposed development is designed to modern standards that incorporate measures that reduce risks to and enhance amenity in terms of population and human health. The impact assessment section did not identify likely significant environmental impacts on population and human health arising from the operational phase of the proposed development. Accordingly, other than the mitigation measures outlined by others in this EIAR relating to human health, no further mitigation measures are proposed with respect to population and human health.

4.10 Residual Impact Assessment

It is anticipated that the proposed development will realise significant positive overall economic benefits for the local community and the wider local area.

Strict adherence to the mitigation measures recommended in this EIAR will ensure that there will be no negative residual impacts or effects on Population and Human Health from the construction and operation of the proposed scheme. Indeed, the delivery of this high quality commercial development at this site will realise a likely **significant positive** effect of **permanent** duration for the local area.

4.11 Worst Case Scenario

The worst-case scenario on population and human health is considered to be the risk of an accident during the construction phase. According to the Health and Safety Authority[2] , in 2023 there were 11 fatal accidents recorded equivalent to 26% of the total fatal work-related incidents. In 2022, 7 fatal accidents occurred in construction equivalent to approx. 25% of the total fatal work-related incidents. This represents an increase from the number recorded the year previous.

The HSA has undertaken a range of activities in regulation, education, accreditation and enforcement to reduce incidents on construction sites. The appointed contractor is required to comply with all relevant Health and Safety legislation and the risk of a fatality is deemed unlikely.

This worst-case scenario is considered **unlikely**, and the significance of the effect is **indeterminable**.

[2] Available via: https://www.hsa.ie/eng/topics/statistics/annual_review_of_workplace_injury_illness_and_fatality_statistics/annual-review-of-workplace-injuries-illnesses-and-fatalities-2021-2022.pdf; and

https://www.hsa.ie/eng/news_events_media/news/press_releases_2024/health_and_safety_authority_reports_43_work-related_fatalities_in_2023.html

4.12 Interactions

Please see **Chapter 18** of this EIAR for details on Interactions.

During the construction phase, the following aspects have potential to interact with population and human health:

- **Landscape and Visual -** Construction processes, plant and hoarding used during the construction phase may give rise to visual impacts..
- **Material Assets – Traffic & Transport:** Increased construction traffic movements on the local road network during the construction phase may give rise to noise, dust, and road safety impacts.
- **Material Assets – Built Services:** Excavation during the construction phase may give rise to risks to human health as a result of any excavation work in areas where built services exist through coming into contact with live electricity lines or damaging watermains.
- **Noise & Vibration:** There is potential for effects on human health associated with noise and vibration during the construction phase which may impact upon residential amenity.
- **Air Quality:** There is potential for impact on human health from dust associated with construction activities and thus impacting air quality.

The potential impact on human health arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

During the operational phase, the following aspects have potential to interact with population and human health:

- **Landscape & Visual:** The landscape plan will impact on the quality of the private and public open spaces, which could impact on people's health and well-being.
- **Material Assets: Traffic and Transport:** Traffic flows towards the site has the potential to create safety risks for pedestrians and cyclists**.**
- **Air Quality:** Energy efficient design within the proposed development may give rise to reduced electricity consumption by future tenants, potentially decreasing dependence on fossil fuels for energy generation, resulting in improved air quality. There is potential for impact on human health from a deterioration in air quality associated with emissions from vehicles.
- **Climate:** Energy efficient design within the proposed development may give rise to reduced electricity consumption by future residents, potentially decreasing dependence on fossil fuels for energy generation, resulting in significant CO_2 savings.

The potential significant impacts on human health arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

4.13 Monitoring

Measures to avoid negative impacts on Population and Human Health are largely integrated into the design and layout of the proposed development. Compliance with the design and layout will be a condition of any permitted development.

No specific monitoring is proposed in relation to this section. Monitoring of standard construction mitigation measures as outlined in this EIAR will be undertaken by the appointed contractor.

4.14 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the proposed development with regards to Population and Human Health. These impacts have been considered for both the construction and operational phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures as set out in this chapter, there are no significant adverse effects with respect to socio-economic factors, land use, or the amenity value potential of the area predicted.

Issues which may cause risks and hazards during the construction and operational phase of the development are given due consideration. All necessary mitigation measures will be put in place to ensure the health and safety of all site personnel and neighbouring properties. All other environmental aspects relating to the human environment which could have an adverse effect on the local population such as soils, geology & hydrogeology, water and ecology have been addressed in the relevant chapters of this EIAR.

4.15 References and Sources

- National Planning Framework, Ireland 2040 – Ireland 2040 – Our Plan (Government of Ireland 2018)
- Eastern and Midland Regional Spatial and Economic Strategy 2019-2031
- Louth County Development Plan 2021 – 2027
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018)
- Central Statistics Office (CSO) website www.cso.ie
- Employment Density Guide (3rd Edition) prepared by Bilfinger GVA and the Homes and Communities Agency (November 2015)
- Louth County Council (www.louthcoco.ie)
- Health and authority website https://hsa.ie
- Tusla Child and Family Agency Website https://www.tusla.ie/

CHAPTER 5

LANDSCAPE & VISUAL

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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5 Landscape and Visual

5.1 Introduction

This Landscape and Visual Impact Assessment (LVIA) was prepared by Cunnane Stratton Reynolds and was informed by a visit to the site and receiving environment in August 2023, as well as a related desktop research before and after the site visit. This assessment is in accordance with the methodology prescribed in the Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013 (GLVIA), published by the UK Landscape Institute and the Institute for Environmental Management and Assessment.

The report identifies and discusses the likely landscape and visual impacts in relation to the proposed development over a 4.88-hectare site area at Greenore Port, Greenore, Co. Louth. A full description of the proposed development is set out in Chapter 2 of this EIAR.

5.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Ronan Finnegan, Chartered Landscape Architect, PGDip LA (Leeds Met) 2008, CMLI, of Cunnane Stratton Reynolds, with oversight by Jamie Ball, Senior Landscape Architect, BA Landscape Architecture (University of Gloucestershire), 1998; MILI, of Cunnane Stratton Reynolds. Both with extensive experience in the design and analysis of landscape and the impacts of change, and the preparation of assessments for inclusion in EIARs.

5.3 Proposed Development

The key elements of the proposed development of consideration in landscape and visual matters are listed below. Further details of the proposed development can be found within Chapter 2 of this EIAR and the various supporting plans.

- Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space with each building having a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.
- A new quay wall of 70m and platoon accommodate crew transfer vessels (CTVs) to/from the offshore windfarms. The works requires dredging approx 45,000m3 of material to facilitate navigable access at this location.
- Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road.
- Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.
- To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

- Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA).
- Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.
- The infrastructure described above will likely be delivered over two phases. However, the sequence of the works may vary, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

5.4 Methodology

5.4.1 Definition of Landscape

Ireland is a signatory to the European Landscape Convention (ELC). The ELC defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe, 2000). This definition is important in that it expands beyond the idea that landscape is only a matter of aesthetics and visual amenity. It encourages a focus on landscape as a resource in its own right; a shared resource providing a complex range of cultural, environmental, and economic benefits to individuals and society.

It is also important to note that this definition of landscape applies not only to all types of rural landscape, marine and coastal landscapes (seascapes) but also to the landscape of villages, towns and cities (Section 2.5, LI, IEMA, 2013).

5.4.2 Guidance

The Guidelines for Landscape and Visual Impact Assessment 2013 (abbreviated to GLVIA 2013) notes that as a cultural resource, the landscape functions as the setting for our day-to-day lives, also providing opportunities for recreational and aesthetic enjoyment and inspiration. It contributes to the sense of place experienced by individuals and communities and provides a link to the past as a record of historic socio-economic and environmental conditions. As an environmental resource, the landscape provides habitat for fauna and flora. It receives, stores, conveys, and cleans water, and vegetation in the landscape stores carbon and produces oxygen. As an economic resource, the landscape provides the raw materials and space for the production of food, materials (e.g. timber, aggregates) and energy (e.g. carbon-based fuels, wind, solar), living space and for recreation and tourism activities.

The GLVIA (2013) notes that landscape is not unchanging. Many different pressures have progressively altered familiar landscapes over time and will continue to do so in the future, creating new landscapes. For example, within the receiving environment, the environs of the proposed development have altered over the last thousand years, from wilderness to agriculture and settlement or townscape.

Many of the drivers for change arise from the requirement for development to meet the needs of a growing population and economy. The concept of sustainable development recognises that change must and will occur to meet the needs of the present, but that it should not compromise the ability of future generations to meet their needs. This involves finding an appropriate balance between economic, social and environmental forces and values.

The reversibility of change is also described as an important consideration. If change must occur to meet a current need, can it be reversed to return the resource (in this case, the landscape) to its previous state to allow for development or management for future needs? Climate change is one of the major factors likely to bring about future change in the landscape, and it is accepted to be the most serious long-term threat to the natural environment, as well as economic activity (particularly primary production) and society. The need for climate change mitigation and adaptation, which includes the management of water and more extreme weather and rainfall patterns, is part of this.

5.4.2.1 Key Guidance Documents

Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity. The methodology for assessment of the landscape and visual effects is informed by the following key guidance documents, namely:

- *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition, Landscape Institute and the Institute of Environmental Management and Assessment (2013) (hereafter referred to as the GLVIA 2013).
- *Guidelines on the Information to be Contained in Environmental Impact Statements*. (EPA, 2022)

This guidance is authored by the Landscape Institute in the UK and the IEMA, which contains a network of members in Ireland, the UK and wider, internationally. The guidance was prepared within the parameters of relevant EU directives at the time and is updated, where necessary, by Landscape Institute bulletins online. The GLIVA 2013 is used internationally and is the industry standard for LVIA in Ireland.

The EPA guidance (2022) refers to the use of topic specific guidance and specifically references the GLVIA 2013 in relation to professional judgement. It recognises (at para 3.72) that:

> *"Some uncertainty is unavoidable in EIA, especially about matters that involve an element of judgement, such as assigning a level of significance to an effect. Such judgements should be explicit and substantiated rather than presented as objective fact. This is best done using agreed referable approaches, e.g. the Guidelines on Landscape and Visual Impacts Assessment provide guidance on what constitutes a severe visual effect".*

5.4.2.2 Other Policy Documents

References are also made to the '*Landscape and Landscape Assessment – Consultation Draft of Guidelines for Planning Authorities*' document, published in 2000 by the Department of Environment, Heritage and Local Government. Other documents referred to include the Louth County Development Plan 2021-2027 and the accompanying Louth Landscape Character Assessment.

5.4.2.3 Landscape and Visual Assessment Process

The GLVIA 2013 outlines the assessment process, which combines judgements on the *sensitivity* of the resource, and the *magnitude* of the change as a result of the proposed development. These are then combined to reach an assessment of the significance of the effect.

Another key distinction to make is that in the GLVIA methodology, a distinction is made between landscape effects and the visual effects of a proposed development.

'Landscape' results from the interplay between the physical, natural and cultural components of our surroundings. Different combinations of these elements and their spatial distribution create distinctive character of landscape in different places. 'Landscape character assessment' is the method used in LVIA to describe landscape, and by which to understand the potential effects of a development on the landscape as 'a resource'. Character is not just about the physical elements and features that make up a landscape, but also embraces the aesthetic, perceptual and experiential aspects of landscape that make a place distinctive.

Views and 'visual amenity' refer to the interrelationship between people and the landscape. The GLVIA 2013 prescribes that effects on views and visual amenity should be assessed separately from landscape, although the two topics are inherently linked. Visual assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity.

Establishment of Baseline

The process set out in the GLVIA 2013 and in the EPA (2022) involves the preparation of the baseline or receiving environment characteristics. This includes two stages, which are a desk based study and a site visit/field study. These allow the assessor to establish the existing receiving environment and key landscape and visual characteristics and their sensitivities.

<u>The desk based study includes:</u>

- Review of preliminary proposals and identification of preliminary study area
- Review of current County Development Plan within the study area, to identify relevant national and local designations and polices. This may include designations such as scenic routes, protected views and other landscape designations including any Landscape Character Assessments.
- Other information that may be consulted include aerial imagery, OSI Discovery series mapping, historic (6-inch and 25 inch) mapping and CORINE Landcover Maps (2018).

A site visit is then carried out to review and/or confirm the findings of the desk based study and provide a more detailed description of the landscape and visual character of the study area. Based on both the desk study and site visit, the assessor identifies landscape and visual receptors and their relative sensitivity. The site visit was carried out in August 2023.

Assessment of Effects:

Once the baseline is established, and the proposed development drawings and descriptions reviewed, the assessment process commences.

Use of 'Impact and 'Effect

Section 1.16 of the GLVIA (referring to the EIA Directive), advises that the terms 'impact' and effect' should be clearly distinguished and consistently used in the preparation of an LVIA.

'*Impact*' is defined as the action being taken. In the case of the proposed development, the impact would include the construction of the proposed buildings and associated boundaries and external areas, including the surface car park on Shore Road, among other features.

'Effect' is defined as the change or changes resulting from those actions, e.g. a change in landscape character, or changes to the composition, character and quality of views in the receiving environment. This report focusses on these effects.

Methodology for Landscape Assessment

In Section 5.8 of this Chapter, the landscape effects of the proposed development are assessed. The nature and scale of changes to the landscape elements and characteristics are identified, and the consequential effect on landscape character and value are discussed. Trends of change in the landscape are taken into account. The assessment of the significance of the effects takes account of the sensitivity of the landscape resource and the magnitude of change to the landscape, which resulted from the proposed development.

Definitions and descriptions of sensitivity, magnitude of change and quality and longevity of effects are derived from the GLVIA 2013. The GLVIA 2013 does not set out specific definitions of descriptions used but contains widely used principles and case studies / examples that are intended to inform a professional's methodology, supported by their experience and judgements in relation to landscape and landscape change. These descriptions expand and complement the EPA guidelines as intended, in relation to topic-specific guidance.

<u>Sensitivity of the Landscape</u>

Sensitivity is a combination of landscape value as well as the susceptibility of the landscape to change:

- Landscape values can be identified by the presence of landscape designations or policies, which indicate particular values, either on a national or local level. In addition, a number of criteria are used to assess the value of a landscape. These are described further below, in Section 5.6.
- Landscape susceptibility is defined in the GLVIA as, "*the ability of the landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline scenario and/or the achievement of landscape planning policies and strategies*." Susceptibility is a function of its land use, landscape patterns and scale, visual enclosure and distribution of visual receptors, scope for mitigation, and the value placed on the landscape. Susceptibility also relates to the type of development; a landscape may be highly susceptible to certain types of development but have a low susceptibility to other types of development.

With regard to landscape effects, a proposed development has the potential to improve the environment as well as damage it. In certain situations, there might be policy encouraging a type of change in the landscape, and a particular development may achieve this.

Landscape Sensitivity ranges from Low to Very High as outlined in Table 5-1, below.

Table 5.1 Categories of Landscape Sensitivity

Sensitivity	Description
Very High	Areas where the landscape exhibits a very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The character of the landscape is such that its capacity for accommodating change in the form of development is very low. These attributes are recognised in landscape policy or designations as being of national or international value and the principal management objective for the area is protection of the existing character from change
High	Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. The character of the landscape is such that it has limited/low capacity for accommodating change in the form of development. These attributes are recognised in landscape policy or designations as being of national, regional or county value and the principal management objective for the area is conservation of the existing character.
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principal management objective may be to consolidate landscape character or facilitate appropriate, necessary change
Low	Areas where the landscape has few valued elements, features or characteristics and the character is weak. The character of the landscape is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and where the principal management objective is to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the landscape exhibits negative character, with no valued elements, features or characteristics. The character of the landscape is such that its capacity for accommodating change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands or extraction sites, as well as sites or areas that are designated for a particular type of development. The principal management objective for the area is to facilitate change in the landscape through development, repair or restoration.

Magnitude of Landscape Change

The magnitude of change is a factor of the scale, extent and degree of change imposed on the landscape with reference to its key elements, features and characteristics (also known as 'landscape receptors'). For the purpose of assessment, five categories are used to classify the landscape sensitivity of the receiving environment, from Very High sensitivity to Negligible. (These categories are defined in Table 5-2, below):

Table 5.2 Magnitude of Landscape Change

Magnitude of Change	Description
Very High	Change that is large in extent, resulting in the loss of or major alteration to key elements, features or characteristics of the landscape and/or introduction of large elements considered totally uncharacteristic in the context. Such development results in fundamental change in the character of the landscape.
High	Change that is moderate to large in extent, resulting in alteration or compromise to key elements, features or characteristics, and/or introduction of large elements considered uncharacteristic in the context. Such development results in a moderate to large change to the character of the landscape.
Medium	Change that is moderate in extent, resulting in partial loss or alteration to key elements, features or characteristics of the landscape, and/or introduction of elements that may be prominent but not necessarily uncharacteristic in the context. Such development results in moderate change to the character of the landscape.
Low	Change that is limited in extent, resulting in minor alteration to key elements, features or characteristics of the landscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape
Negligible	Change that is very limited in extent, resulting in no alteration to key elements, features or characteristics of the landscape, and/or introduction of elements that are characteristic in the context. Such development results in minimal change to the character of the landscape.

Methodology for Visual Assessment

In Section 5.8 of this chapter, the visual effects of the proposed development are assessed. Visual assessment considers the sensitivity of the viewers (i.e. groups of people) and the magnitude of the changes to the composition and character of views. The assessment is made for a number of viewpoints selected to represent the range of visual receptors in the receiving environment. The significance of the visual effects experienced at these locations is assessed by measuring the visual receptor sensitivity against the magnitude of change to the view resulting from the proposed development.

<u>Sensitivity of the Visual Receptor</u>

Visual receptor sensitivity is a function of two main considerations:

- *Susceptibility of the visual receptor to change.* This depends on the occupation or activity of the people experiencing the view, and the extent to which their attention or interest is focussed on the views or visual amenity they experience at that location. Visual receptors most susceptible to change include residents at home, people engaged in outdoor recreation focused on the landscape (e.g. trail users), and visitors to heritage or other attractions and places of community congregation where the setting contributes to the experience. Visual receptors less susceptible to change include travellers on road, rail and other transport routes (unless on recognised scenic routes which would be more susceptible), people engaged in outdoor recreation or sports where the surrounding landscape does not influence the experience, and people in their place of work or shopping where the setting does not influence their experience.

- *Value attached to the view.* This depends to a large extent on the subjective opinion of the visual receptor but also on factors such as policy and designations (e.g. scenic routes, protected views), or the view or setting being associated with a heritage asset, visitor attraction or having some other cultural status (e.g. by appearing in arts).

For the purpose of assessment, five categories are used to classify visual receptor sensitivity. These categories range from Very High to Negligible and are described in Table 5.3.

Table 5.3 Categories of Visual Receptor Sensitivity

Sensitivity	Description
Very High	Viewers at iconic viewpoints - towards or from a landscape feature or area - that are recognised in policy or otherwise regarded as being of very high value or national value. This may also include residential viewers whose primary view is of very high value.
High	Viewers at viewpoints that are recognised in policy or otherwise designated as being of high value, or viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features) and are valued by the local community. This would include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes.
Medium	Viewers at viewpoints representing people travelling at slow or moderate speed through or past the affected landscape in cars or on public transport, where they are partly but not entirely focused on the landscape, or where the landscape has some valued views. The views are generally not designated, but which include panoramic views or views judged to be of some scenic quality, which demonstrate some sense of naturalness, tranquillity or some rare element in the view.
Low	Viewers at viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping, etc. The view may present an attractive backdrop to these activities but there is no evidence that the view is valued, or that it is regarded as an important element of these activities. Viewers travelling at high speeds (e.g. motorways) may also be considered of low susceptibility.
Negligible	Viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities, such as shopping, where the view has no relevance or is of poor quality and not valued.

Magnitude of Change to the view

Classification of the magnitude of change takes into account the size or scale of the intrusion of the proposed development into the view, relative to the other elements and features in the composition(i.e. its relative visual dominance), the degree to which it contrasts or integrates with the other elements and the general character of the view, and the way in which the change will be experienced (e.g. in full view, partial or peripheral, or glimpses). It also takes into account the geographical extent of the change, the duration and the reversibility of the visual effects.

Five categories are used to classify magnitude of change to a view. These range from Very High to Negligible and are defined in Table 5.4, below.

Table 5.4 Magnitude of Visual Change

Magnitude of Change	Description
Very High	Full or extensive intrusion of the development in the view, or partial intrusion that obstructs highly valued features or characteristics, or the introduction of elements that are completely out of character in the context, to the extent that the development becomes dominant in the composition and defines the character of the view and the visual amenity.
High	Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features, or introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity.
Medium	Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.
Low	Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.
Negligible	Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

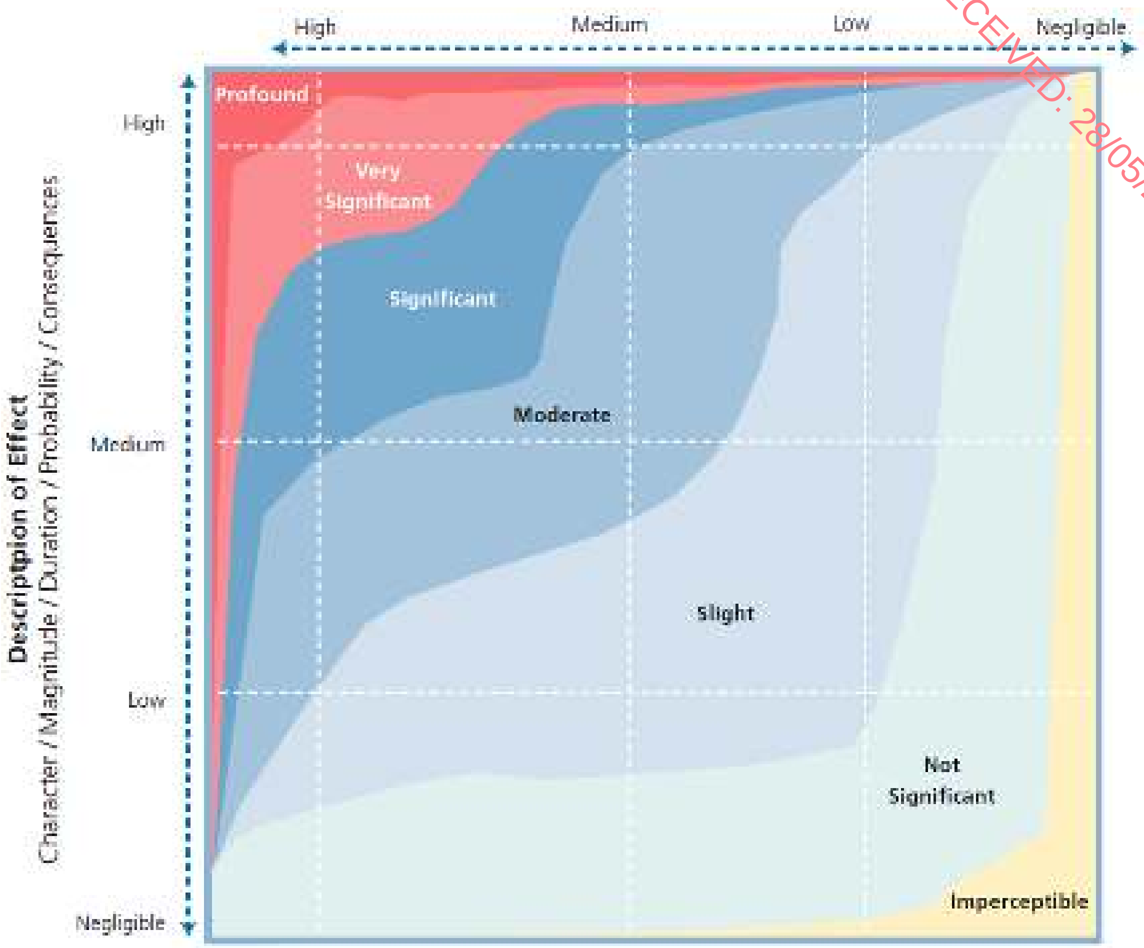
In this case, a number of tools are used to assist in the assessment of visual effects. These include Photomontages, which are produced from selected viewpoints. Initial viewpoints for photomontages are selected during the desk study with the exact location confirmed in the field during the site visit. The completed photomontages are also used to assist in the assessment of visual effects.

Significance of Effects

In order to classify the significance of landscape and visual effects, the predicted magnitude of change is measured against the sensitivity of the landscape/viewpoint. The definitions used by the EPA (2022) provide a useful scale to describe the significance of the effects.

There are seven classifications of significance, namely: (1) imperceptible, (2) not significant, (3) slight, (4) moderate, (5) significant, (6) very significant, (7) profound. Please refer to the Figure below.

Table 5.5 Significance of Effect (Source: EPA 2022)



Please note that the above graphic is a guideline only, and an element of professional judgment is also applied. The assessor also uses professional judgement informed by their expertise, experience and common sense, to arrive at a classification of significance that is reasonable and justifiable. As the GLVIA 3rd Edition recognises (at para 2.23):

> *"…professional judgement is a very important part of LVIA. While there is scope for quantitative measurement of some relatively objective matters, much of the assessment must rely on qualitative judgements."*

Quality and Timescale

In accordance with the EPA (2022), the predicted impacts are also classified as beneficial, neutral, or adverse.

> *"This is not an absolute exercise; in particular, visual receptors' attitudes to development, and thus their response to the impact of a proposed development, will vary. However, the methodology applied is designed to provide robust justification for the conclusions drawn."*

These qualitative definitions are included in Table 5.6, below.

Table 5.6 Quality of Effect **(Source: CSR based on GLVIA 2013)**

Definition of quality of effects	
Adverse/negative	Scheme at variance with landform, scale, pattern. Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape (townscape) view to be diminished;
Neutral	Scheme complements (or does not detract from) the scale, landform and pattern of the landscape (townscape)/view and maintains landscape quality;
Beneficial /positive	Improves landscape (townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.

In accordance with the EPA (2022), Impacts/effects are also categorised according to their longevity or timescale as in Table 5-7 below:

Table 5.7 Duration of Effect **(Source: EPA 2022)**

Definition of duration of effects	
Duration	**Description**
Temporary	Effects lasting one year or less
Short Term	Effects lasting one to seven years
Medium Term	Effects lasting seven to fifteen years
Long Term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years

5.5 Difficulties Encountered

No difficulties were encountered in compiling the required information for this chapter.

5.6 Baseline Environment

5.6.1 Study Area

According to Section 5.2 of the Guidelines for Landscape and Visual Impact Assessment (3rd Edition 2013):

> *"The study area should include the site itself and the full extent of the wider landscape around it, which the proposed development may influence in a significant manner."*

The extent of a study area for an LVIA mainly derives from the nature of the site and wider landscape, in tandem with the specifics of the proposed development. In this instance, while there is a low capacity for significant impacts to arise beyond 2km from the site, a 4km study area has been selected, out of an abundance of caution. However, an emphasis will be placed on receptors within 2km of the site, as these are more/most likely to have the capacity to experience significant visual effects.

It should not be inferred that the proposed development is unlikely to be visible from any location beyond the study area, but, more importantly, that the proposed development is unlikely to influence such receptors in a significant manner.

Figure 5-1 Study area (4km) - blue circle with site boundary – red line.

5.6.2 Planning Policy Context

5.6.2.1 Louth County Development Plan 2021-2027

The Louth County Development Plan 2021-2027 (hereafter referred to as the CDP) contains a range of policies relevant to establishing the landscape and visual values and sensitivities for the site and site environs, as set out below.

Chapter 8 of the CDP pertains to 'Natural Heritage, Biodiversity and Green Infrastructure.' Relevant Policies of Chapter 8 of the CDP are as follows:

NBG 23 - *'To ensure the preservation of the uniqueness of a landscape character type by having regard to its character, value and objectives in accordance with national policy and guidelines and the Louth Landscape Character Assessment and by ensuring that new development meets high standards of siting and design and does not unduly damage or detract from the character of a landscape or natural environment.'*

NBG 24 - *'To ensure development reflects and, where possible, reinforces the distinctiveness and sense of place of the landscape character types including the retention of important features or characteristics, taking into account the various elements, which contribute to their distinctiveness such as scenic quality, habitats, settlement pattern, historic heritage and land use.'*

NBG 25 - *'Where appropriate, require that landscape and visual impact assessments prepared by suitably qualified professionals be submitted with development applications, which may have significant impact on landscape character areas, especially in highly sensitive areas.'*

NBG 26 - *'To explore the designation of Landscape Conservation Areas as appropriate, in conjunction with the relevant Government Department and stakeholders to protect specific important landscapes and particularly in respect of Carlingford Mountain SAC.'*

Section of 8.11 of the CDP pertains to 'Trees, Woodlands and Hedgerows.' It states:

'Trees and in particular groups of trees can represent an important component of the local landscape and townscape, the setting of buildings and the means of providing successful integration of new development into the landscape. Development can, if not sensitively designed, sited and constructed, result in the loss or damage of trees. Thus, it is desirable that existing trees be considered in the formulation and assessment of development proposals.'

NBG 34 - *'To increase native tree coverage in the County to also act as carbon sinks by promoting the planting of suitable native trees and hedgerows along public roads, residential streets, parks and other areas of open space.'*

<u>Scenic Designations:</u>

Section 8.12.3 of the CDP pertains to 'Views and Prospects of Special Amenity Value.'

'Louth has many areas of high quality landscape particularly along the coast, the river valleys and its upland areas. As a result, the County boasts many vantage points from which views and prospects of great natural beauty are available. The scenery and landscapes of the County are of enormous amenity value to tourists and residents alike, contributing to quality of life and constituting a valuable economic asset. The protection of this asset is therefore of importance in developing the potential of the County.

'The challenge is to manage the landscape, so any change is positive in its effects thereby ensuring that the landscape is protected. There is a need therefore to preserve views and prospects for the enjoyment of future generations. It is not proposed that this should prohibit development, but rather, where development is permitted that it should not hinder or obstruct these views and prospects and be designed and located to minimise impact.'

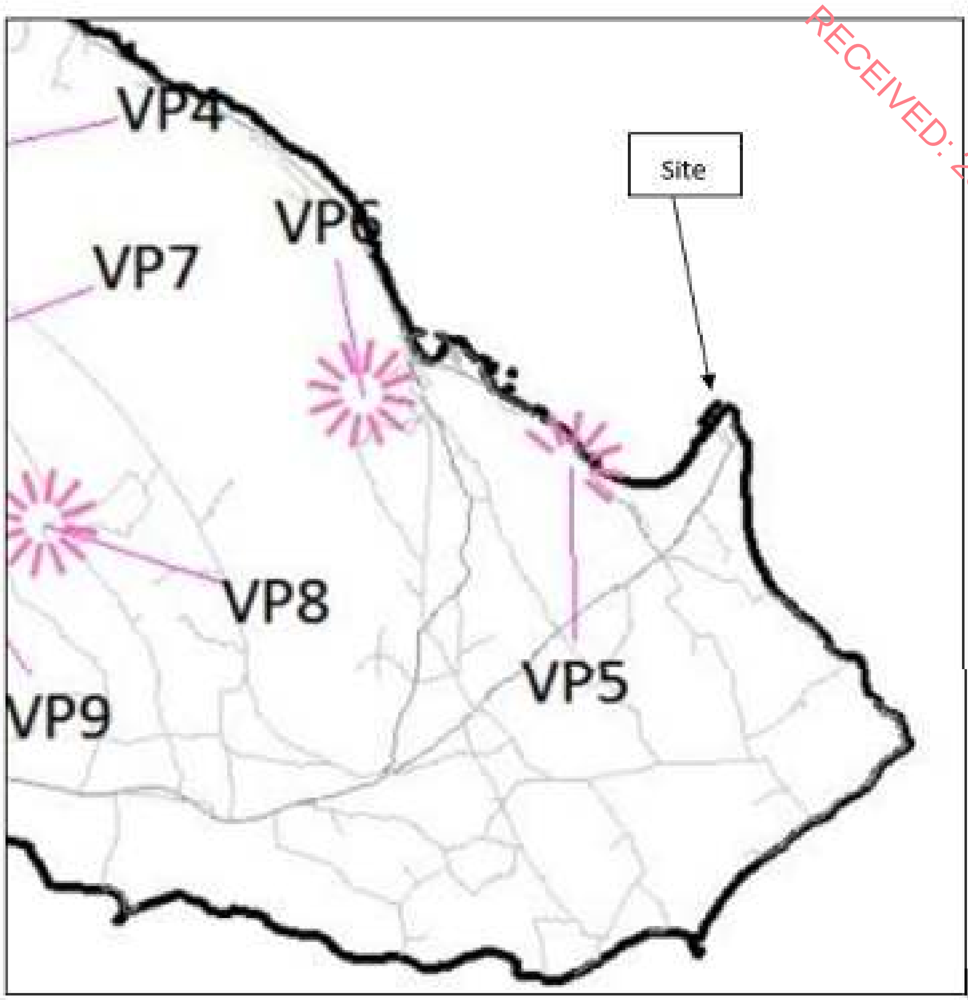


Figure 5-2 Extract of Map 'County Louth View & Prospects'. Page 6 of Appendix 7 of the CDP.

There is one protected viewpoint/prospect within the study area, which is more than 1.3km west/ southwest of the site. This is 'VP5 Carlingford Lough', as set out in Figure 5-3. Table 1 of Appendix 7 of the CDP states that the direction of the designated view from VP5 is:

> *'Viewpoint is along a section of the main road on the Greenore Road (R173) between Carlingford and Greenore.'*

The description of the view is:

> *'Views north of Carlingford in the middle distance and with the setting of Slieve Foye to the rear. In the foreland across Carlingford Lough, views of the Mourne Mountains in Northern Ireland.'*

> **NGB 38 -** *'Protect and sustain the established appearance and character of views and prospects … that contribute to the distinctive quality of the landscape, from inappropriate development.'*

Section 8.13 of the CDP pertains to 'Scenic Routes'. It states that:

'Louth is fortunate to have many areas of high quality landscape especially along the coast, upland areas and river valleys…Applications for development must carefully consider the siting, design and landscaping of the proposed development to ensure that there are no significant alterations to the character of the area. Any development proposals, which would interfere with or adversely affect these Scenic Routes, will not be permitted.'

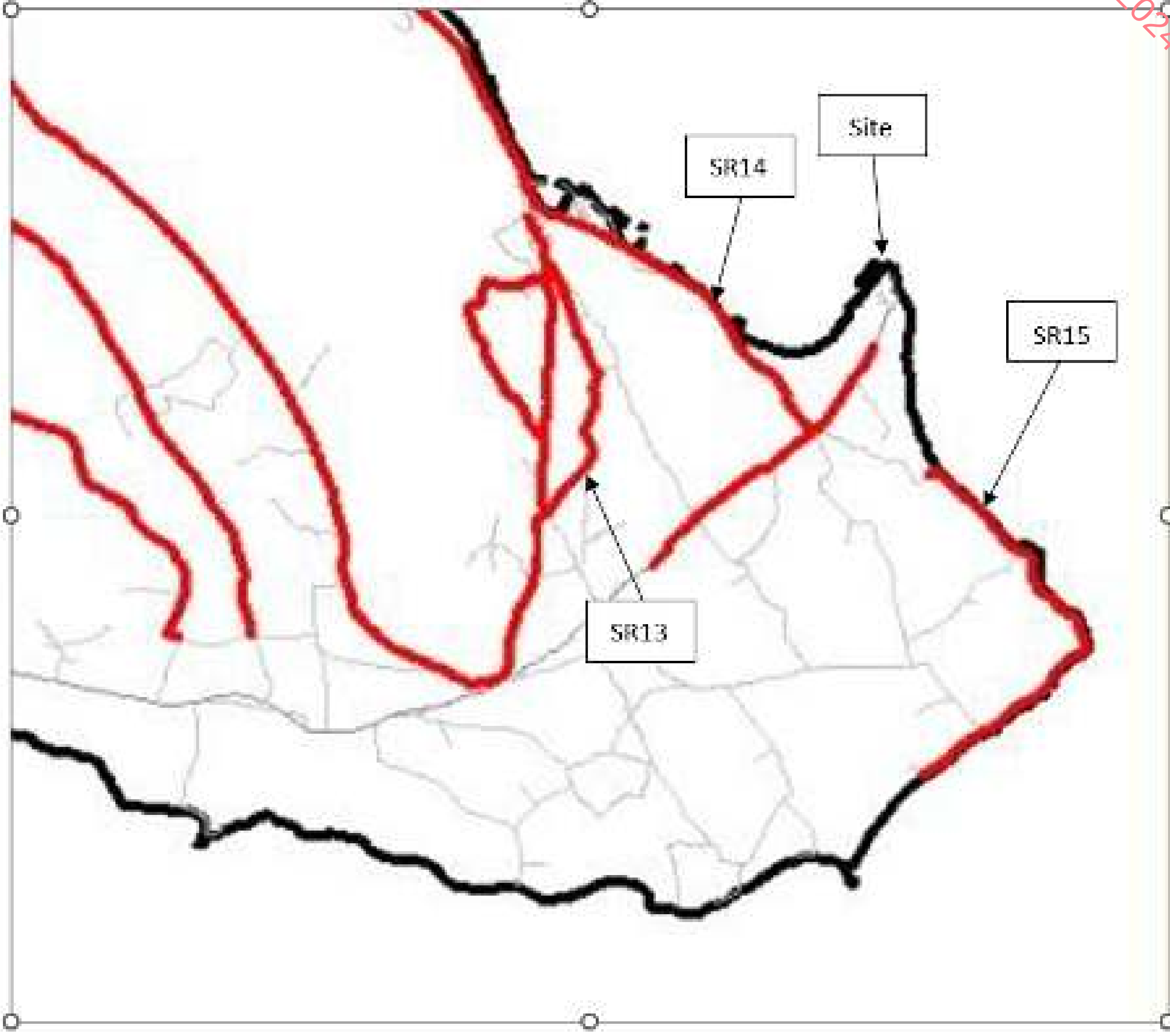


Figure 5-3 Extract of 'Map 8.20: Scenic Routes, County Louth Dand Dundalk' from the Louth CDP

According to Table 8.19: Scenic Routes, County Louth and Dundalk, there are three designated scenic routes in the study area, which are set out in Figure 5-3, above. All of these remain more than 500m from the site, and are as follows:

- SR13 - Bush-Carlingford incl. Commons
- SR14 - Greenore-Carlingford- Omeath
- SR15 - Coast Road-Whitestown-Ballagan-Ballytrasna

> **NBG 40 -** *'To prohibit inappropriate development which would interfere with or adversely affect the Scenic Routes as identified in Table 8.19 and illustrated on Map 8.20.'*

It is worth noting that there are no Areas of Outstanding Natural Beauty (AONB) or Areas of High Scenic Quality (AHSQ) within the study area.

<u>Landscape Character Area:</u>

The CDP highlights a matrix of factors contributing to a 'Landscape Character Area' (LCA), as follows:

- Landscape Quality
- Scenic Quality
- Rarity
- Conservation Interests
- Wilderness
- Recreational Opportunity
- Cultural Association
- Tranquillity
- Stakeholder Representative

This classification is based on the Louth Landscape Character Assessment (Louth County Council, 2002), which details the landscape assessment of the Landscape Character Area. However, it is worth noting that the Louth Landscape Character Assessment was completed more than 20 years ago, while the Co. Louth landscape, and its character, has continued to evolve since; much as it has done for millennia.

The study area falls within the 'Cooley Lowlands & Coastal Area' LCA, as detailed later in this section. Of the four levels of importance attributed to Landscape Characters Areas within the Louth CDP, the 'Cooley Lowlands & Coastal Area' LCA is deemed to be of 'Local' importance (i.e. the lowest of the four categories).

The key characteristics of this LCA are listed as:

- *'A dramatic gentle sloping landform from the base of the Carlingford and Slieve na Gloch mountains to the sea.*
- *Predominantly agricultural land with well-defined hedgerows and small field patterns, which sustain the biodiversity of the area.*
- *Main settlements at Greenore and Gyles Quay, with a number of very small centres.*
- *Isolated housing is scattered throughout the many narrow country roads.*
- *Regional route 173 links Dundalk with the peninsula with Greenore, Carlingford, Omeath and further on to Newry.*
- *Rich in archaeological items.*
- *Extensive views of both Cooley and Mourne Mountains and across Dundalk Bay.*
- *Prominence of quarrying in the area.'*

This LCA's is described as having:

> *'…relatively flat and slopes gradually to the sea to the north, east and south, in contrast to the Carlingford Mountains, which rise steeply to the rear. At Cooley Point there are some sheer*

faces onto the shore. The major route through the area is regional route 173 which offers panoramic views of the Carlingford and Mourne Mountains with its rugged coastline, when travelling towards Greenore.'

Landcover & landform - *'Crop growing and particularly potatoes are the main agricultural activity with some areas given over to grazing and silage production. A shelter belt of Scots Pine at Greenore Golf Club is a landscape feature, which is visible from a wide area and only threatened by its maturity and possible loss of regeneration. The shoreline is principally stony with rock outcrops and has 3 small sandy beaches … Being practically surrounded by the sea, surface water is discharged to the sea by means of small water courses.'*

Human Intervention - *'Greenore is a 19th century village established with the railway line (no longer in existence) to serve the natural port and hotel and provide a connection right along Carlingford Lough to Newry. The old hotel is now very dilapidated and used as offices by the port authorities. The significance of this coastline for leisure facilities has been recognised for some time …*

'Field patterns are small and complex in the main, with well-maintained hedgerows of thorn and bramble with dotted trees of ash, sycamore and elder. In many cases, these hedgerows conceal a bank or loose stone wall. Nearer the coast the hedgerows are less pronounced.

'Isolated housing is very evident in this area with most of the new housing located along the class 1 and class 2 county roads. Apart from Greenore and Giles Quay eight other Category II Development Centres have been listed in the Development Plan.'

Landscape Sensitivity - *'The agricultural landscape in this area is very robust due to the presence of strong hedgerows, which help to occlude the number of isolated houses in the area. On this account, interference with the existing walls and hedgerow patterns would serve to degrade the landscape.*

'Along the designated scenic routes in the Development Plan the introduction of further isolated housing would not be sustainable, and it should instead be located within the listed Development Centres in the area…'

It is worth noting that no sensitivity is attributed to this LCA, nor any of the other LCAs, in the Louth Landscape Character Assessment. In addition, there is no Local Area Plan (LAP) that pertains to Greenore.

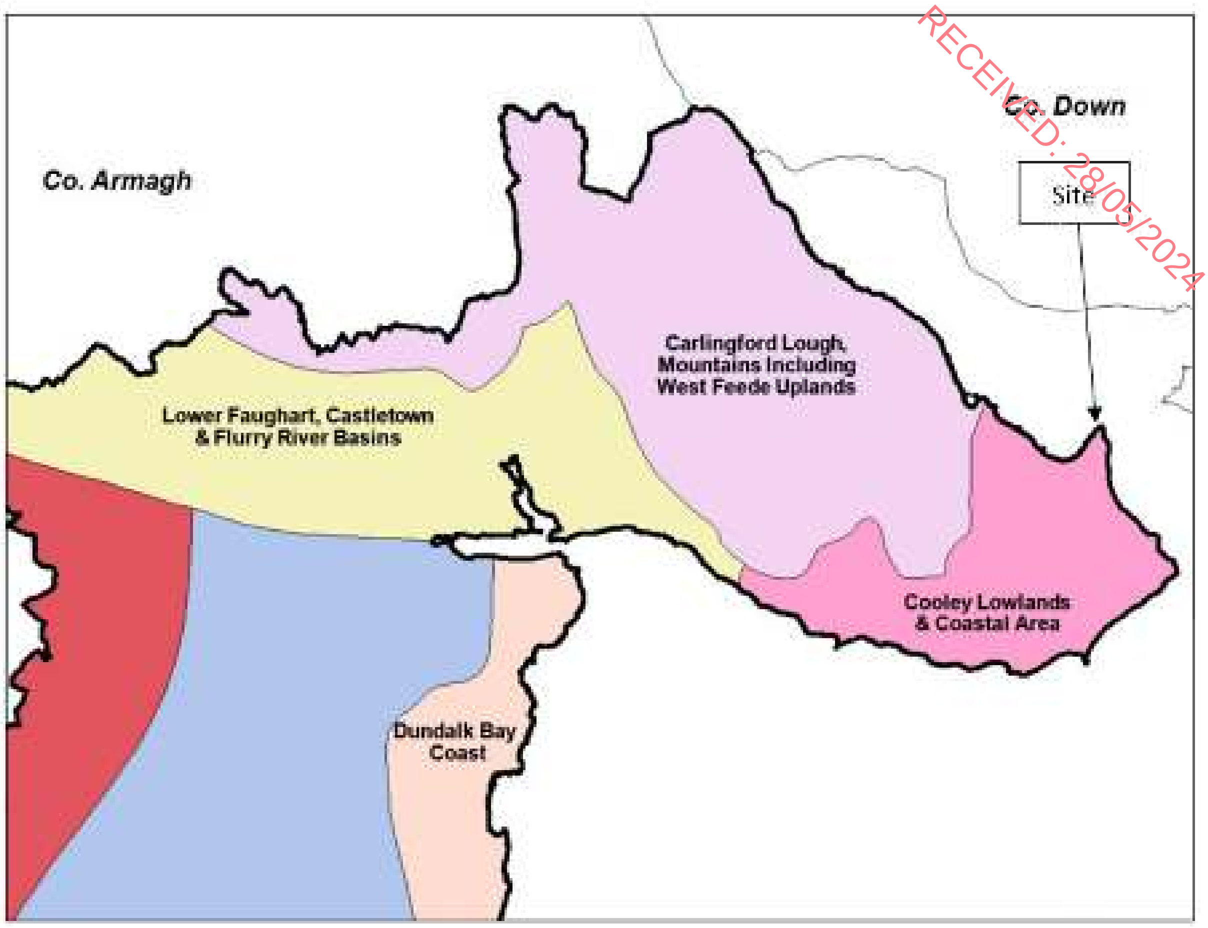


Figure 5-4 Extract of County Louth Landscape Character Area map. (Source: Louth CDP 2021-2027 Map 8.5 Landscape Character Area)

<u>Greenore Architectural Conservation Area (ACA):</u>

According to Section 9.6.1:

> *'An Architectural Conservation Area (ACA) is a place, area, group of structures or townscape that is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or contributes to the appreciation of protected structures…*
>
> *'Hence the need to protect elements such as public realm, planting, traditional settlement patterns and building materials, by controlling the nature of alterations and new development.*
>
> *'The protected status of an ACA applies to the exteriors and the streetscape, and any works which would materially affect its character requires planning permission. However, the designation of an area as an ACA is not intended to bring excessive restrictions on development but rather to be a positive influence, to ensure that new development makes a positive contribution to an area that has been identified as being of significant importance. Changes to the buildings or the public realm, signage and public infrastructure can alter the character of an ACA and need to be assessed for the possible impact on its character.'*

A small area of the site falls within the northern end of the Greenore ACA including the revised access arrangements to the site in front of the port offices, as indicated in Figure 5-5 below. Effects on the

ACA and built heritage in general will be considered in Chapter 17 Cultural Heritage -Built Heritage of this EIAR.

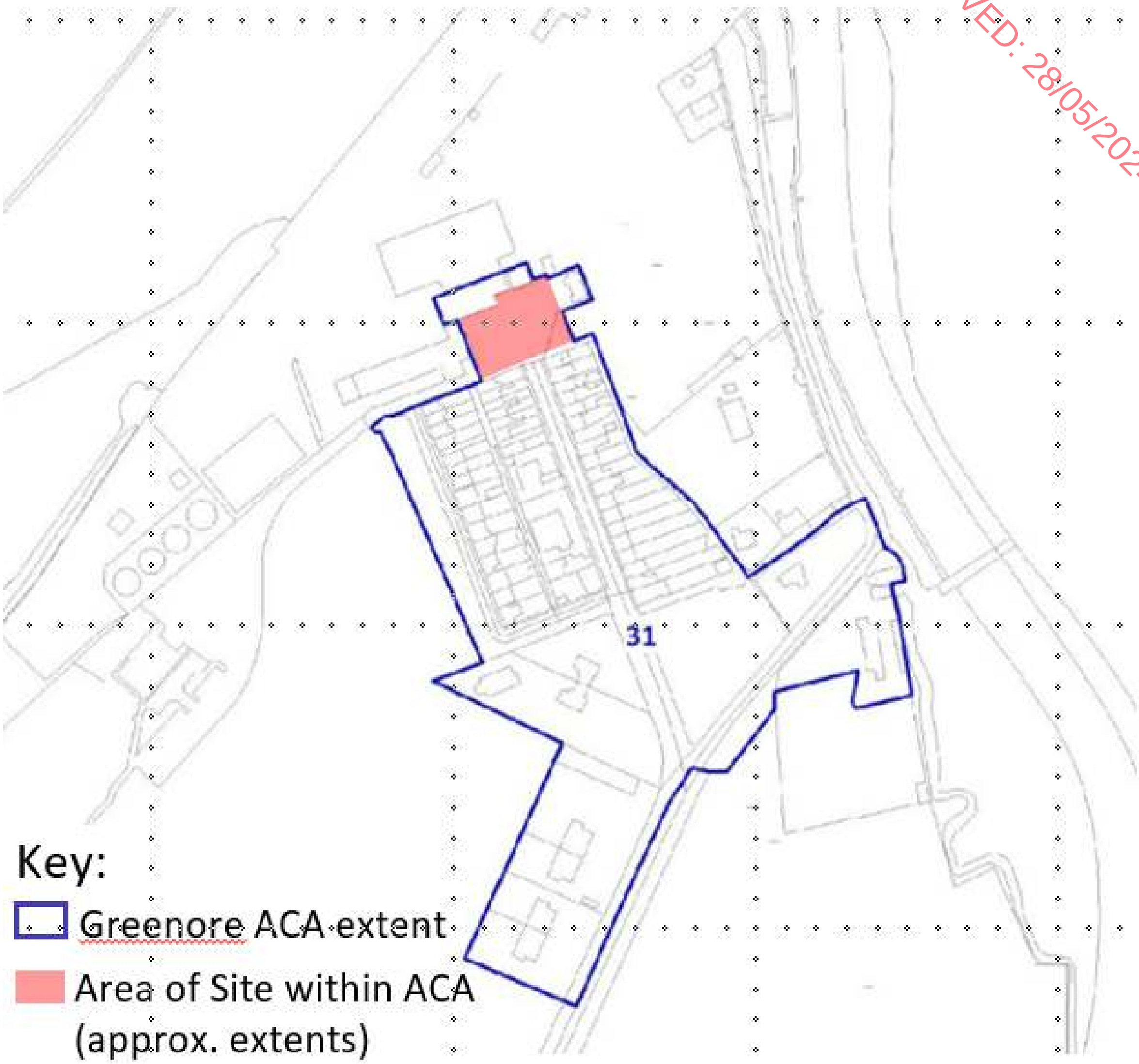


Figure 5-5 Extract of County Louth Architectural Conservation Map – Greenore ACA (Source: Louth CDP 2021-2027 Map 31)

5.6.2.2 Natura 2000 Designations

Two Natura 2000 Designations are within the vicinity of the site (i.e. they do not align or enter to within the site): Carlingford Shore SAC (Site code 002306) and Carlingford Lough SPA (Site code 004078). However, the site enters into one Natura 2000 Designation, which is Carlingford Lough Proposed NHA (Site code NH452). Effects on these sites will be considered in Chapter 12 - Biodiversity.

5.6.2.3 Regional Seascape Assessment

A study of Ireland's Seascapes was produced in 2020 by the Marine Institute to gain a better understanding of Ireland's coastline, following on from the well-established Landscape Character Assessment process and in keeping with the aims of the European Landscape Convention and the All Ireland Landscape Strategy 2015-2025. The study's seascape definition is derived from studies of the

English seascape by Natural England (2012): *"an area of sea, coastline and land, as perceived by people, whose character results from the actions and interactions of land with sea, by natural and/or human factors."*

The study area falls within the Seascape Character Area No. 17 -Border SCA-Carlingford Lough and small portion of the neighbouring SCA 16 – Northeastern Irish Sea Islands and Beaches to southwest of Ballaghan Point.

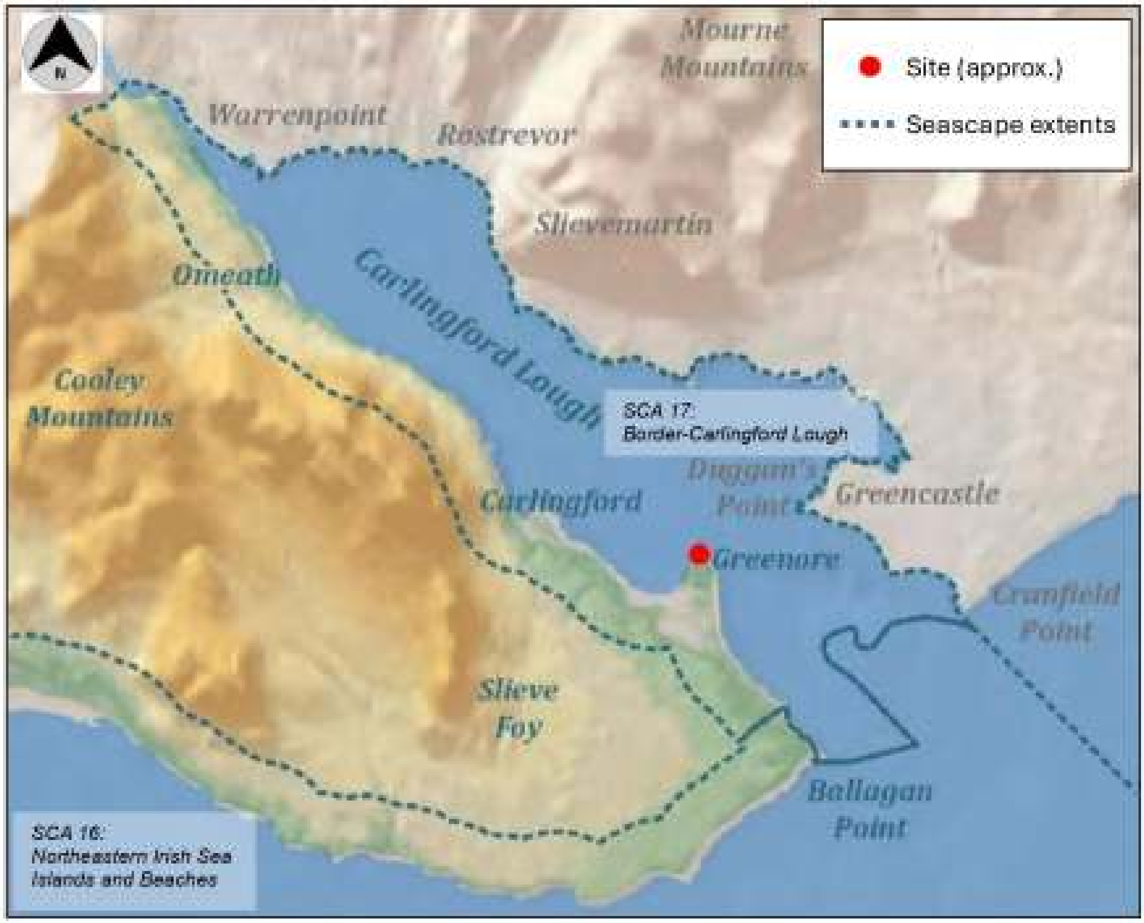


Figure 5-6 Extract of RSA Border-Carlingford Lough SCA 17 Map. (Source: Marine Institute)

According to the Regional Seascape Assessment the key attributes of the SCA 17 are described as following;

Key characteristics:

- *A very distinctive and fine example of a glacial fjord (sea lough) that has long offered a haven from the choppier waters of the Irish Sea, where the changeable weather particularly in the northern part of the sea is well known.*
- *Where sheltered inlets are present, these are frequently wooded which contribute to an attractive and diverse landscape and seascape interface.*
- *A busy and active SCA, the Newry River/Newry Canal empties into the lough at the head of Carlingford Lough and links the lough to Newry, in Co. Armagh.*

- *Shellfish beds are numerous close to the shoreline of the lough with oysters, mussels and razor clams cultivated.*
- *Greenore and Warrenpoint are principal ports, in addition to freight and bulk cargo, a scenic ferry from Greenore, Co. Louth to Greencastle, Co. Down.*
- *The presence of marinas, jetties and water based infrastructure reflect popularity of the SCA.*
- *The undeveloped headlands provide a more tranquil character.*

Perceptual Influences:

Views and Vistas

- *An active and busy seascape area, the long history of settlement and interaction of intertidal, sea and sloping mountains create a diverse seascape*
- *Although a relatively small SCA, the scale of the lough helps to create a more expansive scale and the backdrop of mountains and frequently wooded shorelines and slopes creates a highly scenic SCA.*
- *Long views across the Irish Sea particularly pronounced at the headlands of the lough are a key visual characteristic.*
- *Similarly from the elevated slopes of the Cooley and Mourne Mountains long views over the lough are key characteristics.*
- *At local level the interplay of smaller headlands and shoreline infrastructure adds visual interest and can shorten views along the shoreline*
- *Notable sea and landmark features include the Haulbowline Lighthouse separating Counties Louth and Down, Robert Ross Monument (Northern Ireland), King John's Castle at the shoreline of Carlingford Town and*
- *Lighting 5 - A necklace of settlements and the shoreline road present as glowing light along the shoreline.*

Sense of Place

- *The predominant character is expansive, but the area retains a very distinctive lough character, being framed by land on three sides.*

Sounds and Smells

- *At low tide, summer smells of seaweed and mudflats occur particularly around the exposed mudflats*.

5.6.2.4 Key implications of Planning Policy Context

In terms of potential landscape & visual issues pertaining to the site and the study area, the key implications of the aforementioned Planning Policy Context (see Section 5.6.2.1, above) entail:

- Louth CDP policy NBG 23, '… *that new development meets high standards of siting and design and does not unduly damage or detract from the character of a landscape*...'
- While there are four different scenic designations within the study area, all remain more than 500m from the site. There is one protected viewpoint/prospect within the study area (i.e. 'VP5 Carlingford Lough') and three designated scenic routes (SR13, SR14 & SR15). In summary, the

proposed development must not interfere with or adversely affect these scenic designations and/or must protect/sustain the established appearance and character of views/ prospects.

- Part of the proposed development falls within the northern edge of the Greenore ACA by the port offices area and end of Euston Street interface, any development within or nearby Greenore ACA needs to not detract from the unique character of the ACA.
- The study area falls within the 'Cooley Lowlands & Coastal Area' Landscape Character Area (LCA). Of the four levels of importance attributed to Landscape Characters Areas within the Louth CDP, this LCA is deemed to have the lowest importance. However, no sensitivity is attributed to this LCA, nor any of the other LCAs, in the Landscape Character Assessment.
- The site enters into one Natura 2000 Designation and is in the vicinity of two others.
- The Regional Seascape Assessment has not been considered within the Louth CDP. Most of the study area falls within the Seascape Character Area No. 17 - Border SCA-Carlingford Lough seascape study which covers the lower slopes of the Cooley Mountain and Carlingford Lough. No sensitivity is attributed to this SCA.

5.6.3 Landscape Baseline

5.6.3.1 Site location and context

The site is located within Greenore Port and at 'Barabara's Field, Shore Road, Greenore Village, County Louth. The site has been divided into four individual plots which have been described in Chapter 2 of this EIAR to include:

1. 'Terrestrial Port Area', (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.

2. 'Nearshore Environment' (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.

3. 'Residential Site' (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.

4. 'Port Office Entrance' (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

In direct vicinity of the site is the small village of Greenore, Greenore Golf Club and the shoreline of Carlingford Lough. The port has been in operation since the 19th Century, it is understood that Greenore is the only privately owned port in Ireland.

On a broader scale, the site is set on the north coast of Co. Louth, along the southern shoreline of Carlingford Lough. Unusual for a study area, it consists of areas of both the UK (i.e. Co. Down) and the Republic of Ireland (i.e. Co. Louth), with Carlingford Lough separating the two.

An overview of the immediate and wider site location/context is set out in Figure 5-7 & 5-8, below.

Figure 5-7 The Site's development area and its immediate context

Figure 5-8 The wider site location and context (Source: Google Earth 2021 capture)

5.6.3.2 Landform - Topography and drainage

While most of the wider Carlingford Peninsula is characterised by the Cooley Mountains, which reach over 500m AOD, the study area is characterised by lower-lying terrain (i.e. less than 100m AOD), either aligning or in the broader vicinity of Carlingford Lough. This is also the case with the study area terrain north of Strangford Lough, within Co. Down, where the foothills of the Mourne Mountains lie several kilometres beyond the study area. In the far western fringe of the study area, the foothills of the Cooleys emerge, though remain less than 200m AOD.

In terms of watercourses and/or drainage patterns, Carlingford Lough is by far the largest and most apparent, being over 3km wide in places (see Figure 5-9 and 5-10, below). Along its southern shoreline, it is largely stony with some rocky outcrops within the Lough. Within the study area, a series of streams feed into the Lough, but there are no larger rivers present, with the exception of White Water River, in Co. Down, that enters into the north-eastern edge of the study area.

Figure 5-9 View of Greenore Port with the Cooley Mountains, with Carlingford Lough to the north.

Figure 5-10 View of Carlingford Lough towards Greenore, from Carlingford town.

5.6.3.3 Landcover & Land use

Unusual for its scale, the site is made up of a considerable degree of diversity in its land use and context. Some units of the site are quite fragmented and entail a distinct mixture of land/sea cover and uses.

The northern areas of the site consist of a terrestrial port area that includes areas of hardstanding, a remnant wall associated with a pre-existing engine room, a warehouse, an ESB substation, and a communications mast. To the immediate north of this terrestrial port area is Carlingford Lough, the nearshore environment, where an approx. 70m long caisson quay wall runs parallel to the dock (please refer to Figurers 5-11 and 5-12, below).

Figure 5-11 View of Greenore Port next to weighbridge

Figure 5-12 View of Greenore Port pier and nearshore.

To the immediate north of Greenore village centre is the port office entrance area, that consists of a port office building and a hardstanding parking area to the front of the port office with a small amount of green space (please refer to Figure 5-13 and 5-14, below). Of which these hardstanding and soft landscape areas of this part of the site fall within the northern end of Greenore Architectural Conservation Area (ACA).


Figure 5-13 View of Greenore Port office area looking west in direction of golf course

Figure 5-14 View of Greenore Port office area look north with view of the water towers

In the southeast of the site is a vacant residential site on Shore Road, known locally as 'Barbara's Field'. It consists of a single-storey unoccupied residential dwelling with its former garden. This former garden contains some mature shrubs and individual trees mostly located up along its southern and northern boundaries and a large area of grass. A group of trees previously along the western boundary have been felled recently due to health and safety grounds. This part of the site shares road frontage to the R175 (see Figures 5-15 and 5-16, below). and a new access route connecting the residential site to the Port Office Entrance area through the existing port yard lands.


Figure 5-15 View of the residential site as viewed from the R175 Shore Road

Figure 5-16 View from within the site looking beyond its western boundary onto the rear of houses along Euston Street.

To the immediate south of the site's port area is Greenore Golf Club. This large, picturesque golf course is backdropped by the Cooleys and/or the Mournes and aligns Carlingford Lough. It has a generous degree of tall Scots Pine trees about the course. The club was founded in 1896, with its entrance located along the western edge of Greenore village (see Figure 5-17, below).

Figure 5-17 View of Greenore Golf Course, with the Greenore Port infrastructure discernible in the background, backdropped by the Mourne Mountains in Co. Down.

Outside the site and Greenore, and to either side of Carlingford Lough, land is overwhelmingly agricultural, with well-defined and well-maintained hedgerows where ash, sycamore and elder are apparent.

5.6.3.4 Settlement pattern, cultural heritage, and transport

The closest settlement to the site is Greenore. Constructed from 1863 to 1873, the village was established with a former railway line (no longer in existence) to serve the port and newly constructed hotel. The village was chiefly constructed to house employees (and their families) working at Greenore Port or the then Dundalk, Newry & Greenore Railway, which was permanently closed in 1951. Notably, prior to the 1860s, there was no known settlement at this location, of any size.

Untypical for an Irish village, the village is laid out across two straight, parallel streets, with near-uniform, Victorian two-storey stone terraces present on stretches of these roads, as well as more distinct/less-austere 2-3 storey brick-and-cut stone commercial buildings, also dating to that period. These two Victorian streetscapes run along Euston Street (i.e. effectively the main street of the village) and Anglesey Terrace, along the western fringe of the village, and constitute the heart of the Greenore Architectural Conservation Area.

Figure 5-18 View of Euston Street looking southwards

Figure 5-19 View of Euston Street looking towards the old Co-op and school buildings

In the western fringe of the study area is Carlingford. With a population of over 1000 residents, it is the largest settlement in the study area and considered to be the main town on the Cooley Peninsula. It is located approx. 3km west of the site and has been settled since at least the 12th Century. The town centre has several remnants of its original Medieval layout, with the extensive ruins of King John's Castle originally dating to the 13th Century, and several other historic buildings and structures present that are several hundred years old. Elsewhere in the study area, there is linear residential development present along numerous roads, particularly third class roads closer to the coastline.

North of the Lough, within Co. Down, there is notable linear residential development at and near Greencastle, as well as a vast mobile home/caravan park at Cranfield Beach, on the eastern fringe of the study area.

In terms of transport connections, there are three regional roads (R173, R175 and R176) within the study area, with the R175 running to Greenore Port main entrance that is adjacent to the popular Greenore-Greencastle car & pedestrian ferry. Lastly, the corridor of the former Dundalk, Newry & Greenore Rail line is evident in several locations within the study area.

5.6.3.5 Summary of Key Landscape Characteristics & Values

- The site is located within four plots located within Greenore Port, its nearshore and a former residence on Shore Road which are in the direct vicinity of the village centre of Greenore, Greenore Golf Club, on the southern shores of Carlingford Lough.
- The study area covers areas of Carlingford Lough, northeast Co. Louth and southeast Co. Down.
- The study area is characterised by lower-lying terrain (i.e. less than 100m AOD), either aligning or in the broader vicinity of Carlingford Lough.
- The site is made up of a considerable degree of diversity in its land use and context. Some units of the site are quite fragmented and entail a distinct mixture of land/sea cover and uses.

- Untypical for an Irish village, Greenore village was only first constructed approx. 150 years ago, laid out across two straight, parallel Victorian streets, which today form the heart of the Greenore Architectural Conservation Area (ACA).
- The R175 runs to Greenore Port HGV entrance, adjacent to the popular Greenore-Greencastle car & pedestrian ferry.

5.7 The 'Do Nothing' Scenario

Were the proposed development not to proceed there is the potential that the previously granted planning permissions for an extension and modification of existing warehouse, LCC Planning Ref 20268, ABP Ref 307862 and additional warehouses, LCC Planning Ref Planning ref 20543, ABP Ref 310184 could be developed out in order to secure continued economic growth for the port business.

These approved changes would result in alternations to the existing large sheds present on site in height and further extensions to it under planning ref: 20268 while the later planning ref 20543 include the previous alternation plus significant addition of other industrial sheds across currently open land within the port directly north of Anglesey Terrace.

If the above approved developments were built, this would lead to a significant increased presence of industrial warehousing within the port's lands. This would result in adverse changes to the immediate area landscape/townscape characteristics, including that of the adjoining Greenore village ACA, due to the increased number and scaling of sheds close to the port boundary as well as indirect effects of increased traffic, noise, lighting etc that could affect the local residential amenity.

Similarly, these approved developments-built form would be clearly visible peering above the port's existing boundary walls and through the proposed new southern boundary fence line to replace a section of this wall. The closeness of these new structures to the port's boundary and their continuous elevation will mean they would be potentially very visible from the immediate area and would constrict inward views of the port and from some locations reduce the visibility of the western water tower. The greatest adverse visual effects potentially occurring upon those immediate visual receptors within the village include nearby residents along Anglesey Terrace and the adjoining golf course users. There will also be some varied distance views possible from the wider coastal landscape along the western and northern shores of Carlingford Lough.

5.8 Predicted Landscape Effects

5.8.1 Landscape Sensitivity

In terms of planning policy context, crucially, the site and its surrounds are within:

- LCA 20 – 'Cooley Lowlands & Coastal Area' LCA (Landscape Character Area).
- Border SCA-Carlingford Lough (Seascape Area)
- Greenore ACA

Neither the Louth County Council Landscape Character Assessment nor the Regional Seascape Character Assessment has assigned any sensitivity level to the assessed landscapes. However, the wider landscape is influenced by the setting of Carlingford Lough, Cooley Peninsula and the Mourne Mountains. Broadly, these areas will have High landscape sensitivity with some lesser Medium sensitivity areas. On the far western end of the study area is Louth County Councils' designated Areas of High Scenic Quality and Area of Outstanding Natural Beauty, which will have High to Very High landscape Sensitivity.

The site and the receiving environment were described in Section 5.6.3. The site is split over four areas (Terrestrial Port Area, Nearshore Environment, Residential Site and Port Ofice Entrance) with each area having its own distinct character. Much of the site falls within the existing working port although the site's setting is greatly influenced by its proximity to Carlingford Lough and Greenore Vilalge ACA.

Although the port is largely a modern functioning port and associated infrastructure, it contains some historic elements relating to the former railway of which the site will contain the retained engine room wall. While the surrounding Greenore village's unique characteristics as a purpose-built settlement for the port and railway are recognised by its designated as a Louth County Council ACA. This ACA includes many of the houses along Euston Street, Anglesey Terrace and other larger houses on the village's edge being designated as protected structures.

A small portion of the site falls within the northern end of the ACA but includes the port office's area of modern car parking surface and small green space, rather than any historic elements of the ACA. This area is bound by the port's two distinct water towers to the north and the surrounding historic streets. The Barabara's field area of the site is not in the ACA, but the ACA's houses on Euston Street are directly to the west. The residential site includes some landscape features including few individual trees and mature shrubs along its southern and northeastern boundary.

Therefore, the landscape sensitivity of the receiving environment is classified as ranging between High to Low. Given the prominence of the active, modern port and nearby historical setting of the ACA, the site will have a '**Medium**' sensitivity. In accordance with Table 5-1, this is defined as:

> *"Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principal management objective may be to consolidate landscape character or facilitate appropriate, necessary change"*

5.8.2 Demolition Phase

The demolition works will require the removal of some buildings and vegetation clearance from the site, which are considered collectively as part of the overall site works occurring under the construction phase below.

5.8.3 Construction Phase

Construction Stage will be programmed over 2 phases with Phase 1 to run for 16 months and Phase 2 19 months, resulting in ongoing infrastructure, building and related works over the two phases of work. In addition, the proposed development will require the removal of the former open hydro building portside and residences on Barabara' field.

Vegetation clearance will include removal of 6 trees (5 removed to accommodate the site works and 1 due to poor health) through the site, of which 4 are locate around the port office area and the remaining two along with mature shrubs and grass cover to be removed within the residential site on Shore Road. Of these trees, six are of moderate quality and one of poor quality as determined by the arborist assessment that accompanies this application.

The landscape sensitivity is described in Section 5.8.1 above (i.e. Medium). The **magnitude of change** will be '**High**'. The likely landscape effect will be of '**Moderate**' significance at Construction Stage

Qualitatively, construction stage will be generally 'adverse' (in accordance with Table 5.6) and 'medium term' in nature for the overall works phase although completion of individual phases includes build outs occurring within 'short-term' period (in accordance with Table 5.7).

5.8.4 Operational Phase

The main operational stage landscape impacts pertain to the effects on landscape/townscape character any proposed development may have. The site is in proximity to Greenore ACA residential neighbour and the village's golf course.

The impact of the proposed development is the change of the site from the existing port facilities to further diversification of port-related facilities, primarily in the form of three OMF buildings and a pontoon for the associated marine service vessels. It also entails a new surface carpark to the east of the village, as well as a mix of hard/soft landscape design to help integrate the new built structures into the receiving environment.

The initial loss of trees and other vegetation will be more than compensated through the design's placement of new trees, hedgerows, climbers, shrubs and perennial and grasses through the site's open spaces, including around the new buildings and car parking. The selection of planting includes a mix of native and non-native pollinator friendly planting suited to the coastal environment, which will not only provide visual amenity but will also provide net biodiversity gains.

The landscape design of the new surface car park area has been designed so that even in times when it is not in use it retains a high-quality landscape similar in the character to that proposed across wider site. Screening will also be provided in the form of native shrubs and trees along the boundary edges to help reduce inwards views of the carpark from nearby residences.

In summary, the 'Magnitude of Change' will be **Medium**. In accordance with Table 5-2, this is defined as *'Change that is moderate in extent, resulting in partial loss or alteration to key elements, features or characteristics of the landscape, and/or introduction of elements that may be prominent but not necessarily uncharacteristic in the context. Such development results in moderate change to the character of the landscape.'*

Thus, the effect will be of **'Moderate' Significance**.

Qualitatively, the landscape effect will be 'Neutral' in the Short, Medium and Long Term. In accordance with Table 5-6, this is defined as '*Scheme complements the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality.'* In terms of duration of effect, this will be 'permanent' (i.e. effect lasting over sixty years)

5.8.5 Cumulative Effects

A review of other proposed or approved applications was undertaken as part of this assessment, as appended to Chapter 1 of this EIAR. In conclusion, the proposed development is not expected to have any significant cumulative landscape effects.

5.8.6 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 5.8 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Change of existing landscape to include a construction site and associated works occurring over two phases.	Adverse	Moderate	Local	Likely	Short Term	Worst Case

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 5.9 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Changes to the building/structure layouts and landscaping within the Terrestrial port lands, Nearshore environments, residential site and port office entrance	Neutral	Moderate	Local	Likely	Permanent	Worst Case

5.9 Predicted Visual Effects

5.9.1 Zone of Visual Influence and Potential Visual Receptors

Based on the landscape & visual characteristics, values and sensitivities of the study area, 15 No. representative viewpoints were selected from a range of distance, angles and contexts in order to assess the predicated visual effects. These are scheduled and mapped below. These views include residences, recreational users and visitors located within the villages of Greenore and Carlingford and across the Cooley Peninsulas as well more distant receptors views from across Carlingford Lough by Greencastle Pier, County Down, Northern Ireland. In addition, there are views located within Greenore ACA and a long designated scenic routes, as outlined in the schedule below.

Existing photographs and verified photomontages are provided by Pivotal Animations, provided as a standalone document with this application.

The assessed viewpoints are shown on Figure 5-20, below, and are listed in Table 5-10, below. A sensitivity rating has been ascribed to each visual receptor, in accordance with the definitions provided in Table 5-3, with a rationale for the sensitivity rating provided under the description of each existing view. The potential impact of the various phases of the proposed development upon these receptors' existing views are assessed in Sections 5.9.3 & 5.9.4, below.

Table 5.10 Viewpoint Locations

Viewpoint Number	Viewpoint Description	Distance and Direction from the nearest site boundary	Rationale for selection
1	Shore Road	13.5m east	Representing walkers on coastal path and ferry users.
2	Euston St No.1	2.50m south	Representing local residential receptors and views from ACA.
3	Euston St No.17	126m south	Representing local residential receptors and views from ACA.
4	Anglesey Terrace No.11	40m southeast	Representing local residential receptors and views from ACA.
5	Anglesey Terrace No. 1	120m southeast	Representing local residential receptors and views from ACA.
6	Golf Club (First Floor of Clubhouse)	33m south	Representing recreational users within golf course.
7	Golf Club (Clubhouse Bar)	20m south	Representing recreational users within golf course.
8	Golf Club (Hole T12)	57m south	Representing recreational users within golf course.
9	R175 Greenore to Dundalk Road	630m south	Representing road users views from start of LCC designated scenic route
10	L70654	800m southwest	Representing recreational users within golf course, local residential receptors and view
11	R176 Greenore to Carlingford Coast Road	1.35km west	Representing road users views from start of LCC designated scenic route No. R14 and Views and Prospects No.5
12	Ghan Road	2.56km west	Representing local residents
13	Ballytrasna Road	1.79km south	Representing road users views from start of LCC designated scenic route No.15
14	Greencastle Pier Road No.125	1.88km northeast	Representing tourist spot and local residents

Viewpoint Number	Viewpoint Description	Distance and Direction from the nearest site boundary	Rationale for selection
15	Kilowen Road No. 182	3.85km north	Representing views from designated Mournes Coastal scenic route

Figure 5-20 Extract of Viewpoint Location Map with inset of nearest viewpoints within Greenore village. Please see the full viewpoint figure version within the photomontage booklet that accompanies this application for details. (Source: Pivotal Animations 2024).

5.9.2 Demolition Effects on Visual Receptors

The demolition works will occur across the two phases of works. With the single dwelling on the residential site removed in phase 1 stage and replaced by a temporary construction area and later developed into the proposed carparking area in phase 2. Around the port area, the demolition of some existing buildings will occur later on during Phase 2, with the removal of the former Open Hydro building, substation and part of the port office building. However, as this work will run concurrently with the proposed development's other construction site work, any likely visual effects of this phase are considered collectively with the construction effects.

5.9.3 Construction Effects on Visual Receptors

The construction phase will occur over two phases. As with most construction stages, there is likely to be negative visual impacts associated with the construction works, over a phased basis, for this development, owing to the building processes required to construct the proposed development.

Effects on visual receptors at construction stage will, by their nature, be adverse in nature, varying in magnitude and significance. Due to the split nature of the site, it is possible that some receptors will experience direct views of the site works within the main site area, but not within the Shore Road carpark area, and vice versa. Some ground level views of works within the main site will also be reduced by the existing retained boundary wall and port office buildings.

All effects on visual receptors resulting from the construction stage are expected to occur across 2 phases within a planning 10 year period, given the relatively short period of each phase are therefore considered short term in nature (in accordance with Table 5-7).

5.9.4 Operational Effects on Visual Receptors

Existing photographs and verified photomontages are provided by Pivotal Animations, provided as a standalone document with this application.

The effects on visual receptors in the Operational Stage are set out below in respect of the views considered (refer to Table 5-10), in accordance with the definitions provided in Table 5-3, with a rationale for the sensitivity rating provided under the description of each existing view.

Table 5.11 Operational Effects on Visual Receptors

Viewpoint 1: Shore Road	
Existing	The existing view is located on the public footpath directly opposite the site. The captured view is split between 1A looking west and south-westwards and 1B looking west and northwards. The view is representative of walkers on the short coast path stretching between the carparks by the coast guard station and ferry. As all vehicular ferry users must also pass this section of road, this view is also representative of ferry users. The view is looking across the road to the former residence and its open overgrown grounds, with some mature trees and shrubs scattered on its garden boundaries. Beyond the house are the rear of the houses of Euston Street. Views northwards looking over the site's boundary into the port and its various elements and some historic features include the old lighthouse and water towers. In the background are the Slieve Foye and Mourne Mountains. Views towards the site's southern end are obscured by its mature shrubs and low trees, with adjacent properties and the coastguard house visible further back, by the bend in the road. The key views, and leading sources of visual amenity, from this location are looking out across Carlingford Lough and towards the Mourne Mountain, with the viewer facing away from the site.
Sensitivity	**Medium**
Visual Impacts and Effects	
	Phase 1:

Operational Phase	Following the demolition and full removal of the former residence and associated garden planting/greenery, the site will consist of a bare, but temporary, gravel carparking/construction area. The northern boundary wall will be painted white washed with a low security fencing attached on top while a timber panel fence will align the southern site boundary. Phase 2: Once the construction of the proposed development is completed, the proposed carpark will be clearly visible. The pre-existing entrances to the site will be removed, with a wider vehicular entrance centred upon the site boundary. The low, concrete road-facing boundary wall of the former residence will be replaced with a white and more contemporary low wall that is compatible with the Port's white boundary walls, to the immediate north of the site, as well as residences to the south of the site. Within the site, a modest-sized contemporary carpark will be visible, while modestly scaled, contemporary lighting will be located through the car park. The hard surfaces and boundary edges of the car park will be softened by the mix of suitable, soft landscaping measures that will assist with visual amenity within the site. Upon semi-maturation, the proposed treelines along the southern and western site boundaries, and part of the northeast site boundary, will assist in partly screening views from residences to the south and west of the site of the car park elements as well as some port infrastructure to the north and northeast of this section of the site. It is worth noting that the remainder of the proposed development in other sections of the site is not likely to be visible from this point. Furthermore, receptors are likely to be focused on the compelling sources of inherent visual amenity at this location, which is towards Carlingford Lough and the Mourne Mountains, and not in the direction of the site.	
	Magnitude of Change	**Medium**
	Significance of Effects	**Moderate**
	Quality	**Neutral**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 2: Euston Street No.1		
Existing	The existing view is located within Greenore ACA at the northern end of Euston Street opposite the port offices and associated parking. The view is split between 2A looking west and north-westwards and 2B looking east and north-eastwards. The foreground view looking west/northwest contains elements of the car park and port office buildings with the western water tower dominating the view. Beyond are partial views of other elements within the port, including crane, former open hydro building, and temporary metal stockpiles. In the background are Cooley Mountains and Slieve Foye. The northeast view is more contained by the active working port's mix of historic and modern buildings and structures in the middle ground including the distinct ivy-covered eastern water tower and two large	

	silos. In the foreground is the small open space while against the background is a very limited view of the Mourne Mountains.	
Sensitivity	**High**	
Visual Impacts and Effects		
Operational Phase	Phase 1: No change is expected in this view for this stage of the proposed development will be screened by the existing port buildings, including the former open hydro building, which will remain intact during this phase. Phase 2: Upon completion, changes to view (2A) will include notable changes around the front of the port office car park because of the proposed realignment and new pedestrian access. The change will include the loss of one existing tree and some low shrubbery to the front of the existing carpark. The widened necessary loss of the two trees and shrubbery will be compensated with a large new specimen tree located within the newly planted up widened central bed. In the foreground there will be notable visually improvements to the streetscape around the port offices carpark area, including the use of heritage cobble paving that's reflective of the ACA material palette. Further back within the view the existing gated entrance to the former open hydro building will be enhanced with a new feature wall with brick relief, gates, signage and planting. In the background the former Open Hydro building will be replaced by two new distant buildings contained (within the site's western area). The two new buildings will marginally reduce existing views of the Cooley hillside. Through the gateway will be views of the southern profile of the old engine room wall which forms a feature of the proposed development. For view 2B, there will be notable visible improvements to the existing small public realm/port boundary area implemented through the proposed development. design. This will include a redesign of the existing space with a high-quality paving scheme including heritage cobble paving and bands of granite kerbing to guide users along with relocating some existing street furniture elements to create a larger and more functional space. Some slight alternations to the east boundary wall include for the new walkway allowing minor views into the adjoining port yard and alternations of the small group of trees, with loss of three trees, but will be suitably replaced to maintain tree cover here. Overall, the proposed development, through its use of high-quality materials and planting, is likely to enhance the existing visual interaction at this junction between the street edges and the port area on the northern end of Greenore ACA.	
	Magnitude of Change	**Medium**
	Significance of Effects	**Moderate-Significant**
	Quality	**Beneficial**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location.	

	Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 3: Euston Street No.17		
Existing	The existing view is from the opposite end of the same street as Viewpoint 2 and is within the ACA. The view is enclosed on either side by the street's distinct row of Victorian houses, which are characteristics of Greenore ACA. The former national school and co-op buildings are visible halfway along the street on the left side of the image. The only part of the site visible is a small area of the public / private realm in front of the port's building and its eastern water tower at the far end of the street. Peering above these buildings is a ship and its crane, while the Mourne Mountains are visible in the background.	
Sensitivity	**High**	
Visual Impacts and Effects		
Operational Phase	Phase 1: Not visible from this point due to views contained by the housing either side of the street. Phase 2 only: The proposed development would be barely visible from this location. The only change will be distant, intermittent views of the streetscape enhancements at the end of the street. No other part of the proposed development will be visible.	
	Magnitude of Change	**Negligible**
	Significance of Effects	**Not Significant**
	Quality	**Neutral**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 4: Anglesey Terrace No.11		
Existing	This view is from the northern end of Anglesey Terrace within, but by the west edge of, Greenore ACA. The captured view is split between 4A looking westwards and 4B looking northwards. 4A - This western view looks across the street, past four Scots Pine trees and into Greenore golf course with partial views of the Cooley mountains and Slieve Foye in the background. The presence of the site's large, industrial, former open hydro building, in the mid-distance, partially obscures views of these hills. The site's boundary wall is clearly visible, although softened by climbers growing up the wall (on the golf course side), with some temporary metal stockpiles within the site slightly peering above this wall. 4B - The northern facing view looks along the street towards the site in the mid-distance, where its various elements including the temporary metal stockpiles, old engine room wall, mobile crane and former open hydro building are clearly visible peering above the high boundary wall. These elements	

	add distinct working industrial elements to this view. Beyond these elements are partial/glimpsed views of Slieve Foye and the Mourne Mountains in the background.	
Sensitivity	**High**	
Visual Impacts and Effects		
Operational Phase	<u>View 4A</u> Phase 1: View will contain the most western of the proposed OMF buildings, which will be visible in the mid-distance from this location. Little can be discerned about this building other than it will be a dark-toned, light industrial building of modest scale, and of similar height to the former open hydro building. Its location will fractionally decrease views of the distant hills. Phase 2: On completion, the proposed development will be largely visible, having replaced the former open hydro building. It will add a more dark-toned, contemporary and high-end, light industrial built design to the existing industrial context visible in the mid-distance from this location. These buildings will be set further back into the site than the existing former open hydro building. Numerous proposed and suitable trees to the south of these buildings will help to marginally reduce the visual presence of the proposed buildings. The setting of the second building and its roofline, lower than the open hydro roofline, will help improve views to the summit of Slieve Foye than were currently visibly from Anglesey Terrace. <u>View 4B:</u> Phase 1: There will be no change to the existing view from this northwards angle. Phase 2: On completion, the proposed buildings are clearly visible with the most eastern building (building c) extending further right (east) than the former open hydro building. As above, these buildings are set back from the boundary into the site, instil a more high-end, light industrial built design to the viewing context and will permit greater views of the peak of Slieve Foye from this Anglesey Terrace. The existing engine room wall will be retained as a feature within the proposed development and will no longer be obscured by temporary material stockpiles. The retained existing boundary wall will, overtime, be softened by the proposed climbers and help blend with the section of wall in the adjoining golf course. Overall, on completion, the visual changes across the full extent of this viewpoint will consist of the replacement of one building with three new more high-end, contemporary buildings of a similar scale. There will be some variations to the outward visibility of the hillside in the background along with some enhancement of the site's existing internal historic elements. Overall, while having a notable visual presence within the vista, the proposed development will serve to enhance the visual amenity of the setting.	
	Magnitude of Change	**Medium**
	Significance of Effects	**Significant**

	Quality	**Positive**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 5: Anglesey Terrace No. 1		
Existing	The existing view is from the southern end of the same street as viewpoint No. 4 and is just within Greenore ACA. Again, the view is split between 5A – looking west-north westwards and 5B- looking northwards. 5A- Looks directly across into the golf course, with its distinct tree lines and the golf clubhouse, which are backdropped by the Cooley Mountains and Slieve Foye. In the view's middle ground is the former open hydro building, lighting and temporary metal stockpile visible within the site peering above its boundary wall. This adds an industrial character to the otherwise semi-rural view. 5B- The view contains a mix of Victorian era housing style and open space on the western edge of the village. At the northern end of the street are the site's boundary wall and its taller engine room wall, which blocks views of the lowest slopes of the Mourne Mountains, which are set against the background. The crane within the site and centre of this view is a mobile crane.	
Sensitivity	**High**	
Visual Impacts and Effects		
Operational Phase	<u>View 5A:</u> Phase 1: At this stage, the view will contain the proposed development's western most building (Building A) visible immediately left (west) of the former open hydro building and partially behind the golf course clubhouse. This will result in a slight increase of industrial structures in the view, as well as marginal reduction in visual amenity of the lower slopes of the mountain in the background. Phase 2: Upon completion, the view will contain all three new buildings, with some partially hidden by the foreground trees on the edge of the golf course, of similar nature to the existing former open hydro building being replaced. The buildings are set back further from the golf course's green boundary wall, which will help to further reduce their prominence, while there will be a slight improvement to the visibility of the eastern side of the mountain. <u>View 5B:</u> Phase 1: No change Phase 2: On completion, the eastern end of the OMF (Building C) will be visibly extending further to the right than the existing former open hydro building. It will increase the prominence of the industrial elements within	

	this view but within the context of the port. Its location will slightly reduce the southern profile of the Mourne Mountain within the existing view. The view of the existing engine room will remain as a feature of the development. As with the previous viewpoint, the overall visual change across the extent of this viewpoint will be of three buildings within the port, whose built form is broken up in places by the existing/proposed tree cover. There will be some minor variation to the views of the background hills and enhancement of the engine room wall.	
	Magnitude of Change	**Medium**
	Significance of Effects	**Moderate**
	Quality	**Positive**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 6: Golf Club (First Floor of Clubhouse)		
Existing	This existing view is taken from an internal space of a private premises which is not typically recorded under LVIA perspective. The outward view from first floor of the golf's clubhouse allows for elevated views looking down onto the adjoining site and views of its various elements including the temporary metal stockpiles, modern former open hydro building and silos, mobile cranes along with the port's historical elements including the engine room wall and western water tower. To the left of the Open hydro building there are clear views across Carlingford Lough to the Mourne Mountains in the background. There are also partial views of the house along Anglesey Terrace through the golf courses boundary trees.	
Sensitivity	**Medium**	
Visual Impacts and Effects		
Operational Phase	Phase 1: The proposed development's western most OMF building (Building A) will be clearly visible in this view alongside the former open hydro building. The new building's location means it will fully screen out the former views across the yard to Carlingford Lough and the Mourne Mountains. Phase 2: Upon completion the southern profiles of the three proposed buildings will be clearly visible along with the proposed street elements and soft landscaping to the front of these buildings. The buildings retain a continuation of industrial buildings being visible from this viewpoint. The OMFs eastern profile tapers slightly lower than the existing building. While the engine room wall and other historic elements remain clearly visible.	
	Magnitude of Change	**High**
	Significance of Effects	**Moderate**

	Quality	**Adverse**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 7: Golf Club (Clubhouse Bar)		
Existing	This existing view is taken from an internal space of a private premises which is not typically recorded under LVIA perspective. This elevated view is from the first floor to the rear of the golf clubhouse's bar area, where views aren't looking out across the golf course but down into the golf course's service yard immediate beyond which is the western end of the site within Greenore port hardstanding area with some temporary metal stockpiling. The key views being of Carlingford Lough framed by the mountains of the Cooleys, Mournes and Ring of Gullion. Receptors sensitivity: Medium, as temporary views of golf course users visiting the bar, where the main outward views from the bar are towards activity on the golf course which is not contained within this view.	
Sensitivity	**Medium**	
Visual Impacts and Effects		
Operational Phase	Phase 1: The proposed development western most OMF building (Building A) will be clearly visible along with the hard and soft landscaping around this end of the site. The location of the building will obscure views of the Mourne Mountains while views of the lough and hills on its southern end will remain largely unaltered. Phase 2: The view will be largely the same as Phase 1, due to the viewpoint views looking directly onto the far western end of the site.	
	Magnitude of Change	**High**
	Significance of Effects	**Moderate**
	Quality	**Adverse**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 8: Golf Club (Hole T12)		
Existing	This existing view is taken from an exterior space of a private premises which is not typically recorded under LVIA perspective.	

	The existing view looks back to the hole and golf clubhouse. Where views of the site and port are largely hidden by the golf course's dense leylandii boundary hedge. There are partial views of the former open hydro warehouse and western water tower either side of the golfclub house. While there are other port elements, including lighting, mobile crane and material either above the hedge or through gaps low down. The peaks of the Mourne Mountains are slightly visible in the background peering over the hedge and also to the left (west) of the hedge along with Carlingford Lough	
Sensitivity	**High-Medium**	
Visual Impacts and Effects		
Operational Phase	Phase 1: The view will contain the proposed development western building (Building A) above the existing boundary hedge and next to the golf course clubhouse. Due to its scale it will be more prominent of the two buildings. The new building partially screens views of one of the Mourne Mountains and existing northern profile of the former open hydro building. Phase 2: Upon completion, the view will be very similar as phase 1 except that the small portion of the former open hydro building previously visible is replaced by the adjoining new building of Building B.	
	Magnitude of Change	**Low**
	Significance of Effects	**Moderate- Slight**
	Quality	**Adverse**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 9: R175 Greenore to Dundalk Road (beginning of SR14)		
Existing	The view is from the main road as one approaches Greenore Village by the start of LCC Scenic Route No. 14. The main view is looking directly across the road into the golf course. Although its line of pine trees on the boundary partial block views of the Mourne Mountains in the distance. The extent of view towards the right side of the road are less appealing with it dominated by the large warehouse sheds, partially screened by the line of trees on the roadside. The existing site and port lands are screened by the intervening vegetation within the golf course.	
Sensitivity	**High**	
Visual Impacts and Effects		
Operational Phase	Phase 1: The proposed development, Building A, is not visible from this point, so no change to the existing view, Phase 2:	

	Upon completion, the proposed development is not visible from this point, so no change to the existing view,	
	Magnitude of Change	**No Change**
	Significance of Effects	**None**
	Quality	**Neutral**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 10: L70654		
Existing	The existing view is from a local road opposite some houses, and which provides open views across the adjacent golf course and beyond towards Greenore village in the middle ground and the Mourne Mountains in the background. The port's existing sheds, silos, mobile crane and shipping are visible as are the large warehousing at the other end of Greenore. While much of the housing within the village is screened by the trees within the golf course with some houses along the northern end of Anglesey Terrace partially visible.	
Sensitivity	**High**	
Visual Impacts and Effects		
Operational Phase	Phase 1: The proposed development's western building (Building A) will be visible directly next to the former open hydro building, reducing the visibility of the front of this building Overall the new build will be a minor element within the wider views of the mountains in the background which remain unaltered. Phase 2: Upon Completion, all three OMF buildings will be visible grouped together along with the upper portion of the new lighting and trees within the site peering above the golf course boundary hedge. As before the collection of buildings will be a minor element within the wider view.	
	Magnitude of Change	**Low-Negligible**
	Significance of Effects	**Slight**
	Quality	**Neutral**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 11: R176 Greenore to Carlingford Coast Road		

Existing	The existing view represents views from LCC scenic route No. R14 and Prosect No.5. A break in the roadside vegetation provides open views across Carlingford Lough in the direction of the site and existing elements within Greenore port. Here the ships berthing and the tall vertical forms of the silos and mobile cranes are the most visually prominent structures within the port from this point. The long line of mature trees within the golf course screens out most views of the village's houses. While directly right of these trees is the area of large warehousing by the southern edge of the village. Against the background in the distance are the Mourne Mountains.	
Sensitivity	**HIgh**	
Visual Impacts and Effects		
Operational Phase	Phase 1: Views will include the new western building (Building A) next to the former open hydro and backdropped by the trees along the golf course end. This direction of view also allows for views of the ports northern end where the new platoon and service marine vessels will be visible. Phase 2: Upon completion, all three new buildings (Buildings A-C) will be clearly visible with the replacement of the former open hydro building. Very slight alternation of the view of the western water tower with the addition of Building C in front of it. There will also be an increase of marine service vessels and activity around the port by the new pontoon when all three buildings are fully operational.	
	Magnitude of Change	**Negligible**
	Significance of Effects	**Not Significant**
	Quality	**Neutral**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 12: Ghan Road		
Existing	The existing view is located at a small layby which has a viewing telescope and seating for visitors. It is very similar to the previous viewpoint 11 where the main site and various existing elements around Greenore Port lands and other industrial warehousing on the edge of the village are clearly visible in the centre of the view but located further away from Viewpoint 11, by approx. 1.2km. Allowing greater views of Carlingford Lough and Mourne Mountains and its foothills.	
Sensitivity	**High**	
Visual Impacts and Effects		
	Phase 1:	

Operational Phase	This view of the proposed development will be very similar to that experienced from Viewpoint 11 above but from further away, by approx. 1.2km, where by the proposed developments are only slightly discernible in the wider view. Phase 2: Once completion, views again will be similar to Viewpoint 11 and as outlined for phase 1 are reduced by the distance to being only slightly discernible from this point.	
	Magnitude of Change	**Negligible**
	Significance of Effects	**Not Significant**
	Quality	**Neutral**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 13: Ballytrasna Road – LCC Scenic Route No.15		
Existing	The existing view from roadside next to beach, allows expansive open views across Carlingford Lough towards the prominent outline of the Mourne Mountain in the background. Beyond the open beach foreshore in the middle of the view, to left of the image (west), are clear views of the continuous line of large warehousing on the southern end of Greenore village together with the upper portions of Greenore Port's the tallest elements including the silos and mobile cranes. These elements add a distinct industrialise element which detracts from this rich seascape. The sheds and tree lines help screen views of the site from this point.	
Sensitivity	**High**	
Visual Impacts and Effects		
Operational Phase	Phase 1: The proposed development is not visible from this point due to the intervening screening by the warehousing at the end of the village. Phase 2: Upon completion, the proposed development is not visible from this point due to the intervening screening by the warehousing at the end of the village.	
	Magnitude of Change	**No Change**
	Significance of Effects	**None**
	Quality	**Neutral**
	Duration	**Permanent**

Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 14: Greencastle Pier Road No.125		
Existing	The existing view is one of a distance view from across the opposite side of Carlingford Lough within Northern Ireland by Greencastle beach looking back across the lough in the direction of Greenore. Where the various elements within Greenore Port are clearly visible including the existing sea break and some of the port's western end, partially hided by the docked ship, which both fall within the site's main area. Also visible to the left of the port (south) is the house and grounds at the residenital site on Shore Road which forms the site's proposed carpark lands. Also clearly visible are the warehousing on the edge of the village. While the wider view contains other built elements within Carlingford village and surrounding rural landscape which are all backdropped by the outline of the Cooley mountains and Slieve Foye.	
Sensitivity	**High**	
Visual Impacts and Effects		
Operational Phase	Phase1: At this stage the former house at the residential site will have been removed and replaced by a contractors compound / carpark. Allowing for greater views of the rear of house off Euston Street, There will be barely discernible views of the roofline of Building A peering above the existing former open hydro building. Phase 2: Once completion, views will include the final car park with a range of tree planting. Looking across to the main site there will be barely discernible views of the rooflines of all three proposed buildings (Buildings A-C) peering above the existing built structures within the ports lands. The proposed development would be barely visible from this location. The roofs of some OMF buildings may be faintly discernible from this location. However, even noticed, the proposed development will not detract from the limited inherent visual amenity.	
	Magnitude of Change	**Negligible**
	Significance of Effects	**Not Significant**
	Quality	**Neutral**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	
Viewpoint 15: Kilowen Road No. 182		

Existing	The existing view is the furthest viewpoint from the site at approx. 3.85km away and similarly located on the northern end of Carlingford Lough along a layby off the main road which forms part of the Mournes Coastal Route scenic route. At this distance the various elements of Greenore Port while still distinguishable on the opposite end of Carlingford Lough, are a minor element within the expansive view dominated by Slieve Foye further to the right (north) of view. The same extent of the site, as per the earlier viewpoint no. 14, is visible including the portside end of the main site and lands at Barabara's Field.	
Sensitivity	**High**	
Visual Impacts and Effects		
Operational Phase	Phase 1: The main view will be looking towards the port's northern end where there will be views of new OMF building (Building A) located directly right (west) of the former open hydro plant and also the new pontoon with marine service vessels. Changes around the residential site on Shore Road will be less discernible. Phase 2: Once completed, all three proposed OMF buildings will be visible, having replaced the former open hydro building, along with the new pontoon and additional marine service vessels which are visible next to the pontoon. The proposed height of the OMF buildings ensure they are well backdropped by the higher lands and dp not protrude against the skyline as is the case for other existing elements in the port. At this stage the overflow car parking will be operational, but similarly will be less discernible than the other above elements of the proposed development.	
	Magnitude of Change	**Negligible**
	Significance of Effects	**Not Significant**
	Quality	**Neutral**
	Duration	**Permanent**
Cumulative Effects	There are no other permitted developments of note that would be visible in tandem with the proposed development from this location. Thus, there will be no significant cumulative visual effects associated with the proposed development.	

5.9.5 Summary

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 5.12 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Viewpoint	Location	Sensitivity	Magnitude of Change	Operational Stage Significance, Quality & Duration	Cumulative Effects
1	Shore Road	Medium	Medium	Moderate, Neutral, Permanent	None
2	Euston St No.1	High	Medium	Moderate-Significant, Beneficial, Permanent	None
3	Euston St No.17	High	Negligible	Not Significant, Neutral, Permanent	None
4	Anglesey Terrace No.11	High	Medium	Significant, Positive, Permanent	None
5	Anglesey Terrace No. 1	High	Medium	Moderate, Positive, Permanent	None
6	Golf Club (First Floor of Clubhouse)	Medium	High	Moderate, Adverse, Permanent	None
7	Golf Club (Clubhouse Bar)	Medium	High	Moderate, Adverse, Permanent	None
8	Golf Club (Hole T12)	High-Medium	Low	Moderate-Slight, Adverse, Permanent	None
9	R175 Greenore to Dundalk Road	High	No Change	None, Neutral, Permanent	None
10	L70654	High	Low-Negligible	Slight, Neutral, Permanent	None
11	R176 Greenore to Carlingford Coast Road	High	Negligible	Not Significant, Neutral, Permanent	None
12	Ghan Road	High	Negligible	Not Significant, Neutral, Permanent	None
13	Ballytrasna Road	High	No Change	None, Neutral, Permanent	None
14	Greencastle Pier Road No.125	High	Negligible	Not Significant, Neutral, Permanent	None
15	Kilowen Road No. 182	High	Negligible	Not Significant, Neutral, Permanent	None

5.10 Potential Significant Effects

5.10.1 Demolition Phase

The landscape and visual effects were assessed under Section 5.8 and 5.9 above. It found that there are no potential significant landscape and visual effects during the demolition phase.

5.10.2 Construction Phase

The landscape and visual effects were assessed under Section 5.8 and 5.9 above. It found that there are no potential significant landscape and visual effects during the construction phase.

5.10.3 Operational Phase

The landscape and visual effects were assessed under Section 5.8 and 5.9 above. It found that there are no potential significant landscape effects during the operational phase.

Once fully completed out and operational the proposed development will not have any significant effects on most of the assessed viewpoints above. Only viewpoints 2 and 4 will have **moderate-significant or significant effects**, both of which having **positive** changes to the receptors existing views as result of the material changes occurring around the port as part of the proposed development's layout.

Regardless of the proposed development, the recent approved planning applications for an approved extension and modification of existing Warehouse (LCC Planning Ref 20268, ABP Ref 307862) and new warehouse (LCC Planning Ref Planning ref 20543, ABP Ref 310184) have set out acceptable levels of visual changes , deemed appropriate by LCC and ABP planning authorities, upon the same assessed receptors when looking towards any future developments within the port were they to proceed.

The visual changes of the proposed development once completed will in places be notable more visually pleasing upon the assessed affected receptors views than in comparison to the already approved visual changes for the above approved developments. Due in part to their broken up built form, set back of buildings from boundary wall and high-quality design. Also, this application's proposed development improvements along the interface of the port and the north end of Euston Street will have notable beneficial/positive visual effects by the northern end of the ACA.

5.10.4 Cumulative Effects

A review of other planning applications within the study area including the mix of application types and scale as appended to Chapter 1 of this EIAR. However, there are no applications, pending or approved but not yet constructed which could be considered to have the potential for any notable cumulative landscape or visual effects with the proposed development.

Therefore, there are no significant for cumulative landscape and visual effects at the time of this assessment and not are considered any further in this assessment.

Similarly, there are no potential cumulative landscape or visual effects with the port's developments already approved but not constructed (new warehousing (LCC Planning Ref Planning ref 20543, ABP Ref 310184) and extension of the existing former open hydro building (LCC Planning Ref Planning ref 20543, ABP Ref 310184) as it is deemed not feasible to build the proposed development with either of these extant permissions.

5.11 Mitigation

5.11.1 Incorporated Design Mitigation

The proposed design through its evolution has placed a great emphasis on integrating the proposed development into the receiving landscape through respecting and enhancing the existing character of the port lands and surrounding Greenore ACA. These measures include:

- The proposed landscape consists of robust planting species specifically selected to cope with the harsh coastal environment so to minimise the risk of planting failures.
- The careful design and placement of building to create new elevations, features and focal points in the views available. While offset from the historic structures within the port so to not impact on their visibility.
- The softening of the setting and framing of the elevations with the proposed planting mixes including trees, specimen shrubs and hedgerow to reduce the visual mass of the new building, soften and integrate the development over time from various viewpoints, as identified in the assessment, thereby minimising the visual impacts and generally enhancing the current outlook for many viewpoints. As outlined in the set of landscape masterplans which accompanies this application.
- Tree and shrub planting to help break up the carparking areas throughout the site and implementation of suitable SUD planting in the carparks.
- The design of the public realm scheme at the end of Euston Street to a high standard and seamless integration of the Port end off Euston Street and surrounding streetscape within Greenore ACA.
- The design has considered the movement of vehicles, cyclists and pedestrians within the site and surrounding area and improves upon the existing access to minimise disruption. Proposed pedestrian routes through the site will have strong legibility by using contrasting paving materials.
- Integration of the proposed planting will all other proposed services so that these services don't affect the new planting and existing vegetations long term growth and maintenance.
- The site layout has been designed, for each phase, so that there is adequate levels of parking within the site lands to accommodate employees vehicles of the OMFs and those of the existing Port operations so that no parking will occur within the surrounding streets and minimise disturbance to character of the ACA.

5.11.2 Demolition Phase Mitigation

The proposed demolition works to occur within the site, as a form of construction, will follow similar mitigation as outlined below in the construction works phase.

5.11.3 Construction Phase Mitigation

During the construction for all phases there will be a change to the landscape and there will be adverse visual impacts for residents and visitors to the areas adjacent to the site associated with construction activity.

The remedial measures proposed revolve around the implementation of appropriate site management procedures as part of the CEMP to help minimise disturbance to landscape and visual receptors. These measures will include: the likes of the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, agreed working hours etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish. Any temporary lighting will be directed down and away from the residences and will only be switched on only when necessary to ensure works can be safely carried out.

The construction traffic route has been designed so that site traffic/deliveries will run via Shore Road to ensure minimal disturbance to residences within the core of the village during the works.

The retained trees along the boundaries will be protected by installation of fencing in accordance with BS5837:2012: Trees in Relation to Construction around the root protection areas (RPAs) as per the arborists Arboricultural Impact Assessment (AIA) report.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action other than as stated above.

Adverse impacts both during construction will be short-lived and superseded by the completed new development.

5.11.4 Operational Phase Mitigation

While the proposed development is to occur in two phases the landscape and visual mitigation will be similar through these phases and being fully implemented at the end of the two phases completed construction phase.

These measures will include:

Lighting has been designed to minimise the potential for light spillage into the surrounding area through the use of suitable directional lighting centred to fall within the site. The lighting will be only on as required to provide safe access through the site during operations and for security cover of the site.

Traffic – The site layout has been designed, for each phase, so that there is adequate levels of parking within the site lands to accommodate employees vehicles of the OMFs and those of the existing Port operations so that no parking will occur within the surrounding streets. So to minimise disturbance to local residents and character of the ACA.

Maintenance- The proposed landscape, which will be fully implemented by the end of Phase 2, consists of robust planting species specifically selected to cope with the harsh coastal environment so to minimise the risk of planting failures. The proposed and existing planting will be maintained through the operation phase to ensure the new planting becomes established and matures over time to help integrate the site's proposed built elements into the landscape and also soften and screen views of these new structures from receptors in the surrounding areas identified in this assessment as per the intentions of the landscape masterplan proposals.

5.12 Residual Impact Assessment

As covered in Section 5.8, there are no significant residual landscape effects associated with the proposal. The highest landscape effect will be of 'Moderate' significance at Construction Stage, and of 'Moderate' significance at Operational Stage.

As covered in Section 5.9, there are a range of visual effects, from No Change to the existing view through to Significant effects. The phased nature of the proposed development means these effects range between temporary to permanent duration across the site lands. However, only those deemed as Moderate-Significant or Significant occur within very close proximity to the site as experienced from Viewpoint 2 at the northern end of Euston Street and Viewpoints 4 and 5 on Anglesey Terrace.

In light of the development lands recent planning history approvals and planning policy for the county ports, development of this site would appear to be inevitable. It is considered likely that any proposed viable portside development is likely to give rise to landscape & visual effects of a similar, if not higher, nature. While the intensification of land use in the site is a change that cannot be wholly mitigated, this application's proposed layout reflects a higher quality design than that of previous recent proposals for the port. This is likely to result in an overall beneficial effect locally and to the wider area.

5.13 Risk of Major Accidents or Disasters

It is expected that the risk of any major accidents or disasters on landscape and visual receptors can be averted by the implementation of a robust Construction Environmental Management Plan (CEMP) and appointment of an experienced competent contractor to undertake the construction works.

Where an accident to occur during the construction or operational phase, such as a contamination event in the form of a leakage this could cause damage to the aquatic environment of Carlingford Lough. Another potential event during the construction phase could be a biosecurity breach whereby invasive species (plant and insects) and diseased plant material are brought on site during the landscaping works.

Such events could have a localised direct or indirect impact on the characteristics of the seascape of the SCA17 – Border SCA-Carlingford Lough including that of altering the human activity on the local shore or lough, e.g. loss of oyster farming or reduced level of recreational sailing, and of the sensitive habitats of its ecological designations (see Chapter – 11 Biodiversity for details), e.g. decline of bird activity visibly present around the lough.

5.14 Worst Case Scenario

Would occur if the proposed development was not fully implemented as per the proposed site layout plans, including that of the proposed landscaping across the site.

5.15 Interactions

The potential for interactions with Biodiversity to occur will largely be beneficial effects as a result of implementing the proposed landscape masterplan, which includes measures to increase the level of beneficial planting across the existing site with a range of species include native species and pollinator rich species in keeping with the All-Ireland Pollinator Plan. Some minor loss of trees includes 6 no. that are required to be removed due to accommodate the Proposed Development plus 1 no. due to poor health. However, new tree coverage will compensate any losses. The proposed mix of planting species to be used and installation of the planting site will include collaborating with the project ecologist to ensure this new landscaping doesn't negatively impact the highly sensitive Carlingford Lough SAC and SPA. Please refer to Chapter 11- Biodiversity.

The potential for interaction with Traffic & Transport will be indirect effects upon the landscape character and visual amenity as result of changes to existing traffic levels within the immediate surroundings during the decommissioning, construction, and operational phases. Positive effects are likely to occur with the emphasis through the design which will improve the flow of traffic off Euston Street and around the existing port buildings and OFM buildings. While the high level of car park provisions ensures a concentration of parking within the site so to not impact on the existing residence parking along the surrounding streets and streetscape character within the ACA. Similarly, the flow of pedestrian/cyclist through the site will be improved access as well to the small amenity space from off Euston Street. Please refer to Chapter 6 – Material Assets -Traffic & Transport.

The potential interaction with Land and Soils will occur during the demolition and construction phases with movement of material through/off the site and its temporary storage on site. There will be opportunities to reuse the soil lifted from the residential site for the new carpark surface and transport it to those areas of the main site which are currently hardstanding and lacking the depth and quality of soil needed for the various proposed planting areas, thus helping to reduce the need to import soil from an outside source. Please refer to Chapter 9 - Land and Soils.

5.16 Monitoring

The landscape mitigation and enhancement measures are incorporated into the proposed development's landscape masterplan, see this application's accompanying landscape plans and design report.

The masterplan proposals include a range of hard and soft landscaping. The soft landscape measures include the retainment of existing trees, and planting of grasses, wildflowers, climbers, shrubs, hedges, and trees. The successful establishment of the proposed planting will be key to helping to fully integrate the Proposed Development's built structures into the surrounding landscape and provide a visual buffering of the Proposed Development's built elements from surrounding visual receptors. The mitigating effects of which have been considered when determining the predicted landscape and visual effects in the assessment above.

Inspection of planting will be undertaken to ensure the planting becomes established over the initial years and any failed planting is duly replaced.

5.17 Summary of Mitigation and Monitoring

The mitigation measures proposed will seek to reduce any potential significant effects on the landscape and visual receptors. Key measures include: installation of trees, shrubs, hedging to help break up the built forms of the new buildings and of the lines of vehicles within the carpark areas.

Monitoring will be achieved through implementing a landscape management and maintenance plan to ensure the proposed planting becomes fully established overtime.

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 5.13 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Potential for disturbance of the local landscape and to local residences, golf course users, visitors as a result of the construction works.	Implementation of CEMP including controlling site lighting through use of directional lighting and only when needed, storage of materials/site compound, car parking working hours etc. Controlling site traffic/deliveries of goods by using shore road route.	Construction works activities will be controlled and monitored daily by the site manager or other appointed personnel.
Potential for damage to existing retained trees within the site	Installation of tree protection fencing and no dig areas within the root protection area. All works to be in accordance with BS5837:2012: Trees in Relation to Construction around the root protection areas (RPAs) as per the arborists Arboricultural Impact Assessment (AIA) report.	Any construction site works to be carried out within the vicinity of existing trees to be monitored on site by the project arborist.

The following Table summarises the Operational Phase mitigation and monitoring measures.

Table 5.14 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Introduction of the proposed development's new building structure/layouts and associated traffic/personnel.	The landscape scheme consists of robust planting suited to the coastal landscape which will help integrate the site's proposed built elements into the landscape and also soften and screen views of these new structures from receptors in the surrounding areas.	Inspection of planting to ensure the planting becomes established over the initial years and any failed planting is duly replaced.

5.18 Conclusion

This Chapter of the EIAR has assessed the landscape and visual effects of the proposed development at Greenore Port, which is one of four ports within County Louth. The importance of the need to support the sustainable growth and expansion of the county's port is recognised through planning policy in the LCDP. The subject lands recent planning history includes approval by Louth County Council and An Bord Pleanála for warehousing type developments which are deemed acceptable for this area by both planning authorities.

The proposed design reflects a considered form and materiality of development that is sensitive to its unique context of the active port and Greenore ACA and which contributes positively to local place-making.

Landscape

The proposed development will be located within the existing working Greenore port lands and on the lands of an uninhabited residence. A small portion of the site falls within the northern end of the Greenore ACA, which has been designated for its rich architectural heritage directly linked to the founding of the Greenore port and former railway line. Most of the proposed development is located within the main port lands and through the proposed design is systematic to the setting of the port and ACA with the retention of the old engine room wall and not affecting other heritage elements outside of the site. The main changes will occur across large areas on the western end of the port and its northern shoreline. There will be some limited impact on vegetation including the loss of 6 trees (1 due to poor health) and some ornamental shrub/grass cover to accommodate the works.

The proposals are supported by a broad range of hard/soft landscape measures to help mitigate for the integration of the proposed scheme into the receiving landscape. This includes compensating for any losses of vegetation with additional tree planting and mixes of vegetation cover that help enrich the existing biodiversity of the site.

The proposed landscaping and concepts are indicated on the set of Landscape Masterplans (see Dwg 22396-2-101, 102A, 102B, and 103) and within the Landscape Design Report which accompany this application

Overall, the proposed development once completed will have **Moderate** significance of effects and **neutral quality permanent** on the landscape receptors,

Visual

The above assessment has considered the potential views of the proposed development across its various phases from a range of visual receptors located through the study area.

The greatest potential for visual changes will occur to those receptors located within the immediate vicinity of the port which includes both residential and recreational receptors. While further away the changes become less perceptible when viewed amongst the backdrop of other port elements and wider landscape.

Key changes include the removal of the existing former open hydro building and storage yard area and replacement with the three new buildings and associated landscaping. Views of the former engine room wall will be retained, having been previously approved for removal by other recent applications. There will also be enhancement of the existing interface between the existing port offices and Euston Street, improving the visual character of this part of the ACA. While there will be some localised visual changes around the residential site on Shore Road.

Overall, changes to the existing receptors views of the port as a result of the addition of the proposed development will result in significance effects ranging between **No Change to Significant, permanent**, with some of them being of **beneficial/positive quality**.

Summary

The proposed development is of a high-quality design that seeks to sit within the sensitive surroundings of Greenore ACA and limit its impacts including on landscape and visual receptors identified in this report. This application will replace the other already recent LCC and ABP approved but not constructed developments within the main port lands whose designed built forms are considered to have a lesser aesthetic value and not as systematic to their surroundings including Greenore ACA in comparison to this application's proposed development's design and layout.

5.19 References and Sources

Louth County Council (2022) Louth County Development Plan 2021-2027 https://www.louthcoco.ie/en/publications/development-plans/louth-county-development-plan-2021-2027/volume-1-lcdp-2021-2027-.html

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CHAPTER 6

MATERIAL ASSETS: TRAFFIC & TRANSPORT

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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6 Material Assets: Traffic & Transport

6.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on traffic and transportation. It should be read in conjunction with project description. Trafficwise Ltd. has undertaken a Traffic and Transport Assessment (TTA) carried in accordance with Transport Infrastructure Ireland (TII) Publication TII-PE-PDV-02045 *'Traffic and Transport Assessment Guidelines'* (May 2014). The TTA report is submitted with the application. Technical information in the TTA is referenced throughout this chapter which should be read in conjunction with the TTA.

The aim of this Chapter is to provide the Planning Authority with sufficient roads and traffic related information to determine the current traffic characteristics of the existing development and based upon industry standard traffic forecasting to inform an assessment of the potential traffic impact arising from the proposed development which comprises the development of Operations and Maintenance Facilities at Greenore Port.

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on the receiving road environment and should be read in conjunction with Chapter 13 '*Noise and Vibration*' and Chapter 14 '*Air Quality*'.

6.2 Expertise & Qualifications

This Chapter has been prepared by Julian Keenan of Trafficwise Ltd., Traffic and Transportation Planning Consultants.

Julian Keenan is an Engineer in practice and a director of Trafficwise Ltd. holding the degree of Bachelor of Engineering (Hons.) in civil engineering conferred by University College, Galway, in 1990. Mr Keenan is a member of the Institution of Engineers of Ireland and a member of the Chartered Institution of Highways and Transportation and has over 33 years engineering experience, including approximately seven years in local government in the United Kingdom and over 26 years of private engineering consultancy services in Ireland, of which 22 years have been with Trafficwise Ltd. He has specialised in roads design and traffic and transportation planning for approximately 28 years. Consultancy experience includes advising clients in relation to road schemes, residential, commercial, industrial and leisure developments for which the key work involves provision of professional services in the design and appraisal of schemes, including the preparation of planning applications and appeals. Mr Keenan has represented clients at An Bord Pleanála oral hearings for commercial development, strategic infrastructure development and represented landowners and stakeholders in relation to various road schemes and infrastructural works. He has given sworn evidence before the Property Arbitrator, including in relation to road schemes, and has provided expert witness testimony to the High Court.

6.3 Proposed Development

A full description of the proposed development is set out in Chapter 2 of this EIAR and in the TTA Chapter 4 *'Proposed Development'*.

6.3.1 Aspects Relevant to this Assessment

When considering a development of this nature, the potential traffic and transport impact on the receiving road network is considered for each of two distinct stages:

- demolition & construction phase, and;
- operational phase.

During the construction stage the main focus in relation to traffic and transport matters will arise from demolition, piling, dredging and other more typical construction activities. These activities have the potential to generate additional traffic to the receiving roads network. The construction phase impacts will be temporary to short-term in duration.

The primary potential sources of impact upon traffic and transport during the operational phase arise from staff travel together with deliveries and routine servicing of the development. All impacts during the operational phase are assessed as long-term.

6.4 Methodology

This chapter has been prepared having regard to the following guidelines;

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- Louth County Development Plan 2021–2027
- Transport Infrastructure Ireland (TII) Publication TII-PE-PDV-02045 'Traffic and Transport Assessment Guidelines' (May 2014).
- Chartered Institution of Highways and Transportation (CIHT) 'Guidelines for Traffic Impact Assessment' (Sept 1994)
- Department of the Environment & Local Government (DoELG), Department of Transport (DoT) and the Dublin Transportation Office (DTO) 'Traffic Management Guidelines' (May 2022).
- TII Publication PE-PAG-02017 'Project Appraisal Guidelines for National Roads Unit 5.3 Travel Demand Projections' (Oct 2021).
- TII Publication PE-PAG-02039 'Project Appraisal Guidelines for National Roads Unit 16.1: Expansion Factors for Short Period Traffic Counts' (Oct 2016);
- TII Publication PE-PAG-02016 'Project Appraisal Guidelines for National Roads Unit 5.2 - Data Collection' (Dec 2023).
- TII Publication DN-GEO-03060 'Geometric Design of Junctions'. (May 2023)
- TII Publication DN-GEO-03061 'Rural Link Design'. (May 2023)
- Department of Transport, Tourism & Sport, 'Design Manual for Urban Roads & Streets' (2019).

The assessment will be undertaken using the following methodology:

- Baseline traffic surveys have been undertaken in the vicinity of the proposed development site in order to characterise the existing receiving road network and traffic environment;
- A review of the most applicable standards and guidelines to set a range of acceptable threshold criteria for the construction and operational phases of the proposed development;
- Predictive calculations of traffic generation relating to construction phase activities have been undertaken;
- Predictive calculations of traffic generation have been undertaken to assess the potential impacts associated with the operation of the development on the receiving road network within the study area;
- A schedule of mitigation measures has been incorporated where required, to reduce, where necessary, the identified potential impacts relating to traffic and transport arising from the proposed development.

6.4.1 Relevant Guidance

6.4.1.1 Traffic and Transport Assessment

The Transport Infrastructure Ireland (TTI) Traffic and Transport Assessment Guidelines provide a comprehensive framework for evaluating the impacts of developments on traffic and transportation. These guidelines are used by planners, engineers, developers, and government agencies to ensure that the traffic and transportation demands of projects meet whilst minimizing negative effects on traffic flow and safety. Below is an overview of key elements involved in the preparation of the Traffic and Transport Assessment (TTA) accompanying the application which underpins the information provided in this Chapter:

- <u>Purpose and Scope:</u> The objective is to ensure that new developments or changes to existing travel infrastructure are assessed for their impacts on traffic and transportation systems. The guidelines apply to various types of projects, including residential, commercial, industrial, and infrastructure developments.
- <u>Assessment Process:</u> Initially there is a screening process based upon various threshold and sub-threshold values to determine whether the predicted impacts are significant enough to warrant full traffic and transport assessment, the need for which is typically based on the scale, nature and traffic generation characteristics of the project.
- <u>Scoping:</u> Initial high level assessment to the define the extent and focus of the assessment, including the geographical area, time periods, and specific issues to be studied.
- <u>Data Collection and Analysis:</u> This includes for surveys of current traffic volumes, road capacities, public transport availability, and accident statistics. This is used to establish baseline data and includes the collation of data on current transportation network performance including traffic flows. Data collection includes future projections and estimation of future traffic conditions with and without the proposed development, taking into account population growth, economic trends, and other relevant factors.
- <u>Impact Assessment:</u> Calculation of trip generation and estimation of the number of trips generated by the development, including different modes of transport. Forecasting trip distribution and assignment to the receiving road network providing rationale for the analysis of where trips will originate and end, and the routes they will take.

- Capacity Analysis: Evaluation of forecast traffic impacts based upon assessment threshold values and criteria. Modelling assessments of whether existing or planned infrastructure can handle the additional traffic, including intersections, road segments, and public transport facilities in the case of urban development.
- Mitigation Measures: Where impacts are sufficiently significant to warrant infrastructure Improvements typically recommendations for road upgrades, intersection improvements, or new transport facilities are put forward. This may include traffic management strategies to optimize traffic flow, such as staff shift scheduling, new signage, or traffic calming measures. In developments generating significant staff numbers sustainable transport solutions including the promotion of public transport, cycling, and walking can be considered to reduce reliance on private vehicles.

6.4.2 Traffic and Transport Assessment Guidelines - Thresholds

Traffic and Transport Assessment or Traffic Impact Assessment must accompany all planning applications for developments which could potentially generate significant traffic volumes. Initially there is a screening process based upon various threshold and sub-threshold values to determine whether the predicted impacts are significant enough to warrant full traffic and transport assessment. The following sets out the various relevant thresholds:

- Development traffic exceeds 10% of the traffic flow on the adjoining road.
- Development traffic exceeds 5% of the traffic flow on the adjoining road where congestion exists or the location is sensitive.
- Residential development in excess of 200 dwellings.
- Retail and leisure development in excess of 1,000m^2.
- Office, education and hospital development in excess of 2,500m^2.
- Industrial development in excess of 5,000m^2.
- Distribution and warehousing in excess of 10,000m^2.

Relevant thresholds for Traffic Assessment where the development has the potential to affect national roads are as follows:

- 100 trips in / out combined in the peak hours for the proposed development
- Development traffic exceeds 10% of turning movements at junctions with and on National Roads.
- Development traffic exceeds 5% of turning movements at junctions with National Roads if location has potential to become congested or sensitive.
- Industrial development in excess of 5,000m2.
- Distribution and warehousing in excess of 10,000m2.
- 100 on-site parking spaces.

Sub threshold criteria for Traffic Assessment are as follows:

- The character and total number of trips per day is such that as to cause concern.
- Location of the site is not consistent with national guidance or local plan policy or accessibility criteria contained in the Development Plan.

- The development is part of incremental development that will have significant transport implications.
- The development may generate traffic at peak times in a heavily trafficked/ congested area or near a junction with a main traffic route.
- The development may generate heavy vehicles in a residential area.
- There are concerns over the development's potential effects on road safety.
- The development is in a tourist area with potential to cause congestion.
- The planning authority considers that the proposal will result in a material change in trips patterns or raises other significant transport implications.

6.4.3 Assessment Criteria

TII PE-PDV-02045 Traffic and Transportation Assessment Guidelines 2014, Table 2.1 '*Traffic Management Guidelines Thresholds for Transport Assessments'* sets out various threshold values and criteria that typically trigger that a TTA is required where national roads are affected by traffic arising from any proposed development. A general threshold value which is commonly used to identify whether a TTA including detailed junction capacity assessments is required is as follows:

- Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road

It should be noted the 10% flow is generally a prompt for whether or not a TTA is recommended, it is not typically used to determine the significance of effects. It is nonetheless commonly used in TTA to reference the scale of increase in traffic flows when assessing the forecast long-term operational traffic effects of proposed developments. It is used herein as a preliminary measure of the potential magnitude of effect on the receiving road network.

6.4.4 Baseline Traffic Surveys

Traffinomics Transportation Surveys Ltd. carried out classified turning count surveys on the public road network in the vicinity of the site on Wed 17-May-2023. The traffic turning count data was collected mid-week to reflect typical weekday traffic patterns and includes the commuter peak periods. The weekday commuter peak periods typically tend to have the heaviest hourly network flows.

In addition to the short-term turning count surveys Traffinomics Transportation Surveys Ltd. also undertook Automatic Traffic Counter (ATC) surveys spanning 2 no. weeks. These surveys were undertaken on R175, R176 and Euston Street commencing on Thurs 4 May 2023.

The baseline data included an the ATC survey site on R175 Shore Road close to the port access and this enabled the baseline traffic data to be validated and calibrated against long term weighbridge records for the port, spanning 3 years. In the interest of a robust and thorough study, the assessments of traffic impacts include for the recorded average baseline traffic conditions on the receiving roads and also include for a separate upper value baseline sensitivity analysis. Both sets of data are carried through numerical and statistical analyses and are both used in the detailed modelling assessment of the effects of development traffic on the capacity of the receiving roads infrastructure including effects on queuing and delay.

6.5 Difficulties Encountered

There were no difficulties encountered when compiling this assessment.

6.6 Baseline Environment

6.6.1 Baseline Traffic Surveys

Traffinomics Transportation Surveys Ltd. carried out classified turning count surveys on the public road network in the vicinity of the site using CCTV on Wed 17-May-2023 between 07:00 and 19:00hrs. A copy of the survey data is provided in TTA: Appendix A. Traffic data was collected for the following locations identified in Figure 6.1 where the prefix ‘J’ indicates the location of turning counts and the prefix ‘A’ indicates the location of Automatic Traffic Counters that were in place for two weeks.

The traffic turning count data was collected mid-week to reflect typical weekday traffic patterns and includes the commuter peak periods. The weekday commuter peak periods typically tend to have the heaviest hourly network flows. In addition to the short-term turning count surveys Traffinomics Transportation Surveys Ltd. also undertook Automatic Traffic Counter (ATC) surveys spanning 2 no. weeks. These surveys were undertaken on R175, R176 and Euston Street commencing on Thurs 4 May 2023. The locations of the ATC surveys are identified in Figure 6.1 by the prefix ‘A’.

Traffic data was collected for the following locations identified in Figure 6.1.

- Site J1: R175/R176 Priority Junction
- Site J2: R175 Shore Road/L70661 Euston Street Priority Junction
- Site A1: ATC - R175 Dundalk Road (South of R176)
- Site A2: ATC - R175 Greenore Road (South of IDA Industrial Estate)
- Site A3: ATC - R176 Carlingford Road
- Site A4: ATC - L70661 Euston Street (Near Junction with R175)
- Site A5: ATC - R175 Shore Road

The traffic flow data from the May 2023 surveys forms the basis of the assessments of road network capacity and the assessment of the likely impact of the proposed development on the operation of the receiving road network.

Figure 6.1 Baseline Traffic Survey Locations

Table 6.1 provides a summary of the recorded average daily traffic flows by direction at the junction turning count locations. The road link numbers used in the table correspond to those used in the network flow diagrams provided in TTA: Appendix B which for ease of reference correspond with the survey site numbering convention used by Traffinomics Ltd. provided in TTA: Appendix A.

Table 6.1 shows the average weekday traffic flow and percentage HGV content enumerated for 12 hours and provides an estimate of 2023 Annual Average Daily Traffic (AADT). AADT is a commonly used metric in transportation engineering and planning, particularly in the context of roads design and maintenance. AADT represents the total two-way flow of vehicles passing a specific point on a road over the course of a year divided by the number of days per year.

With respect to traffic volume assessment, AADT is a fundamental measure for understanding the traffic flow on a road. It provides insights into how busy a particular stretch of road is, which is crucial for designing and maintaining roads to accommodate the expected volume of traffic. AADT is also a key parameter in the design of roads. Engineers use this data to determine the appropriate road cross-section, design speed, and other features which aid to determine that the road can handle the anticipated traffic demand. The volume and weight of traffic are critical factors in determining the type and thickness of pavement needed for a road. AADT data is used in pavement design to ensure that roads can withstand the expected traffic loads. AADT data is also often used in transportation planning to prioritise infrastructure investment. It helps roads authorities allocate resources by identifying roads with higher traffic volumes that may require upgrades or expansions and is valuable in scheduling road maintenance programmes. AADT data is also used in environmental impact assessments related to transportation projects. The volume of traffic can affect air quality, noise levels, and other environmental factors, and planners use AADT to evaluate these impacts. In summary, AADT is a critical statistical measure that informs various aspects of road design, maintenance, and planning. It helps transportation professionals make informed decisions to ensure that road infrastructure meets the demands of the traveling public.

The estimates of AADT are based upon the total flows recorded in traffic surveys to which are applied the appropriate factors derived from TII Publication PE-PAG-02039: Project Appraisal Guidelines Unit 16.1 (2016) *'Expansion Factors for Short Period Traffic Counts'* (Oct 2016). The network flow diagrams of TTA: Appendix B, each provide a schedule of the link numbers and each link is identified on the diagrams.

Table 6.1 Network Link Road Traffic – Average Daily Flows (Two-way)

Road Link		Survey Traffic Flows 12hrs 07:00-19:00hrs			AADT
		Total	Heavy	%HGV	
1	R175 Dundalk Road (South of R176)	3,820	679	17.8%	5,043(18%)
2	R175 Greenore Road (South of IDA Industrial Estate)	1,892	562	29.7%	2,498(30%)
3	R176 Carlingford Road	2,862	189	6.6%	3,778(7%)
4	R175 Greenore Road (North of IDA Industrial Estate)	1,492	538	36.1%	1,970(36%)
5	L70661 Euston Street (Near Junction with R175)	659	9	1.4%	870(1%)
6	R175 Shore Road	973	529	54.4%	1,284(54%)

The peak hours and associated traffic flows recorded in the May-2023 surveys are as follows:

- Weekday AM Network Peak Hour 08:00-09:00hrs
- Weekday PM Network Peak Hour 17:00-18:00hrs

Table 6.2 and Table 6.3 provide summaries of the recorded two-way peak hour traffic flows on the receiving road network in the morning and evening peak hours.

Table 6.2 Network Link Road Traffic – Average AM Peak Hour Flows (Two-way)

Road Link		Weekday AM Peak Hour Traffic Flows 08:00-09:00hrs		
		Total	Heavy	%HGV
1	R175 Dundalk Road (South of R176)	309	70	23%
2	R175 Greenore Road (South of IDA Industrial Estate)	137	55	40%
3	R176 Carlingford Road	212	19	9%
4	R175 Greenore Road (North of IDA Industrial Estate)	95	48	51%
5	L70661 Euston Street (Near Junction with R175)	44	0	0%
6	R175 Shore Road	59	48	81%

Corresponding network flow diagrams of the recorded peak hour traffic flows are provided in network flow diagram format in TTA: Appendix B, Figure 2 *'Surveyed Morning Peak Hour Traffic Flows 08:00-09:00hrs'* and TTA: Appendix B, Figure 3 *'Surveyed Evening Peak Hour Traffic Flows 17:00-18:00hrs'*.

Table 6.3 Network Link Road Traffic – Average PM Peak Hour Flows (Two-way)

Road Link		Weekday PM Peak Hour Traffic Flows 17:00-18:00hrs		
		Total	Heavy	%HGV
1	R175 Dundalk Road (South of R176)	397	24	6%
2	R175 Greenore Road (South of IDA Industrial Estate)	159	13	8%
3	R176 Carlingford Road	340	13	4%
4	R175 Greenore Road (North of IDA Industrial Estate)	114	2	2%
5	L70661 Euston Street (Near Junction with R175)	72	0	0%
6	R175 Shore Road	52	2	4%

6.6.1.1 Operation of Port and Baseline Calibration

The road network traffic surveys include detailed traffic data spanning two weeks on Euston Street and R175 Shore Road. Euston Street is not subject to significant existing traffic generated by the port. No port HGV traffic is generated to Euston Street. Historically the OpenHydro building car park (part of the application site) was accessed from Euston Street. The OpenHydro car park had capacity for 62 no. car spaces including 3 no. disabled spaces. These spaces are located to the west of the port office buildings served through a separate gate and thus apart from the parking spaces at the end of Euston Street generally used by staff and visitor to the port administration offices.

The generation of HGV and the volume of product transported by each vehicle entering and leaving the port is not only product dependent but is commercially driven. Materials are exported from the port in bulk and generally by articulated vehicles carrying the most logistically efficient and commercially viable loads. Materials are not generally exported from the port in part loads. Based upon a review of weighbridge records for the site for the year 2023 the average vehicle weight from a sample of approx. 30,000 vehicles was 45.6 tonnes per vehicle. Vehicles used to transport loose materials such as grain are predominantly the eight-wheeler tipper and articulated tipper types. There is no importation of materials but some sundry supplies and fuel deliveries occur occasionally. Based upon an assessment of site records for the haulage of materials from the site over the course of 2023 the average payload of vehicles leaving the site was 29 tonnes.

In order to assess the traffic generation characteristics of the existing port operation weighbridge records for that site have been analysed, the weighbridge chiefly records the mass of materials exported together with date and time. The weighbridge data analysis period extends for the 37-month period from Nov-2020 to Nov-2023. Based upon an assessment of weighbridge data the haulage of materials from the port typically occurs all in full loads.

Based upon the full 3 no. years range of data Figure 6.2 shows the percentage of the annual total number of HGV trips generated each month and thus an annual profile of HGV traffic generation. The recorded total annual HGV trips were 45,038 in 2021, 44,616 in 2022 and 29,710 in 2023. The average monthly HGV traffic generation over the 3 no. years is 39,788. The red dashed line in Figure 6.2 is a moving average whilst the solid orange line indicates the average monthly HGV traffic generation which is 8% of annual HGV vehicle trips. The average HGV trip generation per month is in the order of 3,603 in 2021, 3,569 in 2022 and 2,376 in 2023. The average monthly HGV traffic generation over the 3 no. years is 3,183. Figure 6.2 also provides separately the statistics for 2023 when the traffic counts were undertaken.

Figure 6.3 provides a breakdown of port HGV traffic generation and summarises the weekly profile of HGV traffic. The red dashed line is a moving average whilst the solid orange line indicates the average weekday HGV traffic generation (excludes data for Saturday and Sunday). The average weekday HGV traffic generation equates to 17% of the total weekday HGV traffic generation. Figure 6.3 shows that the volume of HGV traffic on Saturdays is approximately half that of weekdays whilst on Sundays it reduces to less than one third. On the basis of approximately 250 full working days per year plus a half day Saturdays and one third days on Sundays and excluding Sundays before a bank holiday there are approximately 289 no. days per year which yields an average weekday daily HGV traffic generation in the order of 138 HGV trips.

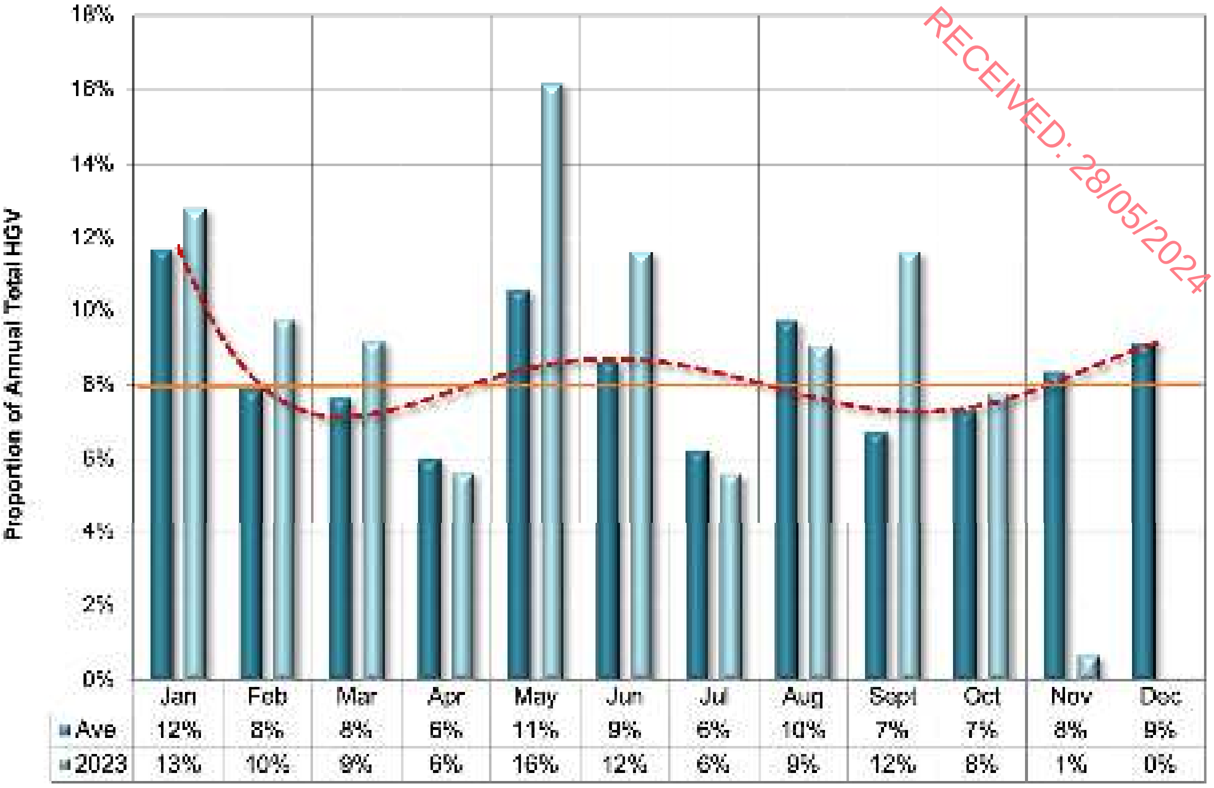

Figure 6.2 Greenore Port Annual HGV Trip Generation Profile

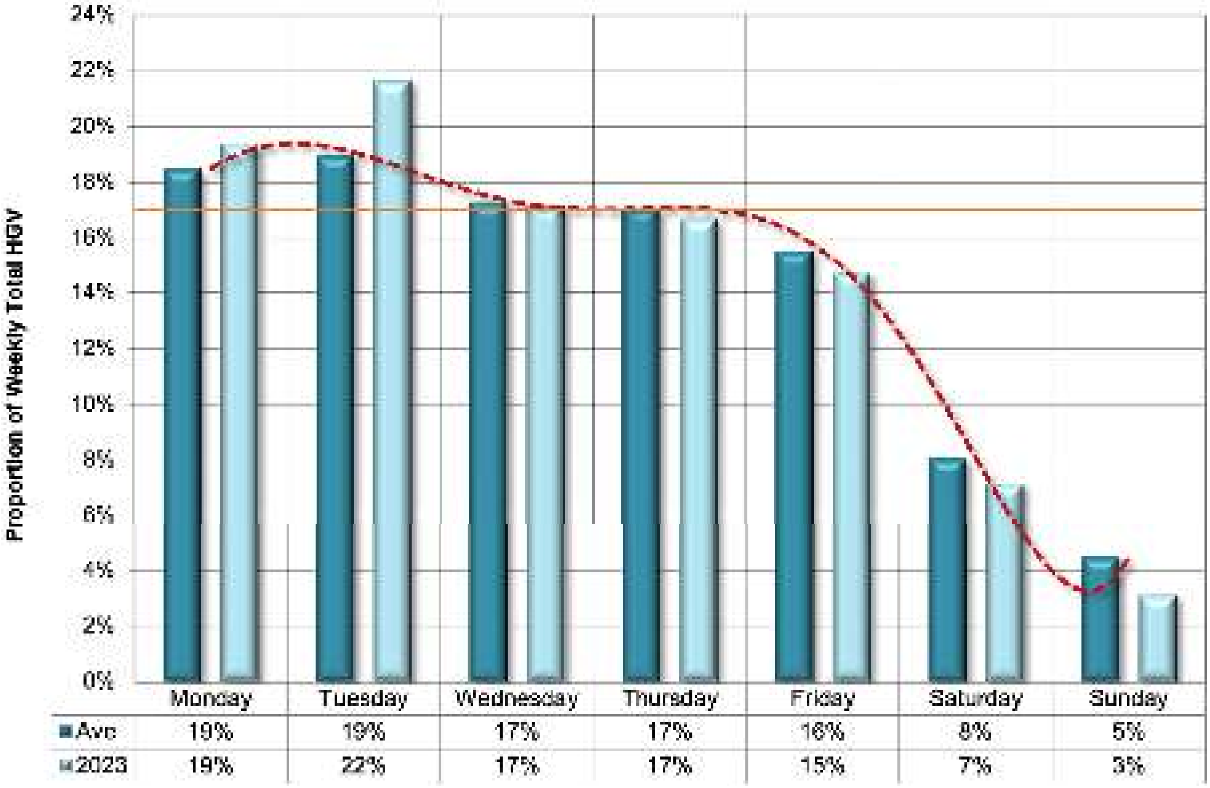

Figure 6.3 Greenore Port Weekly HGV Trip Generation Profile

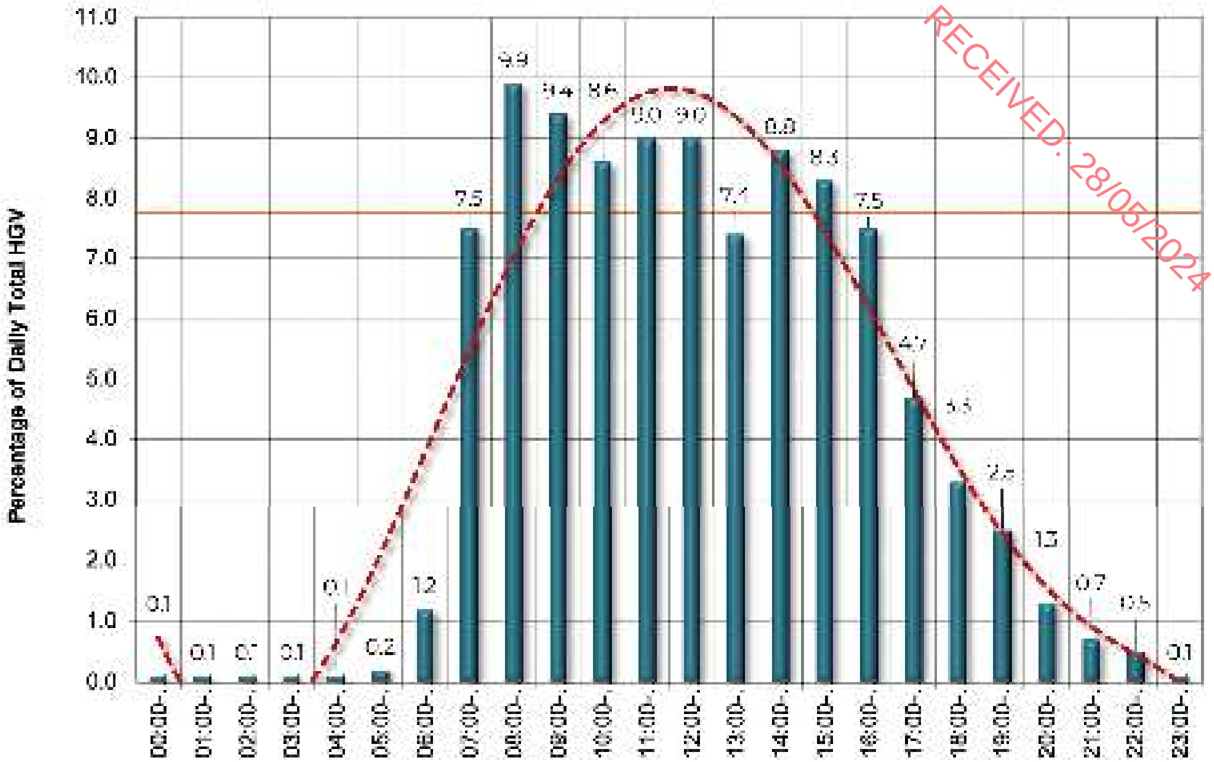

Figure 6.4 Greenore Port Daily HGV Trip Generation Profile

Figure 6.4 summarises the weekday hourly profile of traffic generation recorded over the 3 no. years of weighbridge records. The red dashed line in Figure 6.4 is a moving average whilst the solid orange line indicates the average hourly HGV traffic generation for the period 07:00-19:00hrs. The average hourly HGV traffic generation over this central period equates to 7.8% of the total daily HGV traffic generation. The average HGV traffic generation is estimated to be in the order of 11 HGV trips per hour. HGV traffic generation is relatively constant between 07:00 and 16:00hrs with modest deviation about the mean. The peak HGV traffic generation is 9.9% with a sustained 9% over most of the working day. Based upon the above assessment the typical peak hour HGV traffic generation of the port is estimated to be in the order of 14 no. HGV trips.

Figure 6.2 shows that the total monthly flow of HGV in May 2023 when the traffic counts were undertaken was 16% of the annual total HGV generation of the year. As a proportion of total HGV traffic May 2023 generated double the average for the three years 2020-2023 for which the weighbridge data was assessed.

In the data collection exercise an automatic traffic counter was placed on Shore Road to the south of the port access. Since this counter site will also have enumerated some other general local port traffic moving materials (not exporting) and since it will also include traffic coming to and from the ferry it is not expected to be an accurate reflection of port HGV activity nevertheless it can be used as a general reference for the volume of HGV entering and leaving the port.

The following Table 6.4 summarises the total number of articulated HGV (OGV2) trips on Shore Road recorded during the traffic surveys starting Thursday 4 May 2023 to Wednesday 17th May 2023. Also provided in Table 6.4 is the total HGV recorded crossing the weighbridge (WB) for each of the days of the traffic count. There is a reasonable correlation between the two data sets.

The weighbridge records clearly show that traffic generation arising at the port during the two weeks of the automatic traffic counter traffic surveys was particularly high. Figure 6.2 shows that May 2023 shows HGV traffic generation is approximately double the average calculated for the years 2020-2023 and this is borne out in the data summarised in Table 6.4.

Table 6.4 Shore Road Auto Traffic Count Data and Weighbridge Data

Day	Thur	Fri	Sat	Sun	Mon	Tue	Wed	Thur	Fri	Sat	Sun	Mon	Tue	Wed
Date	04	05	06	07	08	09	10	11	12	13	14	15	16	17
00:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	1	2	1	1	0	2	0	0
04:00	2	1	0	0	0	0	0	2	2	1	0	1	2	0
05:00	2	3	2	0	0	0	2	0	1	0	0	1	4	2
06:00	0	3	8	0	7	6	3	0	0	3	0	0	8	17
07:00	17	14	12	0	14	18	11	17	21	15	0	20	22	21
08:00	14	16	32	0	30	33	13	21	24	29	0	12	33	20
09:00	16	17	31	0	30	37	19	29	30	20	0	19	29	12
10:00	18	13	29	0	29	29	13	38	32	20	0	24	28	17
11:00	22	13	30	1	40	39	29	30	29	0	0	18	31	22
12:00	12	18	35	1	42	29	19	36	42	0	0	16	36	19
13:00	6	9	28	0	32	14	16	23	22	0	0	18	24	23
14:00	17	16	28	0	43	26	35	38	30	0	0	27	29	38
15:00	23	20	31	1	41	25	25	38	28	1	0	22	33	24
16:00	9	5	20	1	24	27	10	28	37	0	1	23	32	21
17:00	2	0	0	0	35	18	1	22	16	1	0	9	28	0
18:00	0	0	0	2	33	20	0	23	3	0	1	0	28	0
19:00	0	0	1	0	27	13	0	13	0	0	0	1	14	2
20:00	0	0	0	0	0	18	0	2	0	0	0	0	20	0
21:00	0	0	0	0	1	4	1	1	0	0	1	0	13	0
22:00	0	0	0	0	0	0	1	0	0	0	1	0	8	3
23:00	0	0	0	0	0	0	1	1	1	0	0	1	3	1
Total 07-19	156	141	276	6	393	315	191	343	314	86	2	208	353	217
Total 00-00	**160**	**149**	**287**	**6**	**428**	**356**	**200**	**364**	**319**	**91**	**4**	**214**	**425**	**242**
WB 04-17	190	109	299	0	409	349	135	343	294	100	0	176	414	171
Date	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
WB 18-31	181	160	44	0	319	181	75	148	106	8	0	81	17	127

Table 6.4 also includes separately the weighbridge records for the two weeks that followed the traffic surveys in May 2023. The weighbridge data shows that 70% of the total May 2023 traffic generation was manifest in the first two weeks of the month during the traffic surveys. Excluding Saturdays and Sundays, the average HGV traffic generation for the first two weeks of May 2023 was 260 no. trips whilst over the course of the latter two weeks it was 140 no. trips. The average for the entire month excluding weekends was 200 no. HGV trips per day where the average calculated for the 3 no. years period 2020-2023 is 138 no. HGV trips.

Traffic generation during May 2023 was 14% higher than the 85th percentile monthly rate for the period 2020-2023. Traffic generation during the automatic traffic surveys can reasonably be considered to be representative of upper value levels of HGV activity at the port. The maximum recorded HGV trips generation during the surveys was Monday 08 May 2023 with 409 no. HGV trips.

The 85th percentile HGV traffic generation rate for the first two weeks of May 2023 was 388 no. HGV trips whilst the 85th percentile rate for the entire month was 343 no. HGV trips. It is noted that the one day 12-hour junction turning count surveys were undertaken on Wednesday 17 May 2023 when traffic generation at the port was 217 no. trips or approximately 50% above the average 138 no. trips. The traffic survey data derived from the junction turning count surveys and summarised in Table 6.4 is considered representative, and perhaps a somewhat robust evaluation of port traffic generation for the purposes of assessment of the operation of the receiving road network.

The data returned from the Automatic Traffic Counter (ATC) surveys are representative of upper value traffic generation associated with the operation of the port. The ATC surveys can be used to factor turning data in the preparation of sensitivity analyses representative of exceptional HGV traffic generation arising from port operations. Where Table 6.1, Table 6.2 and Table 6.3 are based upon the junction turning count survey data and will be used as the typical or average traffic baseline the following Table 6.5, Table 6.6 and Table 6.7 provide corresponding data derived from the ATC surveys which are considered representative of the upper value baseline for operations at the port and are representative of times when ships are unloaded directly at the quayside.

Table 6.5 provides a summary of the recorded average daily traffic flows by direction at the 5 no. ATC site locations over the course of the two-week surveys. A corresponding network flow diagram is provided in network flow diagram format in TTA: Appendix B, Figure 4 *'Surveyed 2023 Weekday Average Link Flows'*.

Table 6.5 Network Link Road Traffic – Upper Value Daily Flows (Two-way)

Road Link		Surveyed Weekday Average Daily Traffic Flows 24hrs			AADT
		Total	Heavy	%HGV	
1	R175 Dundalk Road (South of R176)	9,337	935	9.9%	9,226 (9.9%)
2	R175 Greenore Road (South of IDA Industrial Estate)	2,492	532	21%	2,475(21%)
3	R176 Carlingford Road	5,819	124	3.2%	3,816(3.2%)
4	R175 Greenore Road (North of IDA Industrial Estate)	2,492	532	21%	2,475(21%)
5	L70661 Euston Street (Near Junction with R175)	902	6	0.7%	896(0.7%)
6	R175 Shore Road	1,145	506	43%	1,152(43%)

Table 6.5 shows the average weekday traffic flow and percentage HGV content enumerated for 24 hours and also provides an estimate of 2023 Annual Average Daily Traffic (AADT) based upon the upper value port baseline flows. The estimates of AADT are based upon the total flows recorded in the two-week traffic surveys to which are applied the appropriate factors derived from TII Publication PE-PAG-02039: Project Appraisal Guidelines Unit 16.1 (2016) 'Expansion Factors for Short Period Traffic Counts' (Oct 2016). The Weekly Average Daily Traffic (WADT) for each of the road links is the average daily two-way traffic flow over the two-week survey.

It is generally best practice in preparing TTA to assess the impact of the proposed development during periods when the impact of development traffic flows on the receiving road network are likely to be greatest. The peak hours and associated traffic flows recorded in the May-2023 surveys are as follows:

- Weekday AM Network Peak Hour 08:00-09:00hrs
- Weekday PM Network Peak Hour 17:00-18:00hrs

Table 6.6 and Table 6.7 provide summaries of the recorded two-way peak hour traffic flows on the receiving road network in the morning and evening peak hours.

Table 6.6 Network Link Road Traffic – Upper Value AM Peak Hour (Two-way)

Road Link		Weekday AM Peak Hour Traffic Flows 08:00-09:00hrs		
		Total	Heavy	%HGV
1	R175 Dundalk Road (South of R176)	649	103	16%
2	R175 Greenore Road (South of IDA Industrial Estate)	179	62	35%
3	R176 Carlingford Road	224	14	6%
4	R175 Greenore Road (North of IDA Industrial Estate)	179	62	35%
5	L70661 Euston Street (Near Junction with R175)	44	1	0.7%
6	R175 Shore Road	66	50	77%

Table 6.7 Network Link Road Traffic – Upper Value PM Peak Hour (Two-way)

Road Link		Weekday PM Peak Hour Traffic Flows 17:00-18:00hrs		
		Total	Heavy	%HGV
1	R175 Dundalk Road (South of R176)	691	60	8.7%
2	R175 Greenore Road (South of IDA Industrial Estate)	193	30	16%
3	R176 Carlingford Road	299	8	3%
4	R175 Greenore Road (North of IDA Industrial Estate)	193	30	16%
5	L70661 Euston Street (Near Junction with R175)	77	1	0.4%
6	R175 Shore Road	64	30	46%

Corresponding network flow diagrams are provided in TTA: Appendix B, Figure 5 'Surveyed 2023 Weekday Average Link Flows - Morning Peak' and TTA: Appendix B, Figure 6 ''Surveyed 2023 Weekday Average Link Flows - Evening Peak'.

6.7 The 'Do Nothing' Scenario

In the Do Nothing scenario it is expected that the traffic environment will remain as per the baseline. It's noted that there are two permitted developments that planned for implementation in the absence of the proposed development.

- Extension and modification of existing Warehouse, LCC Planning Ref 20268, ABP Ref 307862;
- New Warehouse, LCC Planning Ref Planning ref 20543, ABP Ref 310184.

6.8 Potential Significant Effects

6.8.1 Construction and Demolition Phase

The construction stage will be undertaken over a number of stages from site preparation through to building construction and internal fit out. The key stages and activities with potential to result in traffic generation are set out below.

6.8.1.1 Phase 1 - Construction Traffic Generation

Based upon the Outline Construction Environmental Management Plan (CEMP) submitted with the application, the following is an estimate of the duration of the various key elements of Phase 1, with the overall length of the Phase 1 works expected to last c.16months:-

- Dredging 2.5 months
- Quay wall 8 months
- Pontoon 3.5 months
- Building A 16 months
- Demolition of residential dwelling 0.5 months
- Communications Mast 1 month

6.8.1.1.1 Dredging

Dredge material will be transported from the quay side to a licenced disposal facility. When exporting materials from the port, as per typical materials export, the operators of the site (contractor) will generally ensure that exports are in as economical loads as feasible and it follows therefore that dredged materials will be exported in fully laden vehicles, which in the case of rigid HGV is 20t-22t per vehicle and for articulated HGV is 29t. The traffic surveys show that all exports of materials form the port are by the latter vehicle type.

Dredging will produce an estimated 45,000m3 of material. It is highly likely that all materials will be exported by articulated vehicle giving rise to a total of 2,045 vehicle trips. Following a 2 no. week mobilisation process, dredging is estimated to be of approximately 50 working days duration and is thus estimated to generate average daily HGV traffic in the order of 41 trips by articulated vehicles.

In the interest of a robust assessment, say more than one haulier was engaged in removing materials there is potential for a local haulier with the smaller vehicles to be engaged in transporting materials. Were it assumed that 30% of materials were transported by the smaller rigid vehicle then the daily HGV trip generation would increase to 47 trips per day. Given the facilities for storing dredged materials on site it is considered reasonable to expect a regulated and constant flow of material from the site without significant peaks.

6.8.1.1.2 Quay Wall

The quay wall consists of a piled face and concrete beam (cope) across the top of the piles. The quay wall is tied back to a sheet piled/concrete anchor wall via steel tie rods. The remaining ground is back filled and topped with a heavy-duty concrete pavement. In total it is estimated in the Outline CEMP that the construction of the quay wall will be of 190 working days duration.

6.8.1.1.3 Quay Wall – Piling

By reference to the Outline CEMP it is estimated that the construction of the quay wall will generate a total of 52 no. deliveries by HGV. Key amongst the required deliveries is a requirement for 240m3 of concrete which will required approximately 30 no. concrete wagon deliveries. The peak activity is likely to be the pouring of concrete. A worst case scenario would be a single concrete pour and the need arising for 30 no. HGV trips in a single day.

6.8.1.1.4 Quay Wall – Ground Works & Tie Rods

By reference to the Outline CEMP tie rod installation will require the excavation of the area between the anchor and quay walls. Once excavated tie rods will connect the two walls. Backfilling of the tie rods will reuse a large portion of the excavated materials. In total the delivery of tie rods will generate 3 no. HGV. The ground works will require the import of an estimated 540t of cement bound granular mixture giving rise to a total of 30 no. HGV. An estimate 720t of stone will be required and is estimated to generate 26 no. HGV.

6.8.1.1.5 Quay Wall – Cope and Pavement

By reference to the Outline CEMP it is estimated that the construction of the quay wall will generate a total of 183 no. deliveries by HGV. Key amongst the required deliveries is a requirement for 1,440m3 of concrete which will required approximately 180 no. concrete wagon deliveries. The peak activity is likely to be the pouring of concrete. It is estimated that there would be a minimum of 6 no. separate concrete pours giving rise to approximately 30 no. HGV trips on each of these days. It is unlikely that any other trip intensive construction activities would be carried in tandem with the concrete pours.

6.8.1.1.6 Breakwater Pontoon -Piling

Piling will require boring into rock, pitching and setting in place of steel piles from floating and elevated platforms. Piling will require the use of a crane barge and piling plant. There is a modest HGV traffic generation arising during the mobilisation stage and decommissioning of the plant required. The breakwater pontoon piling is to be carried out on a phased basis. Phase 1 includes the construction of 4 no. berths. Phase 2 will include the pontoons supporting Buildings B and C. Piling is expected to take 40 working days for Phase 1 and 30 working days for Phase 2. IN both cases an allowance is made for a 2 no. week mobilisation period and 2 no. week period for demobilisation. This construction activity is not an intensive traffic generator. Including for mobilisation of plant and delivery of piles to the site a total of 20 no. HGV deliveries is estimated in both Phase 1 and Phase 2.

6.8.1.1.7 Breakwater Pontoon - Gangway Installation

Breakwater pontoons and services will be manufactured off site and transported by road or sea dependant on the supplier. The pontoons will arrive in segments of up to 70t each if arriving by road.

The route from Greenore to the national motorway network has previously been assessed and used for units measuring up to 6m in width by 37m long. It is considered likely at this stage that the units will be brought to site by sea. If however the segments are to arrive by road an operation specific traffic route analysis and traffic management plan will be conducted by the abnormal loads contractor.

The units will be lifted into the water using the harbour cranes on site and fixed in position manually using workboats and small tools. The gangway will arrive in similar fashion and be bolted in place. Following delivery to site breakwater pontoons are estimated to take 30 working days to install and commission in each of the construction phases. Each phase is estimated as likely to generate a total of 25 no. HGV trips.

6.8.1.1.8 Building A Construction

Building A will comprise a steel frame construction with concrete floors, metal cladding and reinforced concrete lift shaft. The building will be to the latest energy standards and of a high-quality finish. The buildings will be constructed on concrete footings on precast or in-situ concrete piles where ground conditions dictate. It is estimated that Building A will take approximately 335 no. working days to complete. The principal activities will include excavation and preparation of ground, driving of piles and compaction of foundation materials, pouring of foundations and floors, erection of steel structure, erecting cladding and finishings. Based upon the estimated quantities of materials arising from the construction it is estimated in the Outline CEMP that the process will generate approximately 1,068 HGV vehicle trips to the site. The importation of stone gives rise to a total of 444 no. HGV whilst the importation of concrete gives rise to 384 no. HGV. All other activities generate few deliveries by HGV. Importing stone and concrete are not only the greatest generators of HGV traffic but these trips are typically concentrated at various times in the construction. The Outline CEMP associated works programme shows a period of 45 no. working days for the completion of substructures which would involve the import of stone and concrete. It is expect that the most intensive operations would give rise to a HGV trip generation in the order of 25 no. HGV per day and this is based on days when concrete pours are scheduled, which activity is assumed to be concentrated into 15 days of the total 45 no. working days attributed to substructures in the works programme which include for the heavy-duty concrete pavement that will be provided to the rear of building which will be used for storage and direct access to quayside..

6.8.1.1.9 Demolition of Vacant Residential Dwelling

Site clearance will entail the demolition of the existing domestic dwelling. Topsoil will be stripped from the site. Most topsoil will be used through the wider site for landscaping. A sub-base of stone will be laid through the site prior to the excavation for and installation of drainage and services. Gravel/stone arisings from excavations elsewhere on the site will be reused where possible. Imported stone will be used to compete the sub-base. It is proposed that the site clearance works will coincide with Phase 1 of the works to facilitate contractor's laydown and parking. Car park works are expected to take 82 working days to complete. HGV traffic generation will arise chiefly from site clearance work, the removal of demolition material, the import of stone and drainage materials for completion of the sub-base and the import of surfacing materials.

6.8.1.1.10 Communications Mast

The existing 25m communications mast located at the seaward end of Berth 1 will be replaced with a 40m communications mast to be erected at the same location as the decommissioned mast. The works required to replace the existing mast are not considered likely to give rise to significant generation of HGV.

6.8.1.2 Phase 2 - Construction Traffic Generation

Based upon the Outline CEMP, the following is an estimate of the duration of the various key elements of Phase 2, with a total construction programme of C.19 months.

▪ Pontoon (part)	5 months
▪ Demolition OpenHydro	1 month
▪ Building B and C	16 months
▪ Substation	3.5 months
▪ Fuel Storage	1 month
▪ Access control/fencing	1 month
▪ Port Entrance upgrades	2 months
o Demolition of 'Sea Farer's Room'	1 week
o Construction	2 months
▪ Surface Carpark and pedestrian access	4 months

6.8.1.2.1 Pontoon

As per the same activity in Phase 1, breakwater pontoons and services will be manufactured off site and transported by road or sea dependant on the supplier. The pontoons will arrive in segments of up to 70t each if arriving by road. It is considered likely at this stage that the units will be brough to site by sea.

Following delivery to site breakwater pontoons are estimated to take 30 working days to install and commission in each of the construction phases. Each phase is estimated as likely to generate a total of 25 no. HGV trips.

6.8.1.2.2 Demolition OpenHydro Building

An existing office/welfare unit known as the 'OpenHydro' building is to be retained and operational for the duration of Phase 1. It will be demolished and removed off site to facilitate Phase 2 of the development. The building is a steel portal frame structure with precast retaining panels mounted internally to provide bulk warehousing. The existing panels will be removed from the building and stored for reused elsewhere in the port. The building frame will be removed off site for recycling. The existing substructure and walls will be saw cut to reduce breaker effort and grubbed up by excavator and breaker for removal off site. The substation and switch room will be decommissioned and removed as part of these works once a replacement substation and switch has been commissioned. Based upon the Outline CEMP estimate of materials arising being 30t of cladding, 60t of steel and 450m3 of concrete it is estimated that the demolition of the existing building has the potential to generate approximately 50-60 HGV trips.

6.8.1.2.3 Building B and C Construction

Buildings B and C will be identical to Building A and will similarly be comprised of a steel frame construction with concrete floors, metal cladding and reinforced concrete lift shaft. The buildings will be constructed on concrete footings on precast or in-situ concrete piles where ground conditions dictate. Both buildings will be constructed at the same time and it is estimated that construction will take approximately 335 no. working days to complete. Based upon the estimated quantities of materials arising from the construction it is estimated in the Outline CEMP that the process will generate approximately 2,136 HGV vehicle trips to the site. The importation of stone gives rise to a total of 888 no. HGV whilst the importation of concrete gives rise to 768 no. HGV. All other activities generate few deliveries by HGV. Importing stone and concrete are not only the greatest generators of HGV traffic but these trips are typically concentrated at various times in the construction. The CEMP associated works programme shows a period of 45 no. working days for the completion of substructures which would involve the import of stone and concrete. It is expect that the most intensive operations would give rise to a HGV trip generation in the order of 50 no. HGV per day and this is based on days when concrete pours are scheduled, which activity is assumed to be concentrated into 15 days of the total 45 no. working days attributed to substructures in the works programme which include for the heavy-duty concrete pavement that will be provided to the rear of building which will be used for storage and direct access to quayside.

6.8.1.2.4 Port Entrance Upgrades

It is proposed to provide a new pedestrian access from the Shore Road carpark, within and along the Port boundary to the rear of properties at Euston Street, and to upgrade the main civilian entrance to Greenore Port at the north end of Euston Street. This will create a new pedestrian route in front of the existing Port offices to the OMF buildings. This will entail hard and soft landscaping together with the installation of lighting and utilities. Construction works are expected to entail standard road construction methods including trenching, filling, kerbing, paving and road reinstatement. The OMF entrance will be upgraded and widened to provide safe pedestrian access through the demolition of a small portion of the Sea Farer's building. This will entail the demolition of blockwork walls and making good of the remaining boundary with the remaining meeting room. A feature wall will be constructed at the OMF entrance at the new gable end of the shortened Seafarers room. Based upon the CEMP estimate of materials arising a HGV traffic generation over the course of the construction of the entrance upgrade works is 46 HGV trips.

6.8.1.2.5 Surface Car Park, Shore Road

Following installation of kerbing, lighting, and access control foundations in Phase 2 a bituminous surface will be applied to the parking area. Based upon the Outline CEMP estimate of materials arising a HGV traffic generation over the course of the construction of the car park on Shore Road is 154 HGV trips.

6.8.1.3 Assessment of Construction Traffic

The construction activities associated with Phase 1 and Phase 2 are set out above. The activities that are considered the most significant generators of construction traffic include dredging which will require materials to be exported from the port, and construction of the quay wall which will require the importation of materials including stone and concrete.

The peak period for activity will be during dredging in Phase 1 which is forecast to generate 41 no. HGV trips per day. This combined with other sundry activities is likely to give rise to a peak HGV trip generation of 50-60 HGV per day. Dredging has a forecast duration of 50 no. working days and is considered the peak generator of HGV during construction.

Import of stone for the quay wall and other construction activities require significantly less HGV and are generally less intense traffic generators. During construction there are likely to be occasional short periods of intense activity, for instance during concrete pours, where perhaps 50 no. HGV might be generated in one day. This figure is likely to be limited due to the site location and availability of materials.

The construction program will be scheduled and co-ordinated with port activity so that the combined traffic generation to and from the port access does not exceed current levels during periods of greater construction HGV traffic generation. Construction HGV traffic combined with existing port traffic will not exceed the values used in the upper value road network assessments. Construction staff will not exceed the values used in the summer maintenance and winter maintenance figures used in the network assessments. Given that car traffic and HGV traffic generation during construction will not exceed those values already included in the assessments of operational assessment it is not considered that a separate specific network capacity assessment is required for the construction period, either in the construction of Phase 1 or in subsequent construction of Phase 2 when Phase 1 becomes operational. The detailed capacity assessments for the operational volumes of traffic confirm that the effect on the capacity of the receiving road network will not be significant. Since the volume of traffic generated during construction is less than those used in the detailed capacity assessment, it follows that the impact on network capacity and operation during construction will similarly not be significant.

6.8.2 Operational Phase

6.8.2.1 Operational Phase Traffic Generation

In the interest of a robust assessment of traffic generation, no allowance is made for shift working and save for technicians it is expected that each of the OMF buildings will be staffed by approximately 15 no. persons between the hours of 08:00 and 18:00hrs.

Parking demands arising from these staff and sundry visitors will be accommodated in the 76 no. car parking spaces close to the OMF buildings and accessed via the upgraded existing port office access at the northern end of Euston Street.

The traffic scenario arising from the operation of the 3 no. buildings combined will be akin to the previous operation of the former OpenHydro building when it housed 100 staff and was served by a 60 no. space car park. Upon completion of Phase 1 and during Phase 2 construction both OMF staff and technicians will park at the OMF building until such time as the Shore Road car park and connecting pedestrian infrastructure is completed.

There will typically be 30 no. technicians operating from each of the OMF buildings. Technicians will operate on a dynamic schedule which will be influenced by weather and sea conditions. For the purposes of traffic assessment it is assumed that all 3 no. OMF buildings will be staffed by 30 no.

technicians daily giving rise to a total of 90 no. technicians. The majority of technician staff will be required to park in the 135 no. space car park proposed on Shore Road and will use the dedicated pedestrian connection to the OMF buildings. Save for Phase 1 and during the construction period of Phase 2, only a small number of senior technician staff will use Euston Street and the car parking at the OMF buildings.

During periods of annual maintenance during periods of better weather i.e. c. May - September, there will be a potential requirement for an additional 15 no. technicians (45 no. total technician personnel per building) to operate from each of the OMF buildings giving a total demand for 135 no. technicians. This is scheduled annual maintenance and it is likely that each of the OMF building operators will co-ordinate resources. It is unlikely that all OMF buildings would require 45 no. technicians all at the same time. But such maintenance is an annual event and perhaps suitable weather windows may be limited, so in the interest of a robust traffic analyses it is assumed for the purposes of the traffic assessments that this elevated annual demand arises at all OMF buildings all at the same time. If every technician is assumed to travel one per vehicle then this scenario, in which the Shore Road car park is practically filled and thus represents a worst case scenario.

This worst case ignores the possibility of technicians living locally or availing of public transport or other means of travel and also ignores the possibility of car sharing or the provision of private mini-bus or coach transport by the employers. In practice it is likely that there will be a greater car occupancy the 1 no. technician per vehicle.

Once every 3-4 no. years the requirement for technicians will increase to a potential or possible 60 no. technicians per OMF building. This is a scheduled type of operation and it is not considered likely that all 3 no. OMF operators would schedule such work to all occur at the same time as there would not be sufficient resources either landside or maritime to facilitate such a scenario. For the purposes of the traffic assessments in the TTA, to distinguish the two maintenance scenarios, the more regular annual maintenance events are referred to as 'winter maintenance' whilst the scenario where the more intensive 3-4 year maintenance campaigns are considered is referred to as 'summer maintenance' albeit that neither activity is defined by the respective seasonally derived nomenclature.

6.8.2.2 Daily Generation and Distribution of OMF Building Staff Traffic

The TRICS (Trip Rate Information Computer System) database has been used to establish representative traffic daily distribution profiles. Daily traffic generation rates are provided as are hourly rates calculated including the established network peak hours of 08:00-09:00hrs in the morning and 17:00-18:00hrs in the evening. The approach adopted in this study and the traffic assumptions used in the study should yield sufficiently robust network analysis output satisfactory for use in the evaluation and forecasting of roads infrastructure performance.

The operational phase of the development will generate office and landside staff together with technicians that will operate at sea. The traffic generation rates derived from TRICS are based on survey data from existing office developments. The TRICS criteria selected to model the trip distribution for the landside elements of the proposed development are evaluated based upon the survey categories under 'Land Use 02A – Employment/Office'. The traffic profile for Offices have been derived form a selection of 17 no. sites in Ireland and the UK consisting of 71 no. surveys of which

17 no. are located in a town centre, 26 no. at edge of town centre, 10 no. at edge of town and 18 no. others in suburban and neighbourhood areas.

Table 6.8 is derived from the forecast TRICS rates and provides an estimate of the traffic generation arising at the OMF buildings on weekdays. The traffic generation in Table 6.10 and Table 6.11 is based upon the TRICS standard daily profile and the following assumptions.

- 15 no. staff per building are forecast to generate an inbound movement and outbound movement each day associated with arrival and departure from work
- 10 no. additional movements both in and out per building are estimated as likely to be generated by sundry staff and visitor movements throughout the day.

Table 6.8 Daily Traffic Profile of OMF Landside Staff (Each Building/Operator)

Time Period	TRICS Profile		OMF Building Office Staff Profile of Traffic Generation					
			A		B		C	
	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
06:00-07:00	9.3%	1.5%	2	0	2	0	2	0
07:00-08:00	12.0%	1.4%	3	0	3	0	3	0
08:00-09:00	24.9%	3.0%	6	1	6	1	6	1
09:00-10:00	15.6%	4.1%	4	1	4	1	4	1
10:00-11:00	6.1%	4.0%	2	1	2	1	2	1
11:00-12:00	4.6%	4.1%	1	1	1	1	1	1
12:00-13:00	5.0%	6.1%	1	2	1	2	1	2
13:00-14:00	5.6%	5.4%	1	1	1	1	1	1
14:00-15:00	4.4%	5.2%	1	1	1	1	1	1
15:00-16:00	3.1%	7.%	1	2	1	2	1	2
16:00-17:00	3.1%	16.6%	1	5	1	5	1	5
17:00-18:00	2.2%	23.1%	1	6	1	6	1	6
18:00-19:00	1.1%	8.7%	1	2	1	2	1	2
19:00-20:00	1.1%	5.5%	0	1	0	1	0	1
20:00-21:00	0.8%	2.1%	0	1	0	1	0	1
21:00-22:00	1.1%	1.7%	0	0	0	0	0	0
22:00-23:00	0.0%	0.0%	0	0	0	0	0	0
Total	**100%**	**100%**	**25**	**25**	**25**	**25**	**25**	**25**

6.8.2.3 Daily Generation and Distribution of OMF Technician Staff

There is no available TRICS survey data relating to the operation of OMF offshore technician activity. Technicians will typically work in 12hr shifts with normal CTV operation between 06:00 - 21:00hrs. It is likely that there will be a number of shift start times for technicians who will start to arrive after 05:30hrs for the first shift and would arrive after 08:30 for the start of the last shift start at 09:00hrs.

Table 6.9 is derived from first principles and provides a summary of the forecast rate of arrival and departure for permanently commissioned technicians and for technicians brought in for each of the identified maintenance periods.

Table 6.9 Daily Traffic Profile of OMF Landside Staff (Each Building/Operator)

Time Period	TRICS Profile		OMF Building Office Staff Profile of Traffic Generation					
			A		B		C	
	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
05:00-06:00	25%	0%	8	0	11	0	15	0
06:00-07:00	27%	0%	8	0	12	0	16	0
07:00-08:00	29%	0%	9	0	13	0	17	0
08:00-09:00	19%	0%	6	0	9	0	11	0
09:00-10:00	0%	0%	0	0	0	0	0	0
10:00-11:00	0%	0%	0	0	0	0	0	0
11:00-12:00	0%	0%	0	0	0	0	0	0
12:00-13:00	0%	0%	0	0	0	0	0	0
13:00-14:00	0%	0%	0	0	0	0	0	0
14:00-15:00	0%	0%	0	0	0	0	0	0
15:00-16:00	0%	0%	0	0	0	0	0	0
16:00-17:00	0%	0%	0	0	0	0	0	0
17:00-18:00	0%	0%	0	0	0	0	0	0
18:00-19:00	0%	19%	0	6	0	9	0	11
19:00-20:00	0%	29%	0	9	0	13	0	17
20:00-21:00	0%	27%	0	8	0	12	0	16
21:00-22:00	0%	25%	0	8	0	11	0	15
Total	**25%**	**0%**	**8**	**0**	**11**	**0**	**15**	**0**

6.8.2.3.1 Pre-existing Traffic Generation and Relevant Planning History

Planning Reg. Ref. 20/268 (ABP-307862-20) was for extension and modification to the warehouse, formerly OpenHydro, and modification to another warehouse, and ancillary works at Greenore Port, Co. Louth. The former OpenHydro building was initially developed as a research and development facility. Permission was sought for an enlargement of the former OpenHydro building, used as a warehouse, increasing in floor area by 1,499m^2 to 3,185m^2. The application was accompanied by a Transport Statement prepared by AECOM Ireland Limited dated October 2019. The scope, or study area for the Transport Statement included the junction of Euston Street and R175 Shore Road and the R175/R176 junction.

The Transport Statement reported that in 2018, Greenore Port had handled a total of c. 905,000 tonnes per annum. Of that total, the break bulk commodities (i.e. steel, project cargo) remain in storage facilities within the port whilst the dry bulk commodities (737,000 tonnes per annum in 2018) are taken off site to third-party warehousing units or to an end customer. The statement concluded that there was a significant level of traffic associated with the distribution of dry bulk commodities, with approx. 3,000 tonnes being discharged from the port to HGVs (carrying from 20 - 30 tonnes) over a typical 13-hour weekday period. Based upon 737,000 tonnes of dry-bulk commodity being delivered to the port in 2018 resulting in an average of 123 HGV loads per day based on following assumption that (1) break bulk commodities (i.e. steel, project cargo) shipped into Greenore Port remain on site; (2) 48 no. working weeks per annum and 5 no. working days per week; (3) A tipper truck has the capacity of approx. of 25 tonnes.

The proposed development comprised a change of use of the former 'OpenHydro-building from light engineering and office to storage for port commodities (agricultural feed, fertiliser, rock and salt). Access to the development was through the existing Greenore Port main site access at the end of R175 Shore Road. The Transport Statement indicated that existing car parking at Greenore Port was provided adjacent to the existing office building, located at the top of Euston Street and since the proposed development resulted in no increase in the number of employees at Greenore Port no additional parking was proposed. Parking serving the former OpenHydro light engineering use was not proposed to be removed.

The former OpenHydro building closed in August 2018. When in operation the building had comprised light engineering and office use, with approximately 100 no. employees. Staff access to the building was via Euston Street. The Transport Statement estimated that the OpenHydro building had generated a morning peak hour flow of 31 no. arrivals and 3 no. departures between 08:00-09:00hrs and had generated 2 no. arrivals and 26 no. departures in the evening peak hour identified as 17:00-18:00hrs.

The then proposed warehouse development had capacity of approx. 6,000 tonnes. The change of use from light engineering to storage allows for storage of dry bulk commodity to occur on site immediately, without the requirement for HGV to transfer deliveries to a satellite storage facility. This ultimately results in a better efficiency for unloading vessels and delays the requirement to transport a port delivery (200 – 300 tonnes) from the port to an off-site storage facility which the report stated takes approximately 1.5 days. Storage at the building did not reduce the total number of HGV trips generated by the port. Since the proposed development was anticipated to have a net benefit in regulating port traffic no impact analysis was undertaken.

In recommending a grant of permission for the development the An Bord Pleanála Inspector assessment concluded that the proposed development would not change the capacity of port to send or receive cargo because it would not increase the capacity of its berthage. The Inspector acknowledged that the increased covered storage available in the port would allow the port operator to exercise more control over the movement of cargo to and from the port on the landward side and so manage the movement of goods vehicles on the road network in the area. The Inspector concluded that the impact of the proposed development on traffic would therefore be marginally positive.

6.8.2.4 Operational Traffic Generation to Proposed Development

Table 6.8 provides details on the traffic generation arising from permanent landside staff at each of the OMF Buildings when operational. Table 6.9 provides similar daily traffic profile information with respect to the movement of technicians. Table 6.10 shows the combined operational traffic generation of the site upon completion of Phase 1 (Network Peak Hours are highlighted).

Table 6.10 Daily Traffic Profile of Operational Staff – Phase 1

Time Period	OMF Building A							
	Building Staff		Technician Staff					
	Administration		Permanent		Winter Maintenance		Summer Maintenance	
	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
05:00-06:00	0	0	8	0	11	0	15	0
06:00-07:00	2	0	8	0	12	0	16	0
07:00-08:00	3	0	9	0	13	0	17	0
08:00-09:00	6	1	6	0	9	0	11	0
09:00-10:00	4	1	0	0	0	0	0	0
10:00-11:00	2	1	0	0	0	0	0	0
11:00-12:00	1	1	0	0	0	0	0	0
12:00-13:00	1	2	0	0	0	0	0	0
13:00-14:00	1	1	0	0	0	0	0	0
14:00-15:00	1	1	0	0	0	0	0	0
15:00-16:00	1	2	0	0	0	0	0	0
16:00-17:00	1	5	0	0	0	0	0	0
17:00-18:00	1	6	0	0	0	0	0	0
18:00-19:00	1	2	0	6	0	9	0	11
19:00-20:00	0	1	0	9	0	13	0	17
20:00-21:00	0	1	0	8	0	12	0	16
21:00-22:00	0	0	0	8	0	11	0	15
22:00-23:00	0	0	0	0	0	0	0	0
Total	**25**	**25**	**30**	**30**	**45**	**45**	**60**	**60**

Table 6.11 shows the combined operational traffic generation of the site upon completion of Phase 2 (Network Peak Hours are highlighted). Traffic generated by the OMF buildings is assigned to Euston Street as per the traffic to the existing port office and traffic to the former OpenHydro building, although it is acknowledged that from time to time some senior technician staff will park at the OMF buildings, technician traffic is distributed to and from the proposed new purpose-built car park located on R175 Shore Road. Various traffic generation scenarios for the operational phases of the proposed development are set out in network flow diagram format in TTA: Appendix B in Figures 9 through 26.

Table 6.11 Daily Traffic Profile of Operational Staff – Phase 2

Time Period	OMF Building A & Building B & Building C							
	Building Staff		Technician Staff					
	Administration		Permanent		Winter Maintenance		Summer Maintenance	
	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
05:00-06:00	0	0	24	0	33	0	31	0
06:00-07:00	6	0	24	0	36	0	32	0
07:00-08:00	9	0	27	0	39	0	35	0
08:00-09:00	18	3	18	0	27	0	23	0
09:00-10:00	12	3	0	0	0	0	0	0
10:00-11:00	6	3	0	0	0	0	0	0
11:00-12:00	3	3	0	0	0	0	0	0
12:00-13:00	3	6	0	0	0	0	0	0
13:00-14:00	3	3	0	0	0	0	0	0
14:00-15:00	3	3	0	0	0	0	0	0
15:00-16:00	3	6	0	0	0	0	0	0
16:00-17:00	3	15	0	0	0	0	0	0
17:00-18:00	3	18	0	0	0	0	0	0
18:00-19:00	3	6	0	18	0	27	0	23
19:00-20:00	0	3	0	27	0	39	0	35
20:00-21:00	0	3	0	24	0	36	0	32
21:00-22:00	0	0	0	24	0	33	0	31
22:00-23:00	0	0	0	0	0	0	0	0
Total	**75**	**75**	**90**	**90**	**135***	**135**	**120****	**120**

* All 3 no. buildings concurrently undertaking Winter Maintenance (Max)

** 2 no. buildings operating normally whilst 1 no. undertakes Summer Maintenance

6.8.2.5 Development Network Traffic

Section 6.6 details the current traffic flows on the receiving road network. Various figures and tables are provided for weekdays together with the respective peak hours. Table 6.10 and Table 6.11 show the daily assessment traffic generation arising from the proposed development together with the traffic generation in the morning and evening peak hours. It is typical practice and recommended by the Chartered Institution of Highways and Transportation, that additional traffic generated by the proposed development can reasonably be distributed on the adjoining highway in accordance with the proportions of current traffic turning flows recorded during the traffic surveys. The current traffic characteristics and turning proportions of traffic generated at the junctions within the study area during the day and in the peak hours is provided in TTA: Appendix B, Figure 1 *'Surveyed Daily Traffic Flows – Weekday 07:00-19:00hrs'*, TTA: Appendix B, Figure 2 *'Surveyed Peak Hour Traffic Flows – Morning Peak 08:00-09:00hrs'*, and TTA: Appendix B, Figure 3 *'Surveyed Peak Hour Traffic Flows – Evening Peak 17:00-18:00hrs'*. Traffic generation arising at the proposed development as summarised in TTA: Appendix B, Figure 9 through TTA: Appendix B, Figure 26 is assumed to follow this same general pattern. The distribution of traffic in the study is assumed to be the same as the distribution of traffic recorded in the May 2023 turning count traffic surveys.

6.8.2.6 Preliminary Peak Hour Scoping Assessment

6.8.2.6.1 Average Baseline Network Traffic

The following Table 6.12, Table 6.13 and Table 6.14 are based upon Table 6.1, Table 6.2 and Table 6.3 which summarise the baseline network traffic flows when the port is operating at typical average levels of traffic generation. Table 6.12, Table 6.13 and Table 6.14 summarise the proposed development forecast peak hour traffic generation set against the 2023 surveyed peak hour traffic flows on the receiving road network (no allowance has been made for traffic growth).

Table 6.12 Network Link Traffic – Average Daily Flows (Phase 1)

Road Link		Baseline 2023 Network Traffic Flow		Development Generated Traffic Flow		Increase	
		Total	Heavy	Total	Heavy	Total	Heavy
Typical Daily Operation							
1	R175 Dundalk Road (South of R176)	3820	679	75	0	+2%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	1892	562	110	0	+6%	+0
3	R176 Carlingford Road	2862	189	35	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	1492	538	110	0	+7%	+0
5	L70661 Euston Street (Near Junction with R175)	659	9	50	0	+7%	+0
6	R175 Shore Road	973	529	60	0	+6%	+0
Daily Operation During Winter Maintenance							
1	R175 Dundalk Road (South of R176)	3820	679	116	0	+3%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	1892	562	170	0	+9%	+0
3	R176 Carlingford Road	2862	189	54	0	+2%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	1492	538	170	0	+11%	+0
5	L70661 Euston Street (Near Junction with R175)	659	9	50	0	+8%	+0
6	R175 Shore Road	973	529	120	0	+12%	+0

Daily traffic generation arising from Phase 1 typical operation is less than 10% during typical operations and is marginally over 10% during the months when Summer Maintenance is undertaken which would occur every 3 to 4 years.

The forecast morning peak hour traffic effects arising from Phase 1 are set out in Table 6.13 which shows a greater proportional uplift above 10% on the parts of the network closest to the port. The forecast evening peak hour traffic effects arising from Phase 1 are set out in Table 6.14 which shows a proportional uplift in the order of 10% or less.

Table 6.13 Network Link Traffic – Average Morning Peak Flows (Phase 1)

Road Link		Baseline 2023 Network Traffic Flow		Development Generated Traffic Flow		Increase	
		Total	Heavy	Total	Heavy	Total	Heavy
Typical Daily Operation							
1	R175 Dundalk Road (South of R176)	309	70	10	0	+3%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	137	55	13	0	+9%	+0
3	R176 Carlingford Road	212	19	3	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	95	48	13	0	+14%	+0
5	L70661 Euston Street (Near Junction with R175)	44	0	7	0	+16%	+0
6	R175 Shore Road	59	48	6	0	+10%	+0
Daily Operation During Winter Maintenance							
1	R175 Dundalk Road (South of R176)	309	70	14	0	+5%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	137	55	18	0	+13%	+0
3	R176 Carlingford Road	212	19	4	0	+2%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	95	48	18	0	+19%	+0
5	L70661 Euston Street (Near Junction with R175)	44	0	7	0	+16%	+0
6	R175 Shore Road	59	48	11	0	+19%	+0

Table 6.14 Network Link Traffic – Average Evening Peak Flows (Phase 1)

Road Link		Baseline 2023 Network Traffic Flow		Development Generated Traffic Flow		Increase	
		Total	Heavy	Total	Heavy	Total	Heavy
Typical Daily Operation							
1	R175 Dundalk Road (South of R176)	397	24	5	0	+1%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	159	13	7	0	+4%	+0
3	R176 Carlingford Road	340	13	2	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	114	2	7	0	+6%	+0
5	L70661 Euston Street (Near Junction with R175)	72	0	7	0	+10%	+0
6	R175 Shore Road	52	2	0	0	+0%	+0
Daily Operation During Winter Maintenance							
1	R175 Dundalk Road (South of R176)	397	24	5	0	+1%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	159	13	7	0	+4%	+0
3	R176 Carlingford Road	340	13	2	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	114	2	7	0	+6%	+0
5	L70661 Euston Street (Near Junction with R175)	72	0	7	0	+10%	+0
6	R175 Shore Road	52	2	0	0	+0%	+0

6.8.2.6.2 Upper Value Baseline Network Traffic

In the interest of a comprehensive evaluation of traffic effects the following Table 6.15, Table 6.16 and Table 6.17 are based upon Table 6.5, Table 6.6 and Table 6.7 which summarise the baseline network traffic flows when the port is operating at the higher or upper values recorded in the 2-week long automatic traffic counter surveys. Since development traffic is the same as the previous assessment and only the network traffic flows have increased it stands to reason that the proportional uplift in traffic flows is less than for the average network flows. Table 6.15 shows that in the case of both the typical daily operation and the worst case which is when Summer Maintenance is undertaken the effect of the Phase 1 operation is less than 10% when measured against daily traffic flows.

Table 6.15 Network Link Traffic – Upper Value Daily Flows (Phase 1)

Road Link		Baseline 2023 Network Traffic Flow		Development Generated Traffic Flow		Increase	
		Total	Heavy	Total	Heavy	Total	Heavy
Typical Daily Operation							
1	R175 Dundalk Road (South of R176)	9,337	935	75	0	+1%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	2,492	532	110	0	+4%	+0
3	R176 Carlingford Road	5,819	124	35	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	2,492	532	110	0	+4%	+0
5	L70661 Euston Street (Near Junction with R175)	902	6	50	0	+5%	+0
6	R175 Shore Road	1,145	506	60	0	+5%	+0
Daily Operation During Winter Maintenance							
1	R175 Dundalk Road (South of R176)	9,337	935	116	0	+1%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	2,492	532	170	0	+7%	+0
3	R176 Carlingford Road	5,819	124	54	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	2,492	532	170	0	+7%	+0
5	L70661 Euston Street (Near Junction with R175)	902	6	50	0	+6%	+0
6	R175 Shore Road	1,145	506	120	0	+10%	+0

Table 6.16 summarises the effects of Phase 1 of the proposed development set against the upper value baseline network flows for the morning peak hour. The effects of the proposed development are shown to exceed 10% in the morning peak hour at Euston Street and on Shore Road at the port entry. The table shows that the percentage increases exceed 10% but the numerical increases in traffic are relatively low at approximately 10 vehicles additional vehicles per hour. The elevated forecast percentage increase arises directly as a result of the low volumes of traffic manifest on the baseline network. Table 6.17 summarises the forecast traffic generation of the Phase 1 development set against the upper value baseline network traffic flows for the evening peak hour. The results of the analyses show that the proposed development at Phase 1 is not likely to have a significant negative impact upon the operation of the receiving road network.

Table 6.16 Network Link Traffic – Upper Value Morning Peak Flows (Phase 1)

Road Link		Baseline 2023 Network Traffic Flow		Development Generated Traffic Flow		Increase	
		Total	Heavy	Total	Heavy	Total	Heavy
Typical Daily Operation							
1	R175 Dundalk Road (South of R176)	9,337	935	75	0	+1%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	2,492	532	110	0	+4%	+0
3	R176 Carlingford Road	5,819	124	35	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	2,492	532	110	0	+4%	+0
5	L70661 Euston Street (Near Junction with R175)	902	6	50	0	+5%	+0
6	R175 Shore Road	1,145	506	60	0	+5%	+0
Daily Operation During Winter Maintenance							
1	R175 Dundalk Road (South of R176)	9,337	935	116	0	+1%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	2,492	532	170	0	+7%	+0
3	R176 Carlingford Road	5,819	124	54	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	2,492	532	170	0	+7%	+0
5	L70661 Euston Street (Near Junction with R175)	902	6	50	0	+6%	+0
6	R175 Shore Road	1,145	506	120	0	+10%	+0

Table 6.17 Network Link Traffic – Upper Value Evening Peak Flows (Phase 1)

Road Link		Baseline 2023 Network Traffic Flow		Development Generated Traffic Flow		Increase	
		Total	Heavy	Total	Heavy	Total	Heavy
Typical Daily Operation							
1	R175 Dundalk Road (South of R176)	9,337	935	75	0	+1%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	2,492	532	110	0	+4%	+0
3	R176 Carlingford Road	5,819	124	35	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	2,492	532	110	0	+4%	+0
5	L70661 Euston Street (Near Junction with R175)	902	6	50	0	+5%	+0
6	R175 Shore Road	1,145	506	60	0	+5%	+0
Daily Operation During Winter Maintenance							
1	R175 Dundalk Road (South of R176)	9,337	935	116	0	+1%	+0
2	R175 Greenore Road (South of IDA Ind. Est.)	2,492	532	170	0	+7%	+0
3	R176 Carlingford Road	5,819	124	54	0	+1%	+0
4	R175 Greenore Road (North of IDA Ind. Est.)	2,492	532	170	0	+7%	+0
5	L70661 Euston Street (Near Junction with R175)	902	6	50	0	+6%	+0
6	R175 Shore Road	1,145	506	120	0	+10%	+0

Comparing the traffic generation forecasts of the development summarised in Table 6.10 and Table 6.11 it can be appreciated that the operational traffic generation of Phase 2 is approximately treble that of Phase 1. The forecast traffic generation set against the recent 2023 network traffic flow data shows that the proposed development will have the potential to exceed the 10% typical threshold triggering the need for detailed traffic assessment. This happens in the morning peak hour where development traffic is concentrated near the junction Euston Street and R175 Shore Road. Based upon the preliminary assessment against 2023 surveyed traffic flow figures and the traffic flow assumptions of development generated traffic, the proposed development has the potential to increase the two-way daily volume of traffic on Euston Street and Shore Road in excess of the standard threshold value of 10%.

6.8.2.7 Traffic and Transport Assessment Guidelines - Thresholds

In Ireland, a Traffic and Transport Assessment or Traffic Impact Assessment must accompany all planning applications for developments which could potentially generate significant traffic volumes. A Traffic and Transport Assessment should be carried out if the proposed development exceeds the following thresholds:

- Development traffic exceeds 10% of the traffic flow on the adjoining road.
- Development traffic exceeds 5% of the traffic flow on the adjoining road where congestion exists or the location is sensitive.
- Residential development in excess of 200 dwellings.
- Retail and leisure development in excess of 1,000m^2.
- Office, education and hospital development in excess of 2,500m^2.
- Industrial development in excess of 5,000m^2.
- Distribution and warehousing in excess of 10,000m^2.

Relevant thresholds for Traffic Assessment where the development has the potential to affect national roads are as follows:

a) 100 trips in / out combined in the peak hours for the proposed development
b) Development traffic exceeds 10% of turning movements at junctions with and on National Roads.
c) Development traffic exceeds 5% of turning movements at junctions with National Roads if location has potential to become congested or sensitive.
d) Industrial development in excess of 5,000m^2.
e) Distribution and warehousing in excess of 10,000m^2.
f) 100 on-site parking spaces.

Sub threshold criteria for Traffic Assessment are as follows:

g) The character and total number of trips per day is such that as to cause concern.
h) Location of the site is not consistent with national guidance or local plan policy or accessibility criteria contained in the Development Plan.
i) The development is part of incremental development that will have significant transport implications.

j) The development may generate traffic at peak times in a heavily trafficked/ congested area or near a junction with a main traffic route.
k) The development may generate heavy vehicles in a residential area.
l) There are concerns over the development's potential effects on road safety.
m) The development is in a tourist area with potential to cause congestion.
n) The planning authority considers that the proposal will result in a material change in trips patterns or raises other significant transport implications.

The following sets out the forecast traffic generation scenario against the various threshold criteria.

a) The proposed development when fully developed and occupied is forecast to generate approximately 45 inbound and 3 outbound movements in the morning peak hour and 3 inbound and 18 outbound movements trips in the evening peak. Neither exceeds the threshold value of 100 trips[1] in/out.
b) The forecast peak hour traffic flows show that it is likely that development traffic will exceed 10% of traffic flow and turning movements on Euston Street in the evening peak hour period.
c) Development traffic at junctions with National Roads is not considered likely to exceed 5% of existing turning movements. The forecast is likely to be in the order of 2% or less in the case of the closest national road junctions.
d) The proposed development comprises more than 5,000m^2 of buildings and can be considered to exceed the development threshold value of 1,000m^2.
e) Distribution and warehousing is not in excess of 10,000m^2.
f) The proposed development exceeds the threshold value of 100 on-site parking spaces.

Sub threshold criteria for Traffic Assessment are as follows:

g) The lands are zoned appropriately and the character and total number of trips in / out combined per day is not such that it should not reasonably give cause for concern.
h) The location of the site is considered to be consistent with national guidance and local plan policy and is consistent with the accessibility criteria in the Development Plan.
i) The operation of the development is not considered likely to have significant transport implications.
j) The development will generate traffic volumes at peak times that exceed the standard thresholds on Euston Street which is a lightly trafficked route.
k) The development will not generate heavy vehicles in a residential area.
l) The site is appropriately zoned and the receiving roads have been designed to cater for traffic with the characteristics of the proposed development accordingly no concerns should arise with respect to the potential effects on road safety.
m) The development is located in an operational port but the general receiving area is considered a tourist area. The numerical increase in traffic flows in the peak hours are modest even during maintenance periods when traffic generation will be temporarily elevated so the development is not considered likely to have the potential to cause congestion.

[1] Trip comprises an inbound movement from origin and an outbound movement to destination

Given the forecast peak hour traffic generation it can reasonably to concluded that the impact of the proposed development on the capacity and operation of the receiving road network is not likely to be significant. Nevertheless, a number of the threshold criteria set out in the guidelines are either met or exceeded, accordingly the traffic impact of the proposed development warrants further investigation with respect to the potential impact upon the capacity and operation of the junctions in the study area.

6.8.2.8 Assessment Years and Estimation of Traffic Growth

The capacity of any road network is dictated by the operation of the links and junctions within that network. Capacity assessments of the key junctions in the vicinity of the site are modelled for base and future year scenarios in order to provide a comparative basis upon which to evaluate the incremental impact of the proposed development and to appraise the overall performance of the road network under future assumed network traffic flow criteria. To prepare a traffic network model various base assumptions are made with respect to the future growth of traffic on the receiving road network.

Regarding the choice of appropriate assessment years the TII Publication PE-PDV-02045 *'Traffic and Transport Assessment Guidelines'* advise as follows; *"Timescale: Traffic volumes for opening year, opening +5 and opening year +15. These timescales are fairly standard and should be expected"*. The application is for a phased development and the applicant aspires to have Phase 1 of the development completely constructed by the end of 2025 and occupied in 2026. For the purposes of this traffic assessment 2026 has been selected as opening year. Phase 2 of the development is programmed to be completed and occupied in 2032. Since an analysis of operational for 2031 would be prior to the completion of Phase 2 the exercise would be somewhat academic accordingly an interim assessment year of 3032 or Opening +6yrs has been selected to co-ordinate with the forecast year of completion and full occupancy of the 3 no. OMF buildings. In line with the guidance provided in the National Roads Authority 'Traffic and Transport Assessment Guidelines', modelling analyses of the capacity of the receiving road network have been carried out for the following:

- Baseline 2023
- Opening Year (Forecast 2026)
- Opening Year +6yrs (2032)
- Opening Year +15yrs (2041).

The following junctions have been included in the scope of the modelling assessments

- Site 1: R175 Dundalk Road/R176 Carlingford Road
- Site 2: R175 Shore Road/L70661 Euston Street

6.8.2.8.1 Traffic Growth Rates

For the purposes of the traffic assessment traffic generation arising directly from the proposed development has been assumed not to grow over time. Background traffic flows on the public road network have been assumed to grow in accordance with the latest growth factors published by Transport Infrastructure Ireland (TII) in October 2021 in the document PE-PAG-02017 *'Project Appraisal Guidelines: Unit 5.3 Travel Demand Projections'*.

Central growth rate factors have been used in the derivation of the future traffic flows from the surveyed 2023 flows. The TII forecast central growth rate factors for Louth (excluding Metropolitan Area) assume traffic growth rates of 1.48% per annum for light vehicles and 3.63% for heavy vehicles between 2016 and 2030 and 0.70% per annum for light vehicles and 1.74% for heavy vehicles between 2030 and 2040 and 0.63% per annum for light vehicles and 1.98% for heavy vehicles thereafter to 2050. Existing traffic flows are as surveyed and will be used as a baseline for comparison of the analyses for future year junction performance. The growth indices used to derive Opening Year (2026) and; Opening Year +6ys (2032) and Opening Year +15yrs (2041) flows from the surveyed (2023) flows are as follows.

National Primary Road Central Growth Rates (Applied to All Roads)

- 2023-2026 (Opening Year) 1.0451 (Cars) 1.1129 (HGV)
- 2023-2032 (Opening Year +6yrs) 1.1326 (Cars) 1.3532 (HGV)
- 2023-2041 (Opening Year +15yrs) 1.2051 (Cars) 1.5843 (HGV)

TII growth factors have been applied directly to peak hour traffic data. Growth factors are not always directly applicable to peak hour periods (the peak hour generally spreads out as opposed to intensifying). Ignoring this factor and adding growth directly to the peak hour generally results in robust calculations favoured by traffic experts in the assessment of road networks.

The traffic generated by the future completion and occupation of Phase 2 is included in the 2032 and 2041 analyses. In the assessment of these future years, it is assumed that the entire development will be fully constructed, occupied and operating at capacity. The application of TII growth rates to the receiving network is considered likely to account for the cumulative traffic arising as a result of economic growth and development locally over the specified assessment period.

6.8.2.8.2 Scenarios Analysed – Proposed Development

The main corridor upon which the new traffic generated by the development will have an impact is R175 and R176 accordingly the scope of future year assessments focuses on the operation of the affected junctions. The existing receiving road network has operated under similar load when the OpenHydro development was in operation. The assessments aim to confirm that the infrastructure provided by the receiving road network including the strategic network is suitable to accommodate the forecast traffic arising from the proposed development. The various 'do-nothing' and 'do-something' traffic flow scenarios have been assessed for the Opening Year 2026, Opening Year +6yrs and the Design Year of 2041.

The future year assessments include for scenarios both with and without the proposed development so that the incremental impact of development traffic can be evaluated. The TRL suite of programs has been used to assess network junction performance in the identified peak hours. The 'do something' scenarios include for the forecast assessment value development traffic flows being added to the forecast network flows derived from the 2023 traffic surveys factored as set out above. The relative traffic generation and distribution flows arising from the proposed development are shown in TTA: Appendix B Figures 9 through 26.

The forecast network turning traffic flows for each of the assessment years and for each of the assessment scenarios based upon average port traffic flows are shown in TTA: Appendix B Figures 27 through 65.

The forecast network turning traffic flows for each of the assessment years and for each of the assessment scenarios based upon upper value port traffic flows are shown in TTA: Appendix B Figures 66 through 104.

6.8.2.8.3 Forecast Development Traffic (Average Value Network Traffic Baseline)

The forecast network turning traffic flows for each of the assessment years and for the surveyed average value baseline and future forecast traffic flows on the link roads between junctions on the road network within the study scope are summarised in the following tables relating to the lower value or Average value road network assessments:

- Table 6.18 Link 1 – R175 Dundalk Road (South of R176)
- Table 6.19 Link 2 – R175 Greenore Road (South of IDA)
- Table 6.20 Link 3 – R176 Carlingford Road
- Table 6.21 Link 4 – R175 Greenore Road (South of L70661)
- Table 6.22 Link 5 – L70661 Euston Street
- Table 6.23 Link 6 – R175 Shore Road

Table 6.18 Link 1 – Average Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R175 Dundalk Road South of R176 Baseline Do Nothing Scenario	2023	239	70	309	373	24	397	5040	17.8%
	2026	250	78	328	400	27	427	5328	18.7%
	2032	271	95	365	434	32	466	5905	20.5%
	2041	288	111	399	462	38	500	6413	22.1%
Forecast Do Something Typical Traffic	2026	260	78	338	405	27	432	5427	18.4%
	2032	299	95	393	449	32	481	6201	19.5%
	2041	316	111	427	477	38	515	6708	21.25%
Forecast Do Something Winter Maintenance	2026	263	78	341	405	27	432	5453	18.3%
	2032	304	95	398	449	32	481	6288	19.3%
	2041	321	111	432	477	38	515	6795	20.9%
Forecast Do Something Summer Maintenance	2026	264	78	342	405	27	432	5481	18.2%
	2032	307	95	401	449	32	481	6288	19.3%
	2041	324	111	435	477	38	515	6795	20.9%
Forecast Do Something	2026	10 4.0%	0 0.0%	10 3.0%	5 1.3%	0 0.0%	5 1.2%	99 1.9%	-0.3%
	2032	28	0	28	15	0	15	296	-1.0%

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
Typical Traffic Incremental Increase Over Do Nothing		10.3%	0.0%	7.7%	3.5%	0.0%	3.2%	5.0%	
	2041	28	0	28	15	0	15	295	-0.9%
		9.7%	0.0%	7.0%	3.2%	0.0%	3.0%	4.6%	
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	13	0	13	5	0	5	125	-0.4%
		5.2%	0.0%	4.0%	1.3%	0.0%	1.2%	2.3%	
	2032	33	0	33	15	0	15	383	-1.2%
		12.2%	0.0%	9.0%	3.5%	0.0%	3.2%	6.5%	
	2041	33	0	33	15	0	15	382	-1.2%
		11.5%	0.0%	8.3%	3.2%	0.0%	3.0%	6.0%	
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	14	0	14	5	0	5	153	-0.5%
		5.6%	0.0%	4.3%	1.3%	0.0%	1.2%	2.9%	
	2032	36	0	36	15	0	15	383	-1.2%
		13.3%	0.0%	9.9%	3.5%	0.0%	3.2%	6.5%	
	2041	36	0	36	15	0	15	382	-1.2%
		12.5%	0.0%	9.0%	3.2%	0.0%	3.0%	6.0%	

Table 6.19 Link 2 – Average Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R175 Greenore Road South of IDA Baseline Do Nothing Scenario	2023	145	70	215	178	31	209	4526	18.7%
	2026	151	78	229	198	35	233	4788	19.6%
	2032	164	95	259	214	42	257	5313	21.5%
	2041	175	111	285	228	50	278	5775	23.2%
Forecast Do Something Typical Traffic	2026	164	78	242	205	35	240	4933	19.0%
	2032	203	95	298	235	42	278	5748	19.9%
	2041	214	111	324	249	50	299	6210	21.5%
Forecast Do Something Winter Maintenance	2026	167	78	245	205	35	240	4972	18.9%
	2032	208	95	303	235	42	278	5875	19.4%
	2041	219	111	329	249	50	299	6337	21.1%
Forecast Do Something Summer Maintenance	2026	169	78	247	205	35	240	5012	18.7%
	2032	212	95	307	235	42	278	5875	19.4%
	2041	223	111	333	249	50	299	6337	21.1%
Forecast Do Something	2026	13	0	13	7	0	7	145	-0.6%
		8.6%	0.0%	5.7%	3.5%	0.0%	3.0%	3.0%	

Typical Traffic Incremental Increase Over Do Nothing	2032	39 23.8%	0 0.0%	39 15.1%	21 9.8%	0 0.0%	21 8.2%	435 8.2%	-1.6%
	2041	39 22.3%	0 0.0%	39 13.7%	21 9.2%	0 0.0%	21 7.6%	435 7.5%	-1.7%
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	16 10.6%	0 0.0%	16 7.0%	7 3.5%	0 0.0%	7 3.0%	184 3.8%	-0.7%
	2032	44 26.8%	0 0.0%	44 17.0%	21 9.8%	0 0.0%	21 8.2%	562 10.6%	-2.1%
	2041	44 25.1%	0 0.0%	44 15.4%	21 9.2%	0 0.0%	21 7.6%	562 9.7%	-2.1%
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	18 11.9%	0 0.0%	18 7.9%	7 3.5%	0 0.0%	7 3.0%	224 4.7%	-0.9%
	2032	48 29.3%	0 0.0%	48 18.5%	21 9.8%	0 0.0%	21 8.2%	562 10.6%	-2.1%
	2041	48 18.7%	0 18.7%	48 18.7%	21 18.7%	0 18.7%	21 18.7%	562 18.7%	-2.1%

Table 6.20 Link 3 – Average Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R176 Carlingford Road Baseline Do Nothing Scenario	2023	296	20	317	418	15	433	8599	2.8%
	2026	310	23	332	437	17	454	9004	3.0%
	2032	336	27	363	473	21	494	9793	3.3%
	2041	357	32	389	503	24	528	10454	3.7%
Forecast Do Something Typical Traffic	2026	313	23	335	439	17	456	9050	3.0%
	2032	347	27	374	479	21	500	9933	3.3%
	2041	368	32	400	509	24	534	10594	3.6%
Forecast Do Something Winter Maintenance	2026	313	23	335	439	17	456	9063	3.0%
	2032	347	27	374	479	21	500	9972	3.3%
	2041	368	32	400	509	24	534	10634	3.6%
Forecast Do Something Summer Maintenance	2026	314	23	336	439	17	456	9075	3.0%
	2032	348	27	375	479	21	500	9972	3.3%
	2041	369	32	401	509	24	534	10634	3.6%
Forecast Do Something	2026	3 1.0%	0 0.0%	3 0.9%	2 0.5%	0 0.0%	2 0.4%	46 0.5%	0.0%

Typical Traffic Incremental Increase Over Do Nothing	2032	11 3.3%	0 0.0%	11 3.0%	6 1.3%	0 0.0%	6 1.2%	140 1.4%	0.0%
	2041	11 3.1%	0 0.0%	11 2.8%	6 1.2%	0 0.0%	6 1.1%	140 1.3%	-0.1%
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	3 1.0%	0 0.0%	3 0.9%	2 0.5%	0 0.0%	2 0.4%	59 0.7%	0.0%
	2032	11 3.3%	0 0.0%	11 3.0%	6 1.3%	0 0.0%	6 1.2%	179 1.8%	0.0%
	2041	11 3.1%	0 0.0%	11 2.8%	6 1.2%	0 0.0%	6 1.1%	180 1.7%	-0.1%
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	4 1.3%	0 0.0%	4 1.2%	2 0.5%	0 0.0%	2 0.4%	71 0.8%	0.0%
	2032	12 3.6%	0 0.0%	12 3.3%	6 1.3%	0 0.0%	6 1.2%	179 1.8%	0.0%
	2041	12 3.4%	0 0.0%	12 3.1%	6 1.2%	0 0.0%	6 1.1%	180 1.7%	-0.1%

Table 6.21 Link 4 – Average Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R175 Greenore Road South of L70661 Baseline Do Nothing Scenario	2023	88	62	150	156	5	160	3716	22.1%
	2026	92	69	161	163	5	168	3939	23.2%
	2032	99	84	183	176	7	183	4390	25.3%
	2041	106	98	204	188	8	195	4789	27.1%
Forecast Do Something Typical Traffic	2026	105	69	174	170	5	175	4084	22.3%
	2032	138	84	222	197	7	204	4825	23.0%
	2041	145	98	243	209	8	216	5225	24.9%
Forecast Do Something Winter Maintenance	2026	108	69	177	170	5	175	4124	22.1%
	2032	143	84	227	197	7	204	4944	22.4%
	2041	150	98	248	209	8	216	5343	24.3%
Forecast Do Something Summer Maintenance	2026	110	69	179	170	5	175	4164	21.9%
	2032	147	84	231	197	7	204	4944	22.4%
	2041	154	98	252	209	8	216	5343	24.3%
Forecast Do Something	2026	13 14.1%	0 0.0%	13 8.1%	7 4.3%	0 0.0%	7 4.2%	145 3.7%	-0.9%
	2032	39	0	39	21	0	21	435	-2.3%

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
Typical Traffic Incremental Increase Over Do Nothing		39.4%	0.0%	21.3%	11.9%	0.0%	11.5%	9.9%	
	2041	39	0	39	21	0	21	436	-2.2%
		36.8%	0.0%	19.1%	11.2%	0.0%	10.8%	9.1%	
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	16	0	16	7	0	7	185	-1.1%
		17.4%	0.0%	9.9%	4.3%	0.0%	4.2%	4.7%	
	2032	44	0	44	21	0	21	554	-2.9%
		44.4%	0.0%	24.0%	11.9%	0.0%	11.5%	12.6%	
	2041	44	0	44	21	0	21	554	-2.8%
		41.5%	0.0%	21.6%	11.2%	0.0%	10.8%	11.6%	
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	18	0	18	7	0	7	225	-1.3%
		19.6%	0.0%	11.2%	4.3%	0.0%	4.2%	5.7%	
	2032	48	0	48	21	0	21	554	-2.9%
		48.5%	0.0%	26.2%	11.9%	0.0%	11.5%	12.6%	
	2041	48	0	48	21	0	21	554	-2.8%
		45.3%	0.0%	23.5%	11.2%	0.0%	10.8%	11.6%	

Table 6.22 Link 5 – Average Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
L70661 Euston Street Baseline Do Nothing Scenario	2023	44	0	44	72	0	72	869	1.4%
	2026	46	0	46	75	0	75	909	1.5%
	2032	50	0	50	82	0	82	987	1.6%
	2041	53	0	53	87	0	87	1052	1.8%
Forecast Do Something Typical Traffic	2026	53	0	53	82	0	82	975	1.4%
	2032	71	0	71	103	0	103	1185	1.4%
	2041	74	0	74	108	0	108	1250	1.5%
Forecast Do Something Winter Maintenance	2026	53	0	53	82	0	82	975	1.4%
	2032	71	0	71	103	0	103	1185	1.4%
	2041	74	0	74	108	0	108	1250	1.5%
Forecast Do Something Summer Maintenance	2026	53	0	53	82	0	82	975	1.4%
	2032	71	0	71	103	0	103	1185	1.4%
	2041	74	0	74	108	0	108	1250	1.5%
Forecast	2026	7	0	7	7	0	7	66	-0.1%

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
Do Something Typical Traffic Incremental Increase Over Do Nothing		15.2%	0%	15.2%	9.3%	0%	9.3%	7.3%	
	2032	21	0	21	21	0	21	198	-0.2%
		42.0%	0%	42.0%	25.6%	0%	25.6%	20.1%	
	2041	21	0	21	21	0	21	198	-0.3%
		39.6%	0%	39.6%	24.1%	0%	24.1%	18.8%	
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	7	0	7	7	0	7	66	-0.1%
		15.2%	0%	15.2%	9.3%	0%	9.3%	7.3%	
	2032	21	0	21	21	0	21	198	-0.2%
		42.0%	0%	42.0%	25.6%	0%	25.6%	20.1%	
	2041	21	0	21	21	0	21	198	-0.3%
		39.6%	0%	39.6%	24.1%	0%	24.1%	18.8%	
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	7	0	7	7	0	7	66	-0.1%
		15.2%	0%	15.2%	9.3%	0%	9.3%	7.3%	
	2032	21	0	21	21	0	21	198	-0.2%
		42.0%	0%	42.0%	25.6%	0%	25.6%	20.1%	
	2041	21	0	21	21	0	21	198	-0.3%
		39.6%	0%	39.6%	24.1%	0%	24.1%	18.8%	

Table 6.23 Link 6 – Average Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R175 Shore Road Baseline Do Nothing Scenario	2023	11	48	59	50	2	52	1284	1.4%
	2026	11	53	65	52	2	54	1389	1.5%
	2032	12	65	77	57	3	59	1608	1.6%
	2041	13	76	89	60	3	63	1812	1.8%
Forecast Do Something Typical Traffic	2026	17	53	71	52	2	54	1468	1.4%
	2032	30	65	95	57	3	59	1845	1.4%
	2041	31	76	107	60	3	63	2049	1.5%
Forecast Do Something Winter Maintenance	2026	20	53	74	52	2	54	1508	1.4%
	2032	35	65	100	57	3	59	1964	1.4%
	2041	36	76	112	60	3	63	2168	1.5%
Forecast Do Something	2026	22	53	76	52	2	54	1547	1.4%
	2032	39	65	104	57	3	59	1964	1.4%

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
Summer Maintenance	2041	40	76	116	60	3	63	2168	1.5%
Forecast Do Something Typical Traffic Incremental Increase Over Do Nothing	2026	6 54.5%	0 0.0%	6 9.2%	0 0.0%	0 0.0%	0 0.0%	79 5.7%	-0.1%
	2032	18 150%	0 0.0%	18 23.4%	0 0.0%	0 0.0%	0 0.0%	237 14.7%	-0.2%
	2041	18 138%	0 0.0%	18 20.2%	0 0.0%	0 0.0%	0 0.0%	237 13.1%	-0.3%
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	9 81.8%	0 0.0%	9 13.8%	0 0.0%	0 0.0%	0 0.0%	119 8.6%	-0.1%
	2032	23 191%	0 0.0%	23 29.9%	0 0.0%	0 0.0%	0 0.0%	356 22.1%	-0.2%
	2041	23 176%	0 0.0%	23 25.8%	0 0.0%	0 0.0%	0 0.0%	356 19.6%	-0.3%
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	11 100%	0 0.0%	11 16.9%	0 0.0%	0 0.0%	0 0.0%	158 11.4%	-0.1%
	2032	27 225%	0 0.0%	27 35.1%	0 0.0%	0 0.0%	0 0.0%	356 22.1%	-0.2%
	2041	27 207%	0 0.0%	27 30.3%	0 0.0%	0 0.0%	0 0.0%	356 19.6%	-0.3%

The above detailed assessment of baseline and forecast future network traffic flows confirm that results of the preliminary scoping assessments summarised in Table 6.13, Table 6.14 and Table 6.15. The incremental increase in traffic arising from the proposed development in the morning and evening peak hours is sub-threshold on Link 1 'R175 Dundalk Road' and on Link 3 'R176 Carlingford Road'. The incremental effect of development traffic on Link 2 'Greenore Road (South of IDA)' and Link 4 'Greenore Road (North of IDA)' exceed the typical threshold value of 10% which usually triggers the need for further assessment and detailed junction/network capacity assessments. Similarly the effect on Link 5 'Euston Street' and Link 6 'Shore Road' exceeds the threshold percentage and for the same reasons warrant further detailed assessment. It should be noted that where the threshold percentage values are exceeded, the numerical increases are not significant. In that case of Euston Street, the forecast increases in peak hour and daily traffic volumes are similar to those that were generated when OpenHydro operated from the port where the associated car park was accessed from Euston Street as is the case in the current application.

Turning traffic at junctions have the greatest effect on network capacity. Transport Infrastructure Ireland (TII) Publication TII-PE-PDV-02045 'Traffic and Transport Assessment Guidelines' (May 2014) provides advisory thresholds for Traffic and Transport Assessment where national roads are affected. Notwithstanding that the receiving environment is the Regional Road network, having regard to those advisory thresholds the following Table 6.24 summarises the increase over average in traffic flow turning movements on the receiving road junctions in the study area.

Table 6.24 Percentage Uplift in Turning Movements – Do-Something (Average)

Year	AM Peak 08:00-09:00hrs		PM Peak 17:00-18:00hrs		Daily 07:00-19:00hrs	
	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
2026	1.5%	15.2%	0.6%	9.3%	+1.5%	+7.3%
2032	4.6%	42.1%	1.6%	25.7%	+3.8%	+20.0%
2041	4.3%	39.6%	1.5%	24.2%	+3.6%	+18.8%

Table 6.24 shows that the increase in the total turning traffic flows on the receiving road network in the morning peak hour is generally less than +5% at Site 1 which is the intersection of R175 Dundalk Road and R176 Carlingford Road. At the junction of Shore Road and Euston Street where existing turning volumes are relatively low the proportional uplift in the peak hours is 10-15% during Phase 1 of the development and 20-40% in Phase 2. The forecast increase in turning traffic is comprised of light vehicle traffic where the operational phases of the development will generate HGV only occasionally and are not considered in the analysis of peak hour and daily traffic generation.

It is concluded from the above analyses that the effect of development traffic on the capacity of the receiving road network warrants further detailed analysis of the effects of development traffic on junction and network capacity and delay.

6.8.2.8.4 Forecast Development Traffic (Upper Value Network Traffic Baseline)

The preceding network analysis is based upon the recorded average network traffic flows where Greenore Port was recorded to generate traffic volumes that were slightly above average by refence to Table 6.7. During periods of increased activity at the port network traffic flows are locally elevated. The duration of elevated traffic flows is typically around 4 no. days and this is understood to occur approximately 8 no. times per annum. Assessing the proposed development against such elevated traffic flows will show the percentage impact reduced over the preceding tabulated figures. Analysing one or the other scenario or an average of the two would likely not provide a complete picture of the typical and occasional local traffic conditions so, in the interest of a comprehensive assessment it was considered worthwhile to carry through calculations and assessment of traffic effects under both scenarios.

The forecast network turning traffic flows for each of the assessment years and for The surveyed, upper value baseline and future forecast traffic flows on the link roads between junctions on the road network within the study scope are summarised in the following tables relating to the lower value or Average value road network assessments:

- Table 6.25 Link 1 – R175 Dundalk Road (South of R176)
- Table 6.26 Link 2 – R175 Greenore Road (South of IDA)
- Table 6.27 Link 3 – R176 Carlingford Road
- Table 6.28 Link 4 – R175 Greenore Road (South of L70661)
- Table 6.29 Link 5 – L70661 Euston Street
- Table 6.30 Link 6 – R175 Shore Road

Table 6.25 Link 1 – Upper Value Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R175 Dundalk Road South of R176 Baseline Do Nothing Scenario	2023	399	86	486	495	42	538	10627	9.5%
	2026	417	96	513	529	47	576	11174	10.0%
	2032	452	117	569	574	57	631	12258	11.1%
	2041	481	137	618	611	67	677	13189	12.1%
Forecast Do Something Typical Traffic	2026	427	96	523	534	47	581	11273	10.0%
	2032	480	117	597	589	57	646	12554	10.9%
	2041	509	137	646	626	67	692	13484	11.9%
Forecast Do Something Winter Maintenance	2026	430	96	526	534	47	581	11300	9.9%
	2032	485	117	602	589	57	646	12641	10.8%
	2041	514	137	651	626	67	692	13571	11.8%
Forecast Do Something Summer Maintenance	2026	431	96	527	534	47	581	11327	9.9%
	2032	488	117	605	589	57	646	12641	10.8%
	2041	517	137	654	626	67	692	13571	11.8%
Forecast Do Something Typical Traffic Incremental Increase Over Do Nothing	2026	10 2.4%	0 0.0%	10 1.9%	5 0.9%	0 0.0%	5 0.9%	99 0.9%	0.0%
	2032	28 6.2%	0 0.0%	28 4.9%	15 2.6%	0 0.0%	15 2.4%	296 2.4%	-0.2%
	2041	28 5.8%	0 0.0%	28 4.5%	15 2.5%	0 0.0%	15 2.2%	295 2.2%	-0.2%
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	13 3.1%	0 0.0%	13 2.5%	5 0.9%	0 0.0%	5 0.9%	126 1.1%	-0.1%
	2032	33 7.3%	0 0.0%	33 5.8%	15 2.6%	0 0.0%	15 2.4%	383 3.1%	-0.3%
	2041	33 6.9%	0 0.0%	33 5.3%	15 2.5%	0 0.0%	15 2.2%	382 2.9%	-0.3%
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	14 3.4%	0 0.0%	14 2.7%	5 0.9%	0 0.0%	5 0.9%	153 1.4%	-0.1%
	2032	36 8.0%	0 0.0%	36 6.3%	15 2.6%	0 0.0%	15 2.4%	383 3.1%	-0.3%
	2041	36 7.5%	0 0.0%	36 5.8%	15 2.5%	0 0.0%	15 2.2%	382 2.9%	-0.3%

Table 6.26 Link 2 – Upper Value Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R175 Greenore Road South of IDA Baseline Do Nothing Scenario	2023	145	70	215	178	31	209	4526	18.7%
	2026	151	78	229	198	35	233	4788	19.6%
	2032	164	95	259	214	42	257	5313	21.5%
	2041	175	111	285	228	50	278	5775	23.2%
Forecast Do Something Typical Traffic	2026	164	78	242	205	35	240	4933	19.0%
	2032	203	95	298	235	42	278	5748	19.9%
	2041	214	111	324	249	50	299	6210	21.5%
Forecast Do Something Winter Maintenance	2026	167	78	245	205	35	240	4972	18.9%
	2032	208	95	303	235	42	278	5875	19.4%
	2041	219	111	329	249	50	299	6337	21.1%
Forecast Do Something Summer Maintenance	2026	169	78	247	205	35	240	5012	18.7%
	2032	212	95	307	235	42	278	5875	19.4%
	2041	223	111	333	249	50	299	6337	21.1%
Forecast Do Something Typical Traffic Incremental Increase Over Do Nothing	2026	13 8.6%	0 0.0%	13 5.7%	7 3.5%	0 0.0%	7 3.0%	145 3.0%	-0.6%
	2032	39 23.8%	0 0.0%	39 15.1%	21 9.8%	0 0.0%	21 8.2%	435 8.2%	-1.6%
	2041	39 22.3%	0 0.0%	39 13.7%	21 9.2%	0 0.0%	21 7.6%	435 7.5%	-1.7%
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	16 10.6%	0 0.0%	16 7.0%	7 3.5%	0 0.0%	7 3.0%	184 3.8%	-0.7%
	2032	44 26.8%	0 0.0%	44 17.0%	21 9.8%	0 0.0%	21 8.2%	562 10.6%	-2.1%
	2041	44 25.1%	0 0.0%	44 15.4%	21 9.2%	0 0.0%	21 7.6%	562 9.7%	-2.1%
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	18 11.9%	0 0.0%	18 7.9%	7 3.5%	0 0.0%	7 3.0%	224 4.7%	-0.9%
	2032	48 29.3%	0 0.0%	48 18.5%	21 9.8%	0 0.0%	21 8.2%	562 10.6%	-2.1%
	2041	48 27.4%	0 0.0%	48 16.8%	21 9.2%	0 0.0%	21 7.6%	562 9.7%	-2.1%

Table 6.27 Link 3 – Upper Value Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R176 Carlingford Road Baseline Do Nothing Scenario	2023	296	20	317	418	15	433	8599	2.8%
	2026	310	23	332	437	17	454	9004	3.0%
	2032	336	27	363	473	21	494	9793	3.3%
	2041	357	32	389	503	24	528	10454	3.7%
Forecast Do Something Typical Traffic	2026	313	23	335	439	17	456	9050	3.0%
	2032	347	27	374	479	21	500	9933	3.3%
	2041	368	32	400	509	24	534	10594	3.6%
Forecast Do Something Winter Maintenance	2026	313	23	335	439	17	456	9063	3.0%
	2032	347	27	374	479	21	500	9972	3.3%
	2041	368	32	400	509	24	534	10634	3.6%
Forecast Do Something Summer Maintenance	2026	314	23	336	439	17	456	9075	3.0%
	2032	348	27	375	479	21	500	9972	3.3%
	2041	369	32	401	509	24	534	10634	3.6%
Forecast Do Something Typical Traffic Incremental Increase Over Do Nothing	2026	3 1.0%	0 0.0%	3 0.9%	2 0.5%	0 0.0%	2 0.4%	46 0.5%	0.0%
	2032	11 3.3%	0 0.0%	11 3.0%	6 1.3%	0 0.0%	6 1.2%	140 1.4%	0.0%
	2041	11 3.1%	0 0.0%	11 2.8%	6 1.2%	0 0.0%	6 1.1%	140 1.3%	-0.1%
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	3 1.0%	0 0.0%	3 0.9%	2 0.5%	0 0.0%	2 0.4%	59 0.7%	0.0%
	2032	11 3.3%	0 0.0%	11 3.0%	6 1.3%	0 0.0%	6 1.2%	179 1.8%	0.0%
	2041	11 3.1%	0 0.0%	11 2.8%	6 1.2%	0 0.0%	6 1.1%	180 1.7%	-0.1%
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	4 1.3%	0 0.0%	4 1.2%	2 0.5%	0 0.0%	2 0.4%	71 0.8%	0.0%
	2032	12 3.6%	0 0.0%	12 3.3%	6 1.3%	0 0.0%	6 1.2%	179 1.8%	0.0%
	2041	12 3.4%	0 0.0%	12 3.1%	6 1.2%	0 0.0%	6 1.1%	180 1.7%	-0.1%

Table 6.28 Link 4 – Upper Value Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R175 Greenore Road South of L70661 Baseline Do Nothing Scenario	2023	88	62	150	156	5	160	3716	22.1%
	2026	92	69	161	163	5	168	3939	23.2%
	2032	99	84	183	176	7	183	4390	25.3%
	2041	106	98	204	188	8	195	4789	27.1%
Forecast Do Something Typical Traffic	2026	105	69	174	170	5	175	4084	22.3%
	2032	138	84	222	197	7	204	4825	23.0%
	2041	145	98	243	209	8	216	5225	24.9%
Forecast Do Something Winter Maintenance	2026	108	69	177	170	5	175	4124	22.1%
	2032	143	84	227	197	7	204	4944	22.4%
	2041	150	98	248	209	8	216	5343	24.3%
Forecast Do Something Summer Maintenance	2026	110	69	179	170	5	175	4164	21.9%
	2032	147	84	231	197	7	204	4944	22.4%
	2041	154	98	252	209	8	216	5343	24.3%
Forecast Do Something Typical Traffic Incremental Increase Over Do Nothing	2026	13 14.1%	0 0.0%	13 8.1%	7 4.3%	0 0.0%	7 4.2%	145 3.7%	-0.9%
	2032	39 39.4%	0 0.0%	39 21.3%	21 11.9%	0 0.0%	21 11.5%	435 9.9%	-2.3%
	2041	39 36.8%	0 0.0%	39 19.1%	21 11.2%	0 0.0%	21 10.8%	436 9.1%	-2.2%
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	16 17.4%	0 0.0%	16 9.9%	7 4.3%	0 0.0%	7 4.2%	185 4.7%	-1.1%
	2032	44 44.4%	0 0.0%	44 24.0%	21 11.9%	0 0.0%	21 11.5%	554 12.6%	-2.9%
	2041	44 41.5%	0 0.0%	44 21.6%	21 11.2%	0 0.0%	21 10.8%	554 11.6%	-2.8%
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	18 19.6%	0 0.0%	18 11.2%	7 4.3%	0 0.0%	7 4.2%	225 5.7%	-1.3%
	2032	48 48.5%	0 0.0%	48 26.2%	21 11.9%	0 0.0%	21 11.5%	554 12.6%	-2.9%
	2041	48 45.3%	0 0.0%	48 23.5%	21 11.2%	0 0.0%	21 10.8%	554 11.6%	-2.8%

Table 6.29 Link 5 – Upper Value Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
L70661 Euston Street Baseline Do Nothing Scenario	2023	79	0	79	98	0	98	2014	0.6%
	2026	82	0	82	102	0	102	2105	0.6%
	2032	89	0	89	111	0	111	2283	0.7%
	2041	95	0	95	118	0	118	2431	0.8%
Forecast Do Something Typical Traffic	2026	89	0	89	109	0	109	2171	0.6%
	2032	110	0	110	132	0	132	2481	0.6%
	2041	116	0	116	139	0	139	2629	0.7%
Forecast Do Something Winter Maintenance	2026	89	0	89	109	0	109	2171	0.6%
	2032	110	0	110	132	0	132	2481	0.6%
	2041	116	0	116	139	0	139	2629	0.7%
Forecast Do Something Summer Maintenance	2026	89	0	89	109	0	109	2171	0.6%
	2032	110	0	110	132	0	132	2481	0.6%
	2041	116	0	116	139	0	139	2629	0.7%
Forecast Do Something Typical Traffic Incremental Increase Over Do Nothing	2026	7 8.5%	0 0.0%	7 8.5%	7 6.9%	0 0.0%	7 6.9%	66 3.1%	0.0%
	2032	21 23.6%	0 0.0%	21 23.6%	21 18.9%	0 0.0%	21 18.9%	198 8.7%	-0.1%
	2041	21 22.1%	0 0.0%	21 22.1%	21 17.8%	0 0.0%	21 17.8%	198 8.1%	-0.1%
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	7 8.5%	0 0.0%	7 8.5%	7 6.9%	0 0.0%	7 6.9%	66 3.1%	0.0%
	2032	21 23.6%	0 0.0%	21 23.6%	21 18.9%	0 0.0%	21 18.9%	198 8.7%	-0.1%
	2041	21 22.1%	0 0.0%	21 22.1%	21 17.8%	0 0.0%	21 17.8%	198 8.1%	-0.1%
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	7 8.5%	0 0.0%	7 8.5%	7 6.9%	0 0.0%	7 6.9%	66 3.1%	0.0%
	2032	21 23.6%	0 0.0%	21 23.6%	21 18.9%	0 0.0%	21 18.9%	198 8.7%	-0.1%
	2041	21 22.1%	0 0.0%	21 22.1%	21 17.8%	0 0.0%	21 17.8%	198 8.1%	-0.1%

Table 6.30 Link 6 – Upper Value Network Value Two-way Traffic Flows

Assessment Scenario	Year	AM Peak 08:00-09:00hrs			PM Peak 17:00-18:00hrs			AADT	
		LV	HGV	Total	LV	HGV	Total	Value	%HGV
R175 Shore Road Baseline Do Nothing Scenario	2023	20	62	82	67	5	72	2018	40.1%
	2026	21	69	90	70	5	75	2164	41.6%
	2032	22	84	106	76	7	82	2464	44.4%
	2041	24	98	122	81	8	88	2738	46.8%
Forecast Do Something Typical Traffic	2026	27	69	96	70	5	75	2243	40.1%
	2032	40	84	124	76	7	82	2701	40.5%
	2041	42	98	140	81	8	88	2976	43.0%
Forecast Do Something Winter Maintenance	2026	30	69	99	70	5	75	2283	39.4%
	2032	45	84	129	76	7	82	2820	38.8%
	2041	47	98	145	81	8	88	3095	41.4%
Forecast Do Something Summer Maintenance	2026	32	69	101	70	5	75	2322	38.7%
	2032	49	84	133	76	7	82	2820	38.8%
	2041	51	98	149	81	8	88	3095	41.4%
Forecast Do Something Typical Traffic Incremental Increase Over Do Nothing	2026	6 28.6%	0 0.0%	6 6.7%	0 0.0%	0 0.0%	0 0.0%	79 3.7%	-1.5%
	2032	18 81.8%	0 0.0%	18 17.0%	0 0.0%	0 0.0%	0 0.0%	237 9.6%	-3.9%
	2041	18 75.0%	0 0.0%	18 14.8%	0 0.0%	0 0.0%	0 0.0%	238 8.7%	-3.8%
Forecast Do Something Winter Maintenance Incremental Increase Over Do Nothing	2026	9 42.9%	0 0.0%	9 10.0%	0 0.0%	0 0.0%	0 0.0%	119 5.5%	-2.2%
	2032	23 104%	0 0.0%	23 21.7%	0 0.0%	0 0.0%	0 0.0%	356 14.4%	-5.6%
	2041	23 95.8%	0 0.0%	23 18.9%	0 0.0%	0 0.0%	0 0.0%	357 13.0%	-5.4%
Forecast Do Something Summer Maintenance Incremental Increase Over Do Nothing	2026	11 52.4%	0 0.0%	11 12.2%	0 0.0%	0 0.0%	0 0.0%	158 7.3%	-2.9%
	2032	27 122%	0 0.0%	27 25.5%	0 0.0%	0 0.0%	0 0.0%	356 14.4%	-5.6%
	2041	27 112%	0 0.0%	27 22.1%	0 0.0%	0 0.0%	0 0.0%	357 13.0%	-5.4%

The incremental increase in traffic arising from the proposed development in the morning and evening peak hours is sub-threshold on Link 1 'R175 Dundalk Road' and on Link 3 'R176 Carlingford Road'. The incremental effect of development traffic on Link 2 'Greenore Road (South of IDA)' and Link 4 'Greenore Road (North of IDA)' exceed the typical threshold value of 10%. Similarly the effect on Link 5 'Euston Street' and Link 6 'Shore Road' exceed the threshold percentage and therefore warrant further detailed assessment. As with the average flow analysis where the threshold percentage values are exceeded, the numerical increases are not significant. By comparison with the earlier analysis, the baseline network traffic is approximately double the average and so it follows that the measure of percentage impact is halved in the upper value scenario. As in the earlier analysis sub-threshold incremental values are highlighted in the foregoing tables by 'green' figures where the increase is less than 10% and 'orange' figures where the incremental increase exceeds 10%.

Having regard to the TII advisory thresholds for national roads the following Table 6.31 summarises the increase over upper value traffic flow turning movements on the receiving road junctions in the study area.

Table 6.31 Percentage Uplift in Turning Movements – Do-Something (Upper Value)

Year	AM Peak 08:00-09:00hrs		PM Peak 17:00-18:00hrs		Daily 07:00-19:00hrs	
	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
2026	2026	1.0%	8.5%	0.4%	6.8%	0.7%
2032	2032	3.1%	23.5%	1.2%	18.9%	1.7%
2041	2041	2.9%	22.1%	1.1%	17.9%	1.6%

Table 6.31 shows that the average increase in the total traffic flow across the receiving road network in the morning peak hour is less than +3% at Site 1 and less than 20% at Site 2 closer to the port.

The results of the numerical assessment confirms that the effect of development traffic on the capacity of the receiving road network warrants further detailed analysis. Capacity assessments are typically undertaken using traffic modelling software.

6.8.2.9 Traffic Model Results – Capacity & Delay

As recommended by the TII and the CIHT, the Transport Research Laboratory (TRL) computer modelling program Junctions 10 has been used to assess the existing and future performance of the junctions. Junctions 10 is primarily intended as a means of assessing junction performance. The output provides performance indicators for roads designers and planners with regards to capacity, queuing and delay at junctions including priority junctions.

An 85% level of saturation corresponding to a Ratio of Flow to Capacity (RFC) of 0.850 is generally accepted at priority junctions in urban areas, although this figure should not be considered in isolation and should be viewed together with queuing and delay information. The indices for junction operation can be relatively complex, nonetheless an RFC of 0.850 is considered the rule of thumb target figure for a priority junction functioning within capacity.

In the following section we provide a summary of the salient output results for each assessment. The limitations of the Junctions 10 model mean that it will not accurately model exact traffic conditions especially in congested networks. The output results of the analyses should primarily be viewed as a performance indicator facilitating a comparative analysis between the various traffic flow scenarios from which the effect of development traffic can be evaluated.

The infrastructure upon which the proposed development relies has is exiting so a comparative assessment of existing infrastructure at the baseline year of 2023 provides a practical and observable (no development) basis upon which to judge the output analyses of future network performance.

The modelling analyses of the receiving road network includes various traffic flow scenarios aimed at providing a comprehensive assessment of the capacity of the existing junctions under various assumptions and various development scenarios between the forecast year of opening 2026 and the Design Year of 2041 15 years after the opening of the proposed development. The criteria for each assessment and each of the scenarios is specifically set out and clearly detailed.

The various assessment traffic flow scenarios for the proposed development are undertaken based upon Average Value network traffic flows as set out below.

- **Scenario 1 (S1):** 2023 Baseline Year of traffic surveys (Average Traffic Flows)
- **Scenario 2 (S2):** 2026 Year of Opening ‘Do-Nothing’ peak hour assessments which includes for the TII forecast growth in network traffic flows. No traffic flows arising the proposed development is included.
- **Scenario 3 (S3):** 2026 Year of Opening ‘Do-Something’ peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included.
- **Scenario 4 (S4):** 2026 Year of Opening ‘Do-Something’ peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Winter Maintenance period.
- **Scenario 5 (S5):** 2026 Year of Opening ‘Do-Something’ peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Summer Maintenance period.
- **Scenario 6 (S6):** 2032 Year of Opening +6 years (Opening of Phase 2) ‘Do-Nothing’ peak hour assessments which includes for the TII forecast growth in network traffic flows. No traffic flows arising the proposed development is included.
- **Scenario 7 (S7):** 2032 Year of Opening +6 years ‘Do-Something’ peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included.
- **Scenario 8 (S8):** 2032 Year of Opening +6 years ‘Do-Something’ peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Winter Maintenance period.
- **Scenario 9 (S9):** 2032 Year of Opening +6 years ‘Do-Something’ peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from

permanent staff at the proposed development are included together with additional Technician staff involved in the Summer Maintenance period.

- **Scenario 10 (S10):** 2041 Year of Opening +6 years (Opening of Phase 2) 'Do-Nothing' peak hour assessments which includes for the TII forecast growth in network traffic flows. No traffic flows arising the proposed development is included.
- **Scenario 11 (S11):** 2041 Year of Opening +6 years 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included.
- **Scenario 12 (S12):** 2041 Year of Opening +6 years 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Winter Maintenance period.
- **Scenario 13 (S13):** 2041 Year of Opening +6 years 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Summer Maintenance period.

Additional assessment traffic flow scenarios using Upper Value network traffic flows have been undertaken as set out below.

- **Scenario 14 (S14):** 2023 Baseline Year of traffic surveys (Upper Value Traffic Flows).
- **Scenario 15 (S15):** 2026 Year of Opening 'Do-Nothing' peak hour assessments which includes for the TII forecast growth in network traffic flows. No traffic flows arising the proposed development is included.
- **Scenario 16 (S16):** 2026 Year of Opening 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included.
- **Scenario 17 (S17):** 2026 Year of Opening 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Winter Maintenance period.
- **Scenario 18 (S18):** 2026 Year of Opening 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Summer Maintenance period.
- **Scenario 19 (S19):** 2032 Year of Opening +6 years (Opening of Phase 2) 'Do-Nothing' peak hour assessments which includes for the TII forecast growth in network traffic flows. No traffic flows arising the proposed development is included.
- **Scenario 20 (S20):** 2032 Year of Opening +6 years 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included.
- **Scenario 21 (S21):** 2032 Year of Opening +6 years 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Winter Maintenance period.

- **Scenario 22 (S22):** 2032 Year of Opening +6 years 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Summer Maintenance period.
- **Scenario 23 (S23):** 2041 Year of Opening +6 years (Opening of Phase 2) 'Do-Nothing' peak hour assessments which includes for the TII forecast growth in network traffic flows. No traffic flows arising the proposed development is included.
- **Scenario 24 (S24):** 2041 Year of Opening +6 years 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included.
- **Scenario 25 (S25):** 2041 Year of Opening +6 years 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Winter Maintenance period.
- **Scenario 26 (S26):** 2041 Year of Opening +6 years 'Do-Something' peak hour assessments which includes for the TII forecast growth in network traffic flows. Typical traffic flows arising from permanent staff at the proposed development are included together with additional Technician staff involved in the Summer Maintenance period.

6.8.2.9.1 R175 Dundalk Road / R176 Carlingford Road Junction (Site 1)

6.8.2.9.1.1 Effects of Development Traffic on Network (Average Value)

The underlying assessment criteria are as follows:

- Using Average Value network traffic flows (Average activity at port)
- With/Without Proposed Development
- National Road Central Value Growth Rate Applied to Network

The results of the Junctions 10 modelling analyses output for the existing junction subject to surveyed 2023 traffic flows is provided in Table 6.32 and is a basis for practical calibrating of the output from the model for forecast traffic flow scenarios.

Table 6.33, Table 6.34 and Table 6.35 provide a summary of junction modelling output data for the R175/R176 priority junction subject to the forecast future morning and evening weekday peak hour traffic flow scenarios for the year of opening and future year scenarios.

Summary modelling results provide directly comparable output data relating to both the 'Do-Nothing' scenario where only network traffic growth is considered and the 'Do-Something' scenario where the forecast traffic generation arising from the proposed development has been added to the 'Do-Nothing' network traffic flows that have been factored in accordance with TII Publication PE-PAG-02017 'Project Appraisal Guidelines for National Roads Unit 5.3 Travel Demand Projections' (Oct 2021).

The road network assessments include for no specific local developments other than the proposed development. The developments considered are those already in operation. Other future development that may give rise to the generation of new traffic on the receiving roads network is included for by the application of TII published growth rates to all traffic on all routes within the study area. The additional traffic generation arising on the receiving road network assumed in this Chapter through the application of the TII growth rates is as follows:

- 2023-2026 (Opening Year) 1.0451 (Cars) 1.1129 (HGV)
- 2023-2032 (Opening Year +6yrs) 1.1326 (Cars) 1.3532 (HGV)
- 2023-2041 (Opening Year +15yrs) 1.2051 (Cars) 1.5843 (HGV)

In the context of the location the growth rates are likely to result in robust estimates of future network traffic flows that will account for local economic development. The cumulative traffic arising from future economic growth and development resulting in traffic growth on the receiving Regional Road network are included for in both the 'do nothing' and 'do something' road network assessment scenarios. It is reasonable to expect that traffic arising from the proposed development would by definition be included, or at least included in part in the TII growth rates. This factor is disregarded in the traffic assessments that all traffic to the proposed development is considered totally new to the road network for the proposed period of operation commencing with the occupation of Phase 1 in 2026.

The results of the analyses for the year of the traffic surveys in May 2023 are summarised Table 6.32 and show that the junction operates within capacity with a maximum RFC of 0.290. The overall junction Level of Service (LOS) is A in both the morning and evening peak hours.

Table 6.32 Baseline 2023 Modelling Assessment R175/R176 Junction (Site 1)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave	95%				Delay	LOS	
Baseline 2023 Scenario S1 - AM Peak	B-AC	0.3	1.4	7.81	0.23	A	2.79	A	186% [B-AC]
	C-AB	0.0	0.5	6.33	0.01	A			
Baseline 2023 Scenario S1 - PM Peak	B-AC	0.4	1.7	8.25	0.29	A	3.31	A	145% [B-AC]
	C-AB	0.1	0.5	5.72	0.05	A			

Arm A: R175 Dundalk Rd. **Arm B:** R176 Carlingford Rd. **Arm C:** R175 Greenore Rd.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for the year of opening of Phase 1 in 2026 are summarised in Table 6.33.

The results of the analyses for 2026 show that the junction operates within capacity with a maximum RFC of 0.31 and junction Level of Service A. Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the proposed development on the operation of the junction can be determined. The effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.01 seconds and registers no effect on RFC that is registered in the mathematical equations of the modelling program. The effect in the evening peak hour is forecast to consist of an increased junction delay in the order of 0.01 seconds and a corresponding decrease in RFC in the order of 0.01 or 1%. Comparing the data in Table 6.33 against the 2023 analyses in Table 6.32 suggests that neither network growth or the traffic arising from the proposed development will not have a significant impact on the operation of the existing junction in the year of opening 2026.

Table 6.33 2026 Year of Opening Phase 1 - Assessment R175/R176 Junction (Site 1)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2026 Scenario S2 - AM Peak	B-AC	0.3	1.5	8.01	0.25	A	2.81	A	170% [B-AC]
	C-AB	0.0	0.5	6.39	0.01	A			
With Typical 2026 Scenario S3 - AM Peak	B-AC	0.3	1.0	8.07	0.25	A	2.82	A	164% [B-AC]
	C-AB	0.0	0.5	6.40	0.01	A			
With Winter 2026 Scenario S4 - AM Peak	B-AC	0.3	1.1	8.09	0.25	A	2.82	A	162% [B-AC]
	C-AB	0.0	0.5	6.41	0.01	A			
With Summer 2026 Scenario S5 - AM Peak	B-AC	0.3	1.1	8.09	0.26	A	2.83	A	161% [B-AC]
	C-AB	0.0	0.5	6.41	0.01	A			
Do Nothing 2026 Scenario S2 - PM Peak	B-AC	0.4	1.9	8.51	0.30	A	3.33	A	131% [B-AC]
	C-AB	0.1	0.5	5.67	0.05	A			
With Typical 2026 Scenario S3 - PM Peak	B-AC	0.4	1.9	8.55	0.31	A	3.34	A	129% [B-AC]
	C-AB	0.1	0.5	5.68	0.06	A			
With Winter 2026 Scenario S4 - PM Peak	B-AC	0.4	1.9	8.55	0.31	A	3.34	A	129% [B-AC]
	C-AB	0.1	0.5	5.68	0.06	A			
With Summer 2026 Scenario S5 - PM Peak	B-AC	0.4	1.9	8.55	0.31	A	3.33	A	129% [B-AC]
	C-AB	0.1	0.5	5.68	0.06	A			

Arm A: R175 Dundalk Rd. **Arm B:** R176 Carlingford Rd. **Arm C:** R175 Greenore Rd.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for the year of opening of Phase 2 in 2032 are summarised in Table 6.34.

The results of the analyses for 2032 show that the junction operates within capacity with a maximum RFC of 0.34 and junction Level of Service A. Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.03 seconds and a reduction in RFC of 0.02 or 2%. The effect in the evening peak hour is forecast to consist of no increase in junction delay and a decrease in RFC in the order of 0.01 or 1%.

Table 6.34 2032 Opening of Phase 2 - Assessment R175/R176 Junction (Site 1)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2032 Scenario S6 - AM Peak	B-AC	0.4	1.5	8.56	0.28	A	2.93	A	141% [B-AC]
	C-AB	0.0	0.5	6.50	0.01	A			
With Typical 2032 Scenario S7 - AM Peak	B-AC	0.4	1.8	8.79	0.30	A	2.96	A	125% [B-AC]
	C-AB	0.0	0.5	6.42	0.02	A			
With Winter 2032 Scenario S8 - AM Peak	B-AC	0.4	1.8	8.82	0.30	A	2.96	A	124% [B-AC]
	C-AB	0.0	0.5	6.43	0.02	A			
With Summer 2032 Scenario S9 - AM Peak	B-AC	0.4	1.8	8.86	0.30	A	2.96	A	122% [B-AC]
	C-AB	0.0	0.5	6.44	0.02	A			
Do Nothing 2032 Scenario S6 - PM Peak	B-AC	0.5	2.3	9.13	0.34	A	3.56	A	109% [B-AC]
	C-AB	0.1	0.5	5.77	0.06	A			
With Typical 2032 Scenario S7 - PM Peak	B-AC	0.5	2.4	9.25	0.34	A	3.56	A	105% [B-AC]
	C-AB	0.1	0.5	5.73	0.07	A			
With Winter 2032 Scenario S8 - PM Peak	B-AC	0.5	2.4	9.25	0.34	A	3.56	A	105% [B-AC]
	C-AB	0.1	0.5	5.73	0.07	A			
With Summer 2032 Scenario S9 - PM Peak	B-AC	0.5	2.4	9.25	0.34	A	3.56	A	105% [B-AC]
	C-AB	0.1	0.5	5.73	0.07	A			

Arm A: R175 Dundalk Rd. **Arm B:** R176 Carlingford Rd. **Arm C:** R175 Greenore Rd.

Comparing the data in Table 6.34 against the 2023 analyses in Table 6.32 suggests that neither network growth or the traffic arising from the proposed development will have a significant impact on the operation of the existing junction in the year of opening of Phase 2 in 2032.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for the design year which is the year of opening of Phase 1 plus 15 years are summarised in Table 6.35.

The results of the analyses for 2041 design year show that the junction operates within capacity with a maximum RFC of 0.37 and junction Level of Service A. Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.04 seconds and a reduction in RFC of 0.02 or 2%. The effect in the evening peak hour is forecast to consist of an increase in junction delay of 0.01 seconds and a decrease in RFC in the order of 0.01 or 1% for the C-AB stream and no increase in the B-AC stream (no reduction in capacity on the minor arm R176).

Table 6.35 2041 Design Year - Assessment R175/R176 Junction (Site 1)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2041 Scenario S10 - AM Peak	B-AC	0.4	1.9	9.10	0.31	A	3.06	A	120% [B-AC]
	C-AB	0.0	0.5	6.60	0.01	A			
With Typical 2041 Scenario S11- AM Peak	B-AC	0.5	2.1	9.38	0.33	A	3.10	A	107% [B-AC]
	C-AB	0.0	0.5	6.48	0.02	A			
With Winter 2041 Scenario S12 - AM Peak	B-AC	0.5	2.1	9.41	0.33	A	3.10	A	106% [B-AC]
	C-AB	0.0	0.5	6.49	0.02	A			
With Summer 2041 Scenario S13 - AM Peak	B-AC	0.5	2.2	9.43	0.33	A	3.10	A	105% [B-AC]
	C-AB	0.0	0.5	6.49	0.02	A			
Do Nothing 2041 Scenario S10 - PM Peak	B-AC	0.6	2.7	9.73	0.37	A	3.77	A	94% [B-AC]
	C-AB	0.1	0.5	5.81	0.06	A			
With Typical 2041 Scenario S11 - PM Peak	B-AC	0.6	2.7	9.88	0.37	A	3.78	A	90% [B-AC]
	C-AB	0.1	0.5	5.77	0.07	A			
With Winter 2041 Scenario S13- PM Peak	B-AC	0.6	2.7	9.88	0.37	A	3.78	A	90% [B-AC]
	C-AB	0.1	0.5	5.77	0.07	A			
With Summer 2041 Scenario S13 - PM Peak	B-AC	0.6	2.7	9.88	0.37	A	3.78	A	90% [B-AC]
	C-AB	0.1	0.5	5.77	0.07	A			

Arm A: R175 Dundalk Rd. **Arm B:** R176 Carlingford Rd. **Arm C:** R175 Greenore Rd.

6.8.2.9.1.2 Effects of Development Traffic on Network (Upper Value)

The underlying assessment criteria are as follows:

- Using Upper Value network traffic flows (Increased activity at port)
- With/Without Proposed Development
- National Road Central Value Growth Rate Applied to Network

The results of the Junctions 10 modelling analyses output for the existing junction subject to the higher flows recorded in the first week of the Automatic Traffic Counter (ATC) surveys on May 2023 is provided in Table 6.36 and is a basis for practical calibrating of the output from the model for forecast traffic flow scenarios. The data shows that the junction operates within capacity with a maximum RFC of 0.260. The overall junction Level of Service (LOS) is A in both the morning and evening peak hours

Table 6.36 Baseline 2023 Modelling Assessment R175/R176 Junction (Site 1)

Assessment Scenario Upper Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave	95%				Delay	LOS	
Baseline 2023 Scenario S14 - AM Peak	B-AC	0.4	1.2	8.48	0.26	A	2.14	A	134% [B-AC]
	C-AB	0.0	0.5	6.49	0.02	A			
Baseline 2023 Scenario S14 - PM Peak	B-AC	0.4	1.2	8.29	0.26	A	2.27	A	122% [B-AC]
	C-AB	0.1	0.5	6.32	0.06	A			

Arm A: R175 Dundalk Rd. **Arm B:** R176 Carlingford Rd. **Arm C:** R175 Greenore Rd.

Table 6.37, Table 6.38 and Table 6.39 provide a summary of junction modelling output data for the R175/R176 priority junction subject to the forecast future morning and evening weekday peak hour traffic flow scenarios for the year of opening and future year scenarios. As before, the summary modelling results provide directly comparable output data relating to both the 'Do-Nothing' scenario where only network traffic growth is considered and the 'Do-Something' scenario where the forecast traffic generation arising from the proposed development has been added. The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for 2026 are summarised in Table 6.37.

Table 6.37 2026 Year of Opening Phase 1 - Assessment R175/R176 Junction (Site 1)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2026 Scenario S15 - AM Peak	B-AC	0.4	1.5	8.76	0.28	A	2.19	A	121% [B-AC]
	C-AB	0.0	0.5	6.56	0.02	A			
With Typical 2026 Scenario S16 - AM Peak	B-AC	0.4	1.6	8.84	0.28	A	2.20	A	117% [B-AC]
	C-AB	0.0	0.5	6.58	0.02	A			
With Winter 2026 Scenario S17 - AM Peak	B-AC	0.4	1.6	8.87	0.28	A	2.20	A	116% [B-AC]
	C-AB	0.0	0.5	6.59	0.02	A			
With Summer 2026 Scenario S18- AM Peak	B-AC	0.4	1.6	8.88	0.29	A	2.21	A	115% [B-AC]
	C-AB	0.0	0.5	6.59	0.02	A			
Do Nothing 2026 Scenario S15- PM Peak	B-AC	0.4	1.5	8.57	0.28	A	2.29	A	122% [B-AC]
	C-AB	0.1	0.5	6.28	0.07	A			
With Typical 2026 Scenario S16 - PM Peak	B-AC	0.4	1.5	8.61	0.28	A	2.30	A	120% [B-AC]
	C-AB	0.1	0.5	6.28	0.07	A			
With Winter 2026 Scenario S17 - PM Peak	B-AC	0.4	1.5	8.61	0.28	A	2.30	A	120% [B-AC]
	C-AB	0.1	0.5	6.28	0.07	A			
With Summer 2026 Scenario S18 - PM Peak	B-AC	0.4	1.5	8.61	0.28	A	2.30	A	120% [B-AC]
	C-AB	0.1	0.5	6.28	0.07	A			

Arm A: R175 Dundalk Rd. **Arm B:** R176 Carlingford Rd. **Arm C:** R175 Greenore Rd.

The results of the analyses for 2026 show that the junction operates within capacity with a maximum RFC of 0.28 and junction Level of Service A.

Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.01 seconds and a corresponding increase in RFC of 0.01 or 1%.

The effect in the evening peak hour is forecast to consist of an increased junction delay in the order of 0.01 seconds and no corresponding decrease in RFC.

Comparing the data in Table 6.37 against the 2023 upper value analyses in Table 6.36 suggests that neither network growth or the traffic arising from the proposed development will have a significant impact on the operation of the existing junction in the year of opening 2026.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for the year of opening of Phase 2 in 2032 are summarised in Table 6.38.

Table 6.38 2032 2032 Opening of Phase 2 - Assessment R175/R176 Junction (Site 1)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2032 Scenario S19 - AM Peak	B-AC	0.4	1.9	9.52	0.31	A	2.31	A	98% [B-AC]
	C-AB	0.0	0.5	6.72	0.02	A			
With Typical 2032 Scenario S20- AM Peak	B-AC	0.5	2.2	9.85	0.33	A	2.41	A	88% [B-AC]
	C-AB	0.0	0.5	6.69	0.02	A			
With Winter 2032 Scenario S21- AM Peak	B-AC	0.5	2.2	9.89	0.33	A	2.41	A	87% [B-AC]
	C-AB	0.0	0.5	6.70	0.02	A			
With Summer 2032 Scenario S22- AM Peak	B-AC	0.5	2.3	9.92	0.33	A	2.41	A	86% [B-AC]
	C-AB	0.0	0.5	6.72	0.02	A			
Do Nothing 2032 Scenario S19 - PM Peak	B-AC	0.4	1.9	9.24	0.31	A	2.45	A	101% [B-AC]
	C-AB	0.1	0.6	6.43	0.09	A			
With Typical 2032 Scenario S20- PM Peak	B-AC	05	2.0	9.37	0.31	A	2.48	A	97% [B-AC]
	C-AB	0.1	0.6	6.38	0.09	A			
With Winter 2032 Scenario S21- PM Peak	B-AC	0.5	2.0	9.37	0.31	A	2.48	A	97% [B-AC]
	C-AB	0.1	0.6	6.38	0.09	A			
With Summer 2032 Scenario S22 - PM Peak	B-AC	0.5	2.0	9.37	0.31	A	2.48	A	97% [B-AC]
	C-AB	0.1	0.6	6.38	0.09	A			

Arm A: R175 Dundalk Rd. **Arm B:** R176 Carlingford Rd. **Arm C:** R175 Greenore Rd.

The results of the analyses for 2032 show that the junction operates within capacity with a maximum RFC of 0.33 and junction Level of Service A. Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.1 seconds and a reduction in RFC of 0.02 or 2%.

The effect in the evening peak hour is forecast to consist of an increase in junction delay in order of 0.03 seconds and no decrease in RFC.

Comparing the data in Table 6.38 against the 2023 upper value analyses in Table 6.36 suggests that neither network growth or the traffic arising from the proposed development will have a significant impact on the operation of the existing junction in the year of opening of Phase 2 in 2032.

Table 6.39 2041 Design Year - Assessment R175/R176 Junction (Site 1)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2041 Scenario S23 - AM Peak	B-AC	0.5	2.4	10.23	0.34	A	2.44	A	81% [B-AC]
	C-AB	0.0	0.5	6.87	0.02	A			
With Typical 2041 Scenario S24- AM Peak	B-AC	0.6	2.7	10.61	0.36	A	2.54	A	73% [B-AC]
	C-AB	0.0	0.5	6.80	0.03	A			
With Winter 2041 Scenario S25 - AM Peak	B-AC	0.6	2.7	10.65	0.37	A	2.54	A	72% [B-AC]
	C-AB	0.0	0.5	6.81	0.03	A			
With Summer 2041 Scenario S26 - AM Peak	B-AC	0.6	2.7	10.71	0.37	A	2.55	A	71% [B-AC]
	C-AB	0.0	0.5	6.82	0.03	A			
Do Nothing 2041 Scenario S23 - PM Peak	B-AC	0.5	2.3	9.81	0.34	A	2.58	A	86% [B-AC]
	C-AB	0.1	0.6	6.56	0.09	A			
With Typical 2041 Scenario S24 - PM Peak	B-AC	0.5	2.4	9.97	0.34	A	2.60	A	83% [B-AC]
	C-AB	0.1	0.6	6.47	0.10	A			
With Winter 2041 Scenario S25- PM Peak	B-AC	0.5	2.4	9.97	0.34	A	2.60	A	83% [B-AC]
	C-AB	0.1	0.6	6.47	0.10	A			
With Summer 2041 Scenario S26 - PM Peak	B-AC	0.5	2.4	9.97	0.34	A	2.60	A	83% [B-AC]
	C-AB	0.1	0.6	6.47	0.10	A			

Arm A: R175 Dundalk Rd. **Arm B:** R176 Carlingford Rd. **Arm C:** R175 Greenore Rd.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for the design year which is the year of opening of Phase 1 plus 15 years are summarised in Table 6.39.

The results of the analyses for 2041 design year show that the junction operates within capacity with a maximum RFC of 0.37 and junction Level of Service A. Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.1 seconds and a reduction in RFC of 0.03 or 3%. The effect in the evening peak hour is forecast to consist of an increase in junction delay of 0.02 seconds and a decrease in RFC in the order of 0.01 or 1% for the C-AB stream and no increase in the B-AC stream (no reduction in capacity on the minor arm R176).

6.8.2.9.1.3 Capacity Assessment Conclusion

The results of the Junctions 10 using the typical average network flows and the upper value flows (both recorded in the traffic surveys of May 2023) serve to demonstrate that the proposed development will not have a significant impact on the operation of the existing junction. The level of impact is considered likely to be practically imperceptible to existing users of the R175/R176 junction located approximately 1.5km south-west of the proposed development at Greenore Port.

6.8.2.9.2 R175 Shore Road / L70661 Euston Street (Site 2)

6.8.2.9.2.1 Effects of Development Traffic on Network (Average Value)

The underlying assessment criteria are as follows:

- Using Average Value network traffic flows (Average activity at port)
- With/Without Proposed Development
- National Road Central Value Growth Rate Applied to Network

The results of the Junctions 10 modelling analyses output for the existing Euston Street junction subject to surveyed 2023 traffic flows is provided in Table 6.40 and is a basis for practical calibrating of the output from the model for forecast traffic flow scenarios.

Table 6.41, Table 6.42 and Table 6.43 provide a summary of junction modelling output data for the R175 Shore Road/L70661 Euston Street priority junction subject to the forecast future morning and evening weekday peak hour traffic flow scenarios for the year of opening and future year scenarios.

Summary modelling results provide directly comparable output data relating to both the 'Do-Nothing' scenario where only network traffic growth is considered and the 'Do-Something' scenario where the forecast traffic generation arising from the proposed development has been added to the 'Do-Nothing' network traffic flows that have been factored in accordance with TII Publication PE-PAG-02017.

As per the assessments of the R175/R176 junction, the road network assessments include for no specific local developments other than the proposed development. Other future development that may give rise to the generation of new traffic on the receiving roads network is included for by the application of TII published growth rates to all traffic on all routes within the study area. As set out above, in the context of the location the growth rates are likely to result in robust estimates of future network traffic flows that will account for local economic development. The cumulative traffic arising from future economic growth and development resulting in traffic growth on the receiving Regional Road network are included for in both the 'do nothing' and 'do something' road network assessment scenarios. As in the earlier junction assessments it is reasonable to expect that traffic arising from the proposed development would by definition be included, or at least included in part in the TII growth rates. This factor is disregarded in the traffic assessments that all traffic to the proposed development is considered totally new to the road network.

The results of the analyses for the year of the traffic surveys in May 2023 are summarised Table 6.40 and show that the junction operates within capacity with a maximum RFC of 0.06. The overall junction Level of Service (LOS) is A in both the morning and evening peak hours.

Table 6.40 Baseline 2023 Modelling Assessment R175/L70661 Junction (Site 2)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave	95%				Delay	LOS	
Baseline 2023 Scenario S1 - AM Peak	B-AC	0.0	0.5	7.16	0.03	A	0.96	A	900% [B-AC]
	C-AB	0.0	0.5	5.72	0.01	A			
Baseline 2023 Scenario S1 - PM Peak	B-AC	0.1	0.5	6.57	0.06	A	1.62	A	900% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			

Arm A: R175 Greenore Rd. **Arm B:** L70661 Euston St. **Arm C:** R175 Shore Rd.

Table 6.41 2026 Year Opening Phase 1 - Assessment R175/L70661 Junction (Site 2)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2026 Scenario S2 - AM Peak	B-AC	0.0	0.5	7.16	0.03	A	0.79	A	900% [B-AC]
	C-AB	0.0	0.5	5.72	0.01	A			
With Typical 2026 Scenario S3 - AM Peak	B-AC	0.0	0.5	6.69	0.03	A	0.80	A	900% [B-AC]
	C-AB	0.0	0.5	5.72	0.01	A			
With Winter 2026 Scenario S4 - AM Peak	B-AC	0.0	0.5	6.74	0.04	A	0.82	A	837% [B-AC]
	C-AB	0.0	0.5	5.75	0.01	A			
With Summer 2026 Scenario S5 - AM Peak	B-AC	0.0	0.5	6.74	0.04	A	0.82	A	829% [B-AC]
	C-AB	0.0	0.5	5.75	0.01	A			
Do Nothing 2026 Scenario S2 - PM Peak	B-AC	0.1	0.5	6.59	0.06	A	1.85	A	900% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			
With Typical 2026 Scenario S3 - PM Peak	B-AC	0.1	0.5	6.71	0.07	A	1.86	A	783% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			
With Winter 2026 Scenario S4 - PM Peak	B-AC	0.1	0.5	6.71	0.07	A	1.86	A	783% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			
With Summer 2026 Scenario S5 - PM Peak	B-AC	0.1	0.5	6.71	0.07	A	1.86	A	783% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			

Arm A: R175 Greenore Rd. **Arm B:** L70661 Euston St. **Arm C:** R175 Shore Rd.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for 2026 are summarised in Table 6.41.

The results of the analyses for 2026 show that the junction operates within capacity with a maximum RFC of 0.07 and junction Level of Service A. Comparing the ‘Do-Nothing’ and ‘Do-Something’ scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.03 seconds and a reduction in RFC of 0.01 or 1%. The effect in the evening peak hour is forecast to consist of an increase in junction delay of 0.01 seconds and a decrease in RFC of 0.01 or 1%.

Comparing the data in Table 6.40 against the 2023 average value analyses in Table 6.41 suggests that neither network growth or the traffic arising from the proposed development will have a significant impact on the operation of the existing junction in the year of opening of Phase 1 in 2026.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for the year of opening of Phase 2 in 2032 are summarised in Table 6.42.

The results of the analyses for 2032 show that the junction operates within capacity with a maximum RFC of 0.10 and junction Level of Service A. Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.03 seconds and a reduction in RFC of less than 1%. The effect in the evening peak hour is forecast to consist of an increase in junction delay of 0.62 seconds and a decrease in RFC in the order of 0.04 or 4%.

Table 6.42 2032 Opening of Phase 2 - Assessment R175/L70661 Junction (Site 2)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2032 Scenario S6 - AM Peak	B-AC	0.0	0.5	6.77	0.04	A	0.70	A	788% [B-AC]
	C-AB	0.0	0.5	5.74	0.01	A			
With Typical 2032 Scenario S7 - AM Peak	B-AC	0.0	0.5	6.92	0.04	A	0.73	A	647% [B-AC]
	C-AB	0.0	0.5	5.81	0.01	A			
With Winter 2032 Scenario S8 - AM Peak	B-AC	0.0	0.5	6.94	0.04	A	0.73	A	632% [B-AC]
	C-AB	0.0	0.5	5.82	0.01	A			
With Summer 2032 Scenario S9 - AM Peak	B-AC	0.0	0.5	6.95	0.04	A	0.73	A	619% [B-AC]
	C-AB	0.0	0.5	5.83	0.01	A			
Do Nothing 2032 Scenario S6 - PM Peak	B-AC	0.1	0.5	6.63	0.06	A	1.62	A	823% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			
With Typical 2032 Scenario S7 - PM Peak	B-AC	0.1	0.5	6.97	0.10	A	2.24	A	564% [B-AC]
	C-AB	0.0	0.5	5.60	0.0	A			
With Winter 2032 Scenario S8 - PM Peak	B-AC	0.1	0.5	6.97	0.10	A	2.24	A	564% [B-AC]
	C-AB	0.0	0.5	5.60	0.0	A			
With Summer 2032 Scenario S9 - PM Peak	B-AC	0.1	0.5	6.97	0.10	A	2.24	A	564% [B-AC]
	C-AB	0.0	0.5	5.60	0.0	A			

Arm A: R175 Greenore Rd. **Arm B:** L70661 Euston St. **Arm C:** R175 Shore Rd.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for the design year which is the year of opening of Phase 1 plus 15 years are summarised in Table 6.43. The results of the analyses for 2041 design year show that the junction operates within capacity with a maximum RFC of 0.10 and junction Level of Service A. Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.04 seconds and a reduction in RFC of 0.01 or 1%. The effect in the evening peak hour is forecast to consist of an increase in junction delay of 0.64 seconds and a decrease in RFC in the order of 0.03 or 3% for the B-AC stream.

Table 6.43 2041 Design Year - Assessment R175/L70661 Junction (Site 2)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2041 Scenario S10 - AM Peak	B-AC	0.0	0.5	6.86	0.04	A	0.70	A	695% [B-AC]
	C-AB	0.0	0.5	5.76	0.01	A			
With Typical 2041 Scenario S11- AM Peak	B-AC	0.0	0.5	7.01	0.05	A	0.74	A	580% [B-AC]
	C-AB	0.0	0.5	5.83	0.01	A			
With Winter 2041 Scenario S12 - AM Peak	B-AC	0.0	0.5	7.03	0.05	A	0.74	A	566% [B-AC]
	C-AB	0.0	0.5	5.84	0.01	A			
With Summer 2041 Scenario S13 - AM Peak	B-AC	0.0	0.5	7.04	0.05	A	0.74	A	557% [B-AC]
	C-AB	0.0	0.5	5.85	0.01	A			
Do Nothing 2041 Scenario S10 - PM Peak	B-AC	0.1	0.5	6.69	0.07	A	1.62	A	765% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			
With Typical 2041 Scenario S11 - PM Peak	B-AC	0.1	0.5	7.02	0.10	A	2.26	A	533% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			
With Winter 2041 Scenario S13- PM Peak	B-AC	0.1	0.5	7.02	0.10	A	2.26	A	533% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			
With Summer 2041 Scenario S13 - PM Peak	B-AC	0.1	0.5	7.02	0.10	A	2.26	A	533% [B-AC]
	C-AB	0.0	0.5	5.60	0.00	A			

Arm A: R175 Greenore Rd. **Arm B:** L70661 Euston St. **Arm C:** R175 Shore Rd.

6.8.2.9.2.2 Effects of Development Traffic on Network (Upper Value)

The underlying assessment criteria are as follows:

- Using Upper Value network traffic flows (Increased activity at port)
- With/Without Proposed Development
- National Road Central Value Growth Rate Applied to Network

Table 6.44 Baseline 2023 Modelling Assessment R175/L70661 Junction (Site 2)

Assessment Scenario Upper Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave	95%				Delay	LOS	
Baseline 2023 Scenario S14 - AM Peak	B-AC	0.0	0.5	5.65	0.03	A	0.55	A	811% [B-AC]
	C-AB	0.0	0.5	5.40	0.01	A			
Baseline 2023 Scenario S14 - PM Peak	B-AC	0.0	0.5	5.51	0.04	A	0.87	A	900% [B-AC]
	C-AB	0.0	0.5	5.25	0.00	A			

Arm A: R175 Greenore Rd. **Arm B:** L70661 Euston St. **Arm C:** R175 Shore Rd.

The results of the Junctions 10 modelling analyses output for the existing junction subject to the higher flows recorded in the first week of the Automatic Traffic Counter (ATC) surveys on May 2023 is provided in Table 6.44 and is a basis for practical calibrating of the output from the model for forecast traffic flow scenarios. The data shows that the junction operates within capacity with a maximum RFC of 0.040. The overall junction Level of Service (LOS) is A in both the morning and evening peak hours.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for 2026 are summarised in Table 6.45.

The results of the analyses for 2026 show that the junction operates within capacity with a maximum RFC of 0.050 and junction Level of Service A. The effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.02 seconds and a corresponding decrease in RFC of less than 1%. The effect in the evening peak hour is forecast to consist of an increased junction delay in the order of 0.16 seconds and a corresponding decrease in RFC of 1%. The existing junction will continue to operate satisfactorily whilst the effect of the proposed development at Phase 1 is shown not to be not significant.

Table 6.45 2026 Year Opening Phase 1 - Assessment R175/L70661 Junction (Site 2)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2026 Scenario S15 - AM Peak	B-AC	0.0	0.5	5.71	0.03	A	0.53	A	811% [B-AC]
	C-AB	0.0	0.5	5.42	0.01	A			
With Typical 2026 Scenario S16 - AM Peak	B-AC	0.0	0.5	5.75	0.03	A	0.54	A	738% [B-AC]
	C-AB	0.0	0.5	5.45	0.01	A			
With Winter 2026 Scenario S17 - AM Peak	B-AC	0.0	0.5	5.75	0.03	A	0.54	A	695% [B-AC]
	C-AB	0.0	0.5	5.46	0.01	A			
With Summer 2026 Scenario S18- AM Peak	B-AC	0.0	0.5	5.76	0.03	A	0.55	A	685% [B-AC]
	C-AB	0.0	0.5	5.46	0.01	A			
Do Nothing 2026 Scenario S15- PM Peak	B-AC	0.0	0.5	5.53	0.04	A	0.87	A	900% [B-AC]
	C-AB	0.0	0.5	5.25	0.00	A			
With Typical 2026 Scenario S16 - PM Peak	B-AC	0.0	0.5	5.62	0.05	A	1.03	A	807% [B-AC]
	C-AB	0.0	0.5	5.26	0.00	A			
With Winter 2026 Scenario S17 - PM Peak	B-AC	0.0	0.5	5.62	0.05	A	1.03	A	808% [B-AC]
	C-AB	0.0	0.5	5.26	0.00	A			
With Summer 2026 Scenario S18 - PM Peak	B-AC	0.0	0.5	5.62	0.05	A	1.03	A	808% [B-AC]
	C-AB	0.0	0.5	5.26	0.00	A			

Arm A: R175 Greenore Rd. **Arm B:** L70661 Euston St. **Arm C:** R175 Shore Rd.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for the year of opening of Phase 2 in 2032 are summarised in Table 6.46.

Table 6.46 2032 Opening of Phase 2 - Assessment R175/L70661 Junction (Site 2)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2032 Scenario S19 - AM Peak	B-AC	0.0	0.5	5.81	0.03	A	0.51	A	629% [B-AC]
	C-AB	0.0	0.5	5.46	0.01	A			
With Typical 2032 Scenario S20- AM Peak	B-AC	0.0	0.5	5.93	0.04	A	0.51	A	538% [B-AC]
	C-AB	0.0	0.5	5.55	0.01	A			
With Winter 2032 Scenario S21- AM Peak	B-AC	0.0	0.5	5.94	0.04	A	0.52	A	527% [B-AC]
	C-AB	0.0	0.5	5.56	0.01	A			
With Summer 2032 Scenario S22- AM Peak	B-AC	0.0	0.5	5.95	0.04	A	0.52	A	520% [B-AC]
	C-AB	0.0	0.5	5.56	0.01	A			
Do Nothing 2032 Scenario S19 - PM Peak	B-AC	0.0	0.5	5.59	0.05	A	0.87	A	769% [B-AC]
	C-AB	0.0	0.5	5.27	0.00	A			
With Typical 2032 Scenario S20- PM Peak	B-AC	0.1	0.5	5.81	0.08	A	1.30	A	570% [B-AC]
	C-AB	0.0	0.5	5.27	0.00	A			
With Winter 2032 Scenario S21- PM Peak	B-AC	0.1	0.5	5.81	0.08	A	1.30	A	570% [B-AC]
	C-AB	0.0	0.5	5.27	0.00	A			
With Summer 2032 Scenario S22 - PM Peak	B-AC	0.1	0.5	5.81	0.08	A	1.30	A	570% [B-AC]
	C-AB	0.0	0.5	5.27	0.00	A			

Arm A: R175 Greenore Rd. **Arm B:** L70661 Euston St. **Arm C:** R175 Shore Rd.

The results of the analyses for 2032 show that the junction operates within capacity with a maximum RFC of 0.08 and junction Level of Service A. Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.1 seconds and a reduction in RFC of 0.01 or 1%. The effect in the evening peak hour is forecast to consist of an increase in junction delay in order of 0.43 seconds and a reduction in RFC in the order of 3%.

The results of the Junctions 10 modelling for the peak hour traffic flow scenarios for the design year which is the year of opening of Phase 1 plus 15 years are summarised in Table 6.47.

The results of the analyses for 2041 design year show that the junction operates within capacity with a maximum RFC of 0.08 and junction Level of Service A. Comparing the 'Do-Nothing' and 'Do-Something' scenario results the incremental effects of the traffic arising at the proposed development in the morning peak hour is forecast to consist of an increased junction delay in the order of 0.1 seconds and a reduction in RFC of less than 1%. The effect in the evening peak hour is forecast to consist of an increase in junction delay of 0.41 seconds and a decrease in RFC in the order of 0.03 or 3% for the B-AC stream (reduction in capacity due to traffic turning right from Euston Street to R1756).

Table 6.47 2041 Design Year - Assessment R175/L70661 Junction (Site 2)

Assessment Scenario Ave. Values	Stream	Queue (Veh)		Delay (s)	RFC	LOS	Junction		Network Residual Capacity
		Ave.	95%				Delay	LOS	
Do Nothing 2041 Scenario S23 - AM Peak	B-AC	0.0	0.5	5.91	0.04	A	0.50	A	544% [B-AC]
	C-AB	0.0	0.5	5.49	0.01	A			
With Typical 2041 Scenario S24- AM Peak	B-AC	0.0	0.5	6.04	0.04	A	0.51	A	473% [B-AC]
	C-AB	0.0	0.5	5.57	0.01	A			
With Winter 2041 Scenario S25 - AM Peak	B-AC	0.0	0.5	6.05	0.04	A	0.51	A	464% [B-AC]
	C-AB	0.0	0.5	5.58	0.01	A			
With Summer 2041 Scenario S26 - AM Peak	B-AC	0.0	0.5	6.07	0.04	A	0.51	A	457% [B-AC]
	C-AB	0.0	0.5	5.59	0.01	A			
Do Nothing 2041 Scenario S23 - PM Peak	B-AC	0.1	0.5	5.64	0.05	A	0.87	A	450% [B-AC]
	C-AB	0.0	0.5	5.27	0.00	A			
With Typical 2041 Scenario S24 - PM Peak	B-AC	0.1	0.5	5.86	0.08	A	1.28	A	400% [B-AC]
	C-AB	0.0	0.5	5.28	0.00	A			
With Winter 2041 Scenario S25- PM Peak	B-AC	0.1	0.5	5.86	0.08	A	1.28	A	400% [B-AC]
	C-AB	0.0	0.5	5.28	0.00	A			
With Summer 2041 Scenario S26 - PM Peak	B-AC	0.1	0.5	5.86	0.08	A	1.28	A	400% [B-AC]
	C-AB	0.0	0.5	5.28	0.00	A			

Arm A: R175 Greenore Rd. **Arm B:** L70661 Euston St. **Arm C:** R175 Shore Rd.

6.8.2.10 Capacity Assessment Conclusion

The results of the Junctions 10 using the typical average network flows and the upper value flows (both recorded in the traffic surveys of May 2023) serve to demonstrate that the proposed development will not have a significant impact on the operation of the existing junction. The level of impact is considered likely to be practically imperceptible to existing users of the Euston Street junction in terms of delay and level of service. The traffic flows at the junction on weekdays is very low and the numerical analysis shows an approximate 20-40% increase in peak hour traffic at the junction which may be noticeable to existing users. It is noted however that development traffic will be entering the street in the morning against a predominant outbound commuter flow from the area which is characterised by residences. The reverse will prevail in the evening with residents returning and office/staff generated traffic generally leaving the area. It is noted that daily traffic flows to and from Euston Street during the weekend exceed those forecast in the assessments for the weekday. The assessment figures include for national road traffic growth and development traffic generation, both of which are considered robust. Applying national road growth rates to the residential cul-de-sac is extremely robust and has been done in the interest of a comprehensive and satisfactorily robust capacity assessment. This notwithstanding, the results of the capacity assessments show that the existing receiving road network is not under peak hour pressure at present and will satisfactorily accommodate the traffic generation by the proposed development without significant negative impact. The level of impact on the capacity, queuing, operation and level of service at the Shore Road/Euston Street junction will not be significant.

6.8.3 Cumulative Effects

6.8.3.1 Construction Phase

A number of minor developments have been granted permission within the surrounding area, these are typically associated with extensions or alterations to single buildings. Identified developments with the study area with potential for cumulative traffic impacts include the following:

- Lisa and Sean Crudden (Ref: LCC 231);
- Tara and Declan Boyle (Ref: LCC 22614);
- Andrew Bothwell (Ref: LCC 211331);
- Brendan Rafferty (Ref: LCC 211223);
- Valerie Halpenny (Ref: LCC 19202);
- Damien Wynne and Martina McNally (Ref: LCC 2360256);
- Cooley Peninsula Men's Shed (Ref: LCC 23125);
- Hanlon Transport Ltd (Ref: LCC 20362).

The road network assessments do not include for specific local developments other than the proposed development. Permitted development and other future development that may give rise to the generation of new traffic on the receiving roads network is included for by the application of TII published growth rates to existing surveyed traffic flows on the receiving road in the study area. The additional traffic generation arising on the receiving road network assumed in this Chapter through the application of the TII growth rates is as follows:

- 2023-2026 (Opening Year) 1.0451 (Cars) 1.1129 (HGV)
- 2023-2032 (Opening Year +6yrs) 1.1326 (Cars) 1.3532 (HGV)
- 2023-2041 (Opening Year +15yrs) 1.2051 (Cars) 1.5843 (HGV)

The cumulative traffic arising from future economic growth and development resulting in traffic growth on the receiving network are included for in both the ‘do-nothing’ and ‘do-something’ road network assessment scenarios. Baseline traffic on the receiving road network includes traffic generated by the existing port to which growth factors have been applied which is likely to result in robust calculations. It is reasonable to expect that traffic arising from the proposed development would by definition be included, or at least included in part in the TII growth rates. This factor is disregarded in the traffic assessments which considers all future traffic to the proposed development as totally new to the road network for both the proposed construction and operational periods.

6.8.4 Summary

The following Table 6.48 summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 6.48 Summary of Construction Phase Traffic Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Demolition	Negative	Slight	Receiving Network	Likely	Short-term	Direct
Piling for Port Buildings	Negative	Not Significant	Receiving Network	Likely	Short-term	Direct
Quay Wall / Breakwater Pontoon Piling	Negative	Not Significant	Receiving Network	Likely	Short-term	Direct
Construction of Proposed Buildings, Quay Wall and Pontoon & Gangway Installation	Negative	Slight	Receiving Network	Likely	Short-term	Direct
Port Entrance Upgrades	Negative	Not Significant	Receiving Network	Likely	Short-term	Direct
Dredging	Negative	Slight	Receiving Network	Likely	Short-term	Direct
General Construction Traffic	Negative	Not Significant	Receiving Network	Likely	Short-term	Direct

The following Table 6.49 summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 6.49 Summary of Operational Phase Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Operational Traffic	Negative	Not Significant	Receiving Network	Likely	Long-term	Direct

6.9 Mitigation

6.9.1 Incorporated Design Mitigation

The proposed development access is achieved through the existing port office entrance at Euston Street which it is proposed will be modified and enhanced in the interest of increases efficiency of vehicular entry and in the interest of pedestrian safety. Access to the new car park is provided directly from Shore Road. The location of the proposed new car park will ensure that Shore Road continues to provide an element of orbital function to Euston Street aiding in the distribution of traffic away from the centre of Greenore. The specific attributes of the scheme design and public realm enhancements at the northern end of Euston Stret contributes to achieving objectives of DMURS and includes well designed pedestrian crossing facilities along the key travel desire lines through the scheme. The enhancements at the port office entrance and entrance to the OMF buildings was designed with careful consideration for pedestrians and efficient movement of vehicles to and from the port offices and the proposed development. The proposed works include a segregated footway which will become the future link between Shore Road and the port office and OMF buildings. Internal provision for pedestrians includes for 2.0m segregated facilities on the main access road. High quality and slip resistant materials will be used in the construction of crossings and gradients at dropped crossings will be sufficiently shallow to allow access for users of all abilities. Sightlines at the new car park junction on Shore Road are provided in accordance with DMURS from a maximum setback of 2.4m. Roadside features and landscaping is so positioned not to obstruct visibility for drivers approaching or emerging from the Shore Road car park junction.

6.9.2 Construction Phase Mitigation

In the immediate vicinity of the development site it is surrounded by the port and sea to the northwest, north and northeast however there are areas of residential development to the south and north and east. There some industrial and commercial development on the R175 to the west of the port. The proposed development has the potential to affect this residential population, as well as the working population in the area.

During the construction phase of the proposed development, the local residents and local workers will be affected by a range of temporary and short- term effects such as noise, dust, HGV construction traffic, disruption to residential and commercial properties and perhaps in some occasional cases increased journey times.

Construction phase effects will be short-term. It is proposed that construction traffic will access the site via the port entrance at the end of Shore Road. Whilst in use for the purposes of construction the existing port entrance will remain an all movements priority arrangement which has sufficient capacity to accommodate construction traffic. The effects of construction traffic upon the capacity of the port access are forecast to be negligible.

The following mitigation measures are proposed:

- A Construction Traffic Management Plan will be prepared by the appointed contractor(s), including measures to provide information to affected parties, including advising land and property owners in advance of any diversions. Local access shall be maintained at all times. In addition, it is proposed that temporary signage shall be put in place to minimise disruption and ensure all road users understand that construction works are in progress.
- 'Construction Environmental Management Plan'(CEMP) shall include details on working hours, , construction traffic including deliveries, parking arrangements and incorporate the mitigation measures outlined here.
- All HGV vehicle movements will be restricted to the Main Port Entrance on Shore Road.

6.9.3 Operational Phase Mitigation

During the operational phase of the proposed development, there will be direct permanent effects consisting of increases in road traffic. Detailed traffic modelling analysis has shown that traffic arising from the proposed development will not result in significant impact upon the operation of the local receiving road network. The effects upon traffic in the study area including Greenore are shown not to be significant and so minimal mitigation measures (see below) are proposed for the operational phase.

6.9.3.1 Travel Planning

TTA Section 10 outlines a Modal Management Planning for the proposed development. The purpose of a mobility management planning is to evaluate the accessibility of a development to the current and future transport infrastructure relative to the site location and to promote initiatives and to support and encourage future occupiers of the proposed development to use sustainable travel modes. The principal objective of a MMP is to reduce levels of private car use by encouraging staff to walk, cycle, use public transport, car share or to reduce the frequency and/or length of trips.

Mobility management planning aims to positively influence the travel patterns and behaviours of future occupiers and their staff through the encouragement of greater use of active travel, public transport and other sustainable modes of travel to reduce the numbers of cars accessing the development. The aim is to provide more sustainable transport choices, which lead to a reduction in the need for vehicular journeys principally by private car.

The following mitigation measures are proposed:

- The Occupants will prepare a Modal Management Plan and encourage sustainable travel to work

6.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

6.10.1 Construction Phase

The following Table 6.50 summarises the identified likely significant effects during the construction phase of the proposed development after mitigation measures are applied.

Table 6.50 Summary of Construction Phase Traffic Effects after mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Demolition	Negative	Slight	Receiving Network	Likely	Short-term	Direct
Piling for Port Buildings	Negative	Not Significant	Receiving Network	Likely	Short-term	Direct
Quay Wall / Breakwater Pontoon Piling	Negative	Not Significant	Receiving Network	Likely	Short-term	Direct
Construction of Proposed Buildings, Quay Wall and Pontoon & Gangway Installation	Negative	Slight	Receiving Network	Likely	Short-term	Direct
Port Entrance Upgrades	Negative	Not Significant	Receiving Network	Likely	Short-term	Direct
Dredging	Negative	Slight	Receiving Network	Likely	Short-term	Direct

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
General Construction Traffic	Negative	Not Significant	Receiving Network	Likely	Short-term	Direct

6.10.2 Operational Phase

The following Table 6.51 summarises the identified likely significant effects during the operational phase of the proposed development after mitigation measures are applied.

Table 6.51 Summary of Operational Phase Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Operational Traffic	Negative	Not Significant	Receiving Network	Likely	Long-term	Direct

6.10.3 Cumulative Residual Effects

Given the location of other permitted developments and the likely potential for traffic generation it is not considered likely that there will be a perceptible cumulative impact.

6.11 Interactions

There are interactions between the traffic assessments and the noise/vibration and air quality/climate assessments. With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise and air quality environment are assessed by reviewing the change in traffic flows on roads close to the site. In this assessment, the impact of the interactions between traffic and noise are considered to be imperceptible due to the low level changes in traffic flows associated with the proposed development.

6.12 Monitoring

The contractor will be required to ensure construction activities operate within the parameters set out in the Contractors CEMP and the Construction Traffic Management Plan.

There is no monitoring recommended for the operational phase of the development as impacts due to traffic generation are predicted to be not significant.

6.13 Conclusion

Trafficwise Ltd., Traffic and Transportation Planning Consultants have undertaken an assessment of the potential traffic impacts as a result of the proposed development. Mitigation measures have been specified for both the construction stages and the operational stage. With mitigation applied the construction impacts will be reduced although will remain temporarily significant during periods of relatively intense works of short duration. During the operational stage impacts are forecast not to be significant whilst the mitigation measures of modal management will aim to reduce the number to vehicle trips generated by staff.

6.14 References and Sources

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- Louth County Development Plan 2021–2027
- Transport Infrastructure Ireland (TII) Publication TII-PE-PDV-02045 'Traffic and Transport Assessment Guidelines' (May 2014).
- Chartered Institution of Highways and Transportation (CIHT) 'Guidelines for Traffic Impact Assessment' (Sept 1994)
- Department of the Environment & Local Government (DoELG), Department of Transport (DoT) and the Dublin Transportation Office (DTO) 'Traffic Management Guidelines' (May 2022).
- TII Publication PE-PAG-02017 'Project Appraisal Guidelines for National Roads Unit 5.3 Travel Demand Projections' (Oct 2021).
- TII Publication PE-PAG-02039 'Project Appraisal Guidelines for National Roads Unit 16.1: Expansion Factors for Short Period Traffic Counts' (Oct 2016);
- TII Publication PE-PAG-02016 'Project Appraisal Guidelines for National Roads Unit 5.2 - Data Collection' (Dec 2023).
- TII Publication DN-GEO-03060 'Geometric Design of Junctions'. (May 2023)
- TII Publication DN-GEO-03061 'Rural Link Design'. (May 2023)
- Department of Transport, Tourism & Sport, 'Design Manual for Urban Roads & Streets' (2019).

CHAPTER 7

MATERIAL ASSETS:
BUILT SERVICES

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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7 Material Assets: Built Services

7.1 Introduction

This chapter of the EIAR was prepared to assess aspects of the proposed development relating to the material assets of surface water drainage, foul drainage, water supply and utilities (electricity, telecoms and gas) in respect of the proposed development and assesses the impact of the proposed development on the existing environment in the vicinity of the site. This chapter contains necessary information as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

This Chapter should be read in conjunction with Chapter 2 of this EIAR. Other materials assets including roads and traffic have been assessed in Chapter 06 Traffic and Transport of this EIAR. This section should be read in conjunction with the project design drawings and reports including the Engineering Planning Report by CSEA 2024 submitted as part of this application.

7.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Joseph McCarthy & Richard Browne Chartered Engineers and directors at McCarthy Browne Consulting Engineers with Mechanical and Electrical inputs from Shane Belton, Chartered Engineer and Director at Belton Consulting Engineers and Civil and Structural inputs from Ronan Geoghegan, Chartered Engineer and Director Clifton Scannell Emerson and Associates Consulting Engineers.

Joseph McCarthy has over 15 years of experience in the design and construction of built structures, civil and marine engineering schemes including the preparation of EIARs. These have included projects of similar scale and nature such as Dún Laoghaire Urban Beach & Floating Pool and the River Dodder Flood Alleviation Scheme. Richard Browne has over 15 years' experience in the design and construction of heavy civils, marine civils and floating structures.

Ronan Geoghegan has over 20 years of experience in the design of civil and structural projects of similar scale and nature. He and his team have completed EIARs for projects of similar scale such as Dexcom Medical, Athenry, Edge Connex Grid Connection, Clondalkin and multiple data centres.

Shane Belton has over 25 years of experience in his field and has been involved in major marine infrastructural projects in Dublin Port as well as commercial and industrial infrastructure for Harvey Norman, Texaco, Blue Gas, P&O and Seatruck.

7.3 Proposed Development

A full description of the proposed development is provided in **Chapter 2** of this EIAR. The following is a summary of the proposed works:

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. Where rock is encountered (estimate max of 1,000m^3), it will be reused on site.

Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 of the development.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA). The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine room wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary,, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

1. **'Terrestrial Port Area'**, (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.
2. **'Nearshore Environment'** (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
3. **'Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
4. **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

The following is a general location plan of the plots identified above.

Figure 7-1 Development Areas

7.3.1 Aspects Relevant to this Chapter

The aspects of the development that are considered relevant to this assessment and therefore considered as part of this chapter include new and adjusted surface water drainage systems, revised wastewater drainage systems, new freshwater supply systems, new electrical infrastructure and additional telecommunications provisioning by way of a new mast. These include the items described in the sub-headings below across the multiple phases of the project including construction phases & operational phases.

7.3.1.1 Surface Water Drainage

Site surveys indicate the existence of underground positive surface water drainage systems servicing the existing OMF catchment within the Port area. These systems ultimately discharge into the sea through existing outfalls.

7.3.1.1.1 Construction phase

Demolition works remove roof drainage systems from the OpenHydro building, dwelling house and portion of the Seafarer's room.

During the Construction phase, additional gravel hardstanding's will be formed in the proposed surface parking area at the Residential Site on Shore Road. These hard-standings will be self draining in to the soils below. These hard-standings will be in place from the outset of Phase 1 of the development until its completion at the end of Phase 2.

It is not anticipated that groundwater dewatering will be required during the works. As outlined in the Outline Construction & Environmental Management Plan, temporary bunding of the dredge material is anticipated with capture of run-off water.

7.3.1.1.2 Operational Phase

No additional hardstanding areas within the current terrestrial Port area are proposed. The proposed surface water drainage from the O&M site will use an existing outfall into Carlingford Lough. An attenuation system provides temporary storage whilst discharge rates through the outfall is limited during high tides due to tide locking. A bypass separator will be installed to intercept pollutants such as petroleum and oil before the surface water outfalls to sea. Permeable paving is proposed in all parking bay areas to promote infiltration to the groundwater where suitable. However, at locations where infiltration rate is very low, a proposed perforated pipe will convey the excess runoff back to the positive drainage network. Grasscrete will be used in sections of the site where fire tender access is required.

The proposed Shore Road surface carpark catchment area (satellite car park) will be drained by a series of proposed filter drains that will collect surface water runoff from impermeable vehicular aisles through the permeable paving car parking bays prior to discharging into the proposed stone filled attenuation system. The proposed stormwater drainage pipework network will range between 225mm and 450mm pipe diameter depending on the required flow capacity. For further details pertaining the above, please refer to CSEA Drawing 23_119_CSE-00-XX-DR-C-2563 that accompanies this planning application.

7.3.1.2 Wastewater Drainage

7.3.1.2.1 Construction phases

During the construction phases, it is intended that the main contractors compound and welfare will be located within the existing OpenHydro carpark with an average of 30 persons on site. When Phase 2 commences, and the former Open Hydro carpark is no longer available, the surface carpark on Shore Road will be used. Additional temporary compounds may be made available within the port boundaries. In areas where a foul network exists, arrangements will be made for welfare to be connected to existing welfare. In other areas chemical toilets and/or tanks will be utilised.

7.3.1.2.2 Operational phases

The proposed development, subject to this planning application, will comprise of a gravity foul sewer line consisting of 150mm and 225mm diameter pipework, discharging into the existing Uisce Eireann foul collection tank, collected by Uisce Eireann for off-site disposal to Dundalk Wastewater Treatment Plant. The overall wastewater discharge associated with the proposed development are in accordance with the demand/discharge rates estimated based on Irish Water wastewater infrastructure code of practice IW-CDS-5030-03 (Revision 2 - 2020).

7.3.1.3 Water Supply

7.3.1.3.1 Construction phase

No new supplies are anticipated during the construction phases.

7.3.1.3.2 Operational phase

A new watermain and fire supply is proposed for the development and has been confirmed feasible as per Uisce Éireann Confirmation of Feasibility (COF) letter reference number CDS23004977.

7.3.1.4 Electrical Supply

7.3.1.4.1 Construction phase

Electrical power during the construction phase will be supplied by ESB Networks from existing supply lines. A replacement substation will be constructed to facilitate Phase 2 of the works.

7.3.1.4.2 Operational phase

Increased supply to the facility is proposed by means of new electrical infrastructure including a relocated switch and new substation.

7.3.1.5 Gas Supply

There are no current gas supplies in the area, nor are any proposed for this development.

7.3.1.6 Telecommunications

7.3.1.6.1 Operational phase

Wired telecommunications by way for Eir infrastructure will be provided to each of the buildings.

Potential for wireless communications will be provided by way of a new communications mast in place of an existing smaller communications and lighting mast.

7.4 Methodology

This assessment is made in accordance with guidance from 'Guidelines on the information to be contained in environmental impact assessment reports', published by the EPA in May 2022. The study aims to identify the likely significant effects that the Development may have on water services and public utilities under the following headings.

- Surface Water Drainage
- Wastewater Drainage
- Water Supply
- Electrical Supply
- Telecommunications

7.4.1 Relevant Legislation & Guidance

This EIAR chapter has been produced in accordance with the 2014/52/EU Directive as transposed into Irish law through European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018) which amended the Planning and Development Act, 2000 and the Planning and Development Regulations 2001.

As part of assessing the likely impact of the proposed development, surface water runoff, foul drainage discharge and water usage calculations were carried out in accordance with the following guidelines & design standards:

- Louth County Council Development Plan 2021 – 2027 Chapter 10
- Greater Dublin Strategic Drainage Study (GDSDS)
- CIRIA SuDS Manual, 2015
- Irish Water, Code of Practice for Wastewater Infrastructure
- BS EN 752 Drain and sewer systems outside buildings

Electrical usage calculations and assessments were carried out in accordance with the following guidelines & design standards:

- Louth County Council Development Plan 2021 – 2027 Chapter 12
- Building Regulations 2019, Part L
- EU Directive 2010/31/EU

7.4.2 Site Surveys/Investigations

Information on built assets in the vicinity of the development lands was assembled from the following:

Desktop review of existing utilities including;

- ESB network utility mapping, Drawing 20221214-049-001_A3, December 2022.
- Gas Networks Ireland, email consultation with utility provider, July 2023
- Eir utility mapping, accessed via Eir Portal (https://cei.openeir.ie/) June 2022 & May 2024
- Virgin Media, consultation with operator, July 2023
- Uisce Éireann utility, consultation with utility provider & subsequence Confirmation of Feasibility CDS23004977

Additionally, a series of surveys were commissioned for the proposed development, summarised in McCarthy Browne drawings D1014 & D1015 including;

- Aerial and ordnance survey maps of the area
- Existing site investigation information provided by the Client.
- Utility mapping, topographical & bathymetric surveys commissioned for the proposed development. SixWest, 2023 & 2024

Supplementary site investigations were carried out for the proposed development and summarised as a Ground Investigation Report by GDG, 2024.

- Land based site investigation commissioned for the proposed development.

McCarthy Browne also have detailed site knowledge and experience of the site.

7.4.3 Consultation

A Pre-Connection Enquiry (reference CDS23004977) was lodged with Uisce Éireann in relation to proposed water and wastewater connections at the development site. A Confirmation Of Feasibility letter has been issued by Uisce Éireann confirming both are feasible without infrastructure upgrade (Refer to Engineering Planning Report by CSEA submitted under separate cover).

A Pre-planning consultation took place with Louth County Council 10th May 2024 and 20th May 2024.

7.5 Difficulties Encountered

No significant difficulties have been encountered.

7.6 Baseline Environment

The following utilities are noted as being within the proposed scheme study area. The study area is defined as 100m from the redline boundary.

Table 7.1 Utilities in the study area

Utility Provider	Service Type	Description
Greenore Port	Surface water sewer network	Roof water, gullies and surface water network including interceptor tanks and existing outfalls.
	Foul water sewer network	Foul lines to Uisce Éireann storage tank from former OpenHydro Building, Port offices and Greenore Village.
	Low voltage electricity	Underground ducting
	Communications ducting	Underground ducting
	CCTV	Underground cabling
ESB	High voltage electricity	None within proposed development area.
	Medium voltage electricity	Underground 10KV lines traversing underground from Shore Road.
	Low voltage electricity	Underground ducting from substations at OpenHydro and Existing Greenore Port Offices.
Telecommunications	Eir	1x1way MD 2x100 ducts feed to Greenore Port. Underground ducting (1x50pp) from main pit beside Greenore Port Offices to the Old OpenHydro Building.
	Virgin Media	None within proposed development area
Local Authority	Surface water sewer network	Existing 100mm diameter gravity surface water system passes from the Shore Road through the northeast portion of Greenore Port.
Uisce Eireann	Mains water network	An existing 100mm watermain enters the subject site at the location of the former OpenHydro Building. Another 100mm connection is fed into Greenore Port at the Port's heavy goods entrance on Shore Road.
	Foul water network	Existing foul water network enters Greenore Port at the main port entrance. An existing holding tank is present under 'Store 0', within Greenore Port.

7.6.1.1 Surface Water Drainage

The site is located adjacent to Carlingford Lough and as there is no downstream development before out falling to the Irish Sea.

The site survey indicates that the topography of the terrestrial port area and port office entrance area is predominately flat such that drainage is achieved by purpose made low areas where gullies are positioned to intercept the surface water. The survey furthermore indicates the existence of an underground positive surface water drainage system servicing the existing buildings and parking within the OMF Catchment (ie the Terrestrial Site). It shows gully drainage of existing hard standings and around the existing buildings. The gravity system discharges through a bypass separator before discharging into Carlingford Lough through an existing outfall. The outfall is a 225mm diameter uPVC pipe that discharges through a 225mm diameter flap valve.

The site of the proposed Shore Road Carpark is sloping eastward towards Shore Road and comprises a vacant residential dwelling and garden. A 100mm diameter existing surface water uPVC pipe system was identified along Shore Road adjoining the property. Existing gullies and manholes were also identified. This existing surface water uPVC pipe travels along Shore Road into Greenore Port where it discharges through an outfall northeast of Berth 1.

7.6.1.2 Wastewater Drainage

There is an existing Victorian brick arch tank structure (Septic Tank) located under the Greenore Port maintenance shed (Store 0), Figure 7-2. The local Greenore village foul network terminates here. The tank consists of 3no. chambers of 3.5mx4mx2m which approximately equals 84m3. An existing 225mm gravity foul line from the Greenore Village discharges into this tank. A 100mm pipe from the Greenore Port offices and a 150mm connection from the former Open Hydro building also discharges locally into the 225mm feed.

An overflow pipe from this existing Septic Tank that previously discharged directly into the Carlingford Lough was decommissioned by UÉ. Currently, this existing Septic Tank is emptied every fortnight as facilitated by LCC. The waste is disposed of at the Dundalk Waste Water Treatment Plant.

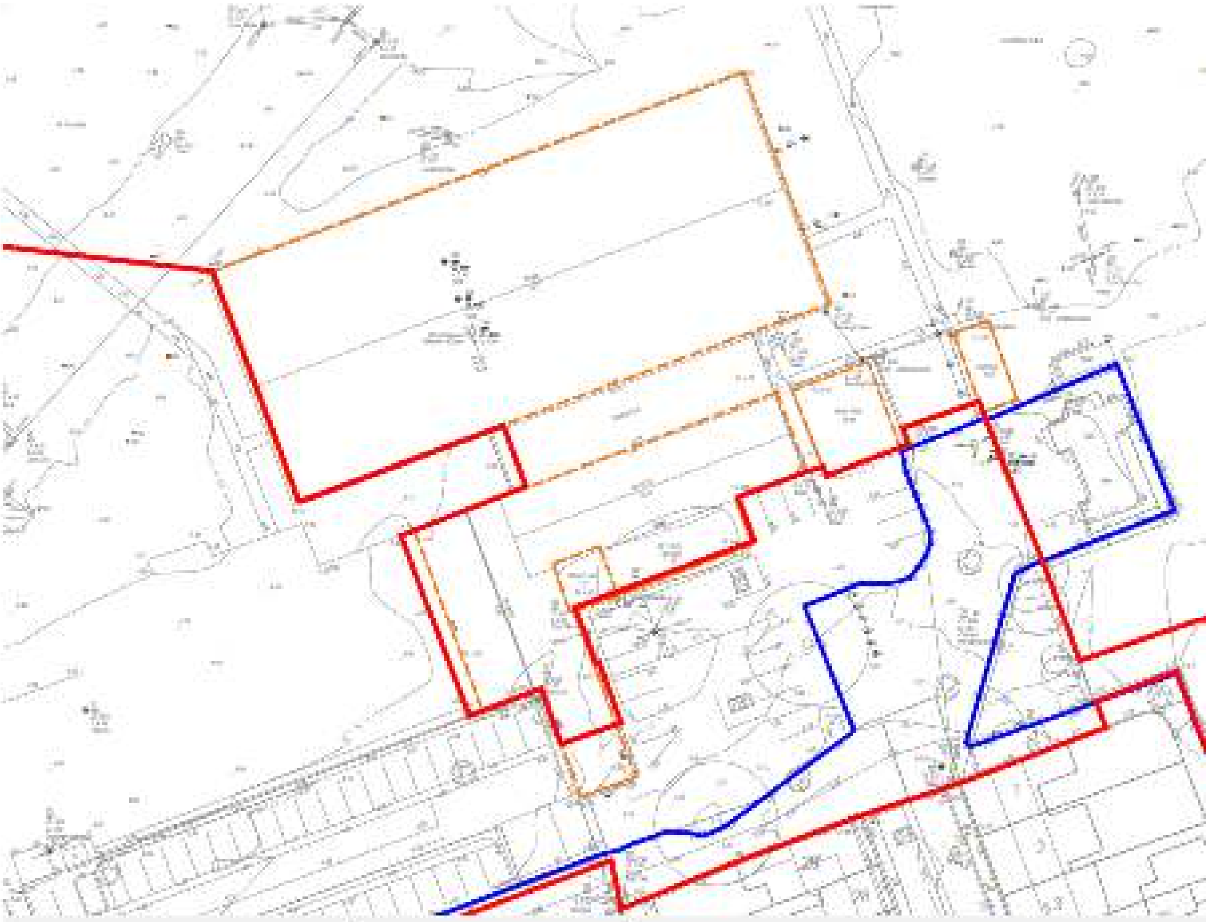

Figure 7-2 Extract of CSEA Drawing 23_119 - CSE - GEN - XX - DR - C - 2535 showing Store 0 to the North with tank surveyed under

7.6.1.3 Water Supply

There is an existing 100mm diameter watermain parallel to the southern boundary of the terrestrial port area of the site. There is also a network of pipes at the port office entrance coming from the Greenore Village. Under the proposed marshalling yard there is an existing water main network that is observed to be mostly obsolete considering that the buildings that would have been served are no longer there. Inside in application site boundary namely the Terrestrial Site, extending to the Existing Port on Berths 1 & 2, there is a watermain network consisting of 100mm pipe network that feeds the port and quay wall infrastructure.

7.6.1.4 Electrical Supply

ESB has 10 kV and low voltage infrastructure serving existing Greenore Port operations. This is located at the existing Greenore Port offices. A further substation is located at the former OpenHydro building. This substation has a redundant low-voltage room and a transformer which supplies power to the neighbouring Golf Club and a number of properties in Greenore Port Village.

7.6.1.5 Telecommunications

Virgin Media have confirmed they have no utilities present on or near the development site. As no new Virgin Media infrastructure is intended as part of the proposed development, Virgin Media infrastructure is not considered further in this assessment.

Eir have confirmed presence of existing utilities in the area. The main connection point is located close to the Greenore Port offices. The Greenore Port Offices and former OpenHydro building are serviced by underground ducting.

An existing mast within the Port lands provides lighting and CCTV for the Port currently.

7.7 The 'Do Nothing' Scenario

In a 'do nothing' scenario this proposed development will not be constructed. The existing baseline environment may be changed in accordance the natural development of the port and/or with the extant permissions for Greenore Port as per permitted developments; namely.

i. Extension and modification of existing Warehouse, **LCC Planning Ref 20268, ABP Ref 307862**

ii. New Warehouse, **LCC Planning Ref Planning ref 20543, ABP Ref 310184**

In neither application, nor in the natural growth of the Port is any significant modernisation or upgrade of utilities.

7.7.1 LCC Planning Ref 20268 ABP Ref 307862

This application concerns the extension and modification to the former OpenHydro warehouse including an overall 4,499m2 extension and modifications to the existing Store 0 including an increase in ridge height. Save for local diversions around the proposed works, it is not proposed to upgrade any utilities infrastructure as part of this development.

In respect of this application, the 'do nothing' scenario has no effect on the surrounding utilities infrastructure should no further development take place.

7.7.2 LCC Planning Ref 20543, ABP Ref 310184

This application considers the construction of 2 no. new warehouse buildings, Store 1 and Store 2 measuring 1,812 sq. m and 1,184 sq. m respectfully. As part of this development, new surface water drainage to service roof rainwater would be installed within the facility draining to the existing outfalls. Demolition of existing and proposed new ESB substation and switch room would be installed to facilitate the position of the new warehouses. Save for local diversions around the proposed works, it is not proposed to upgrade any other utilities infrastructure as part of this development.

In respect of this application, the 'do nothing' scenario has no effect on the surrounding utilities infrastructure should no further development take place.

7.8 Potential Significant Effects

7.8.1 Construction Phases

7.8.1.1 Surface Water Drainage

Without mitigations in place there is potential for the surface water drainage system to become contaminated by site run-off including silts, hydrocarbons. There is the potential for compound at the residential site to cause increase demand on the drainage network. Potential exists for road gullies and associated storm networks to become blocked from 'trackout'. Construction sequencing may also cause ponding.

Surface water networks may be damaged and/or disrupted during works during infrastructure connection/adjustment works.

Without appropriate mitigation, impacts during the construction will be significant and effects short-term and moderate.

7.8.1.2 Wastewater Drainage

Without mitigations in place there is potential for improper discharge from construction activities into the foul drainage network from the contractor's compound. Inappropriate demand may be placed on the foul drainage network due to peak demands and inappropriate discharges. Underground services may be damaged by the works or in the process of making or adjusting infrastructure connections.

With appropriate mitigation impacts during the construction will be negative and effects temporary and significant.

7.8.1.3 Water Supply

It is intended that any water supplies required during construction will be provided from existing water outlets located within the grounds of the Port.

Construction activities will require access to the local water supply network to facilitate connections. These have the potential to disrupt or contaminate local supplies.

Without mitigation, impacts during the construction effects will be local, negative, temporary and significant.

7.8.1.4 Electrical Supply

Construction activities will require temporary connection to existing electrical outlets within the Port for the provision of offices, welfare, lighting etc. There is potential for construction activities to disrupt existing electrical infrastructure through accidental impact or improper works.

With these mitigation measures in place potential impacts from these activities on the electrical supply network will be temporary, negative and significant.

7.8.1.5 Telecommunications

Construction phase activities will require access to the local wired Eir telecommunications network to facilitate connections. These works have the potential to disrupt the existing wired telecommunications infrastructure through accidental impact or improper works.

The proposed communications mast will be constructed before the demolition of the existing mast. Potential exists for local infrastructure (CCTV, lighting) to be disrupted during this work.

Without mitigation measures in place, potential impacts from these activities on the wired telecommunications network will be temporary, negative and significant.

Without mitigation measures in place, potential impacts from these activities on the wireless telecommunications network and Port CCTV will be local to the Port, temporary, negative and insignificant.

7.8.2 Operational Phase

The operational phase of the development may be in excess of 60 years and therefore all operational effects are described as permanent unless noted otherwise.

7.8.2.1 Surface Water Drainage

During the Operational Phases there will be potential for contamination of the surface water drainage system from hydrocarbons, silt/dust and other chemicals. Surface water discharge rates may exceed the capacity of the existing network.

There will be an increase in surface water volumes from the satellite area draining into the existing surface water network on Shore Road.

The effects without mitigation will therefore be negative and moderate.

7.8.2.2 Wastewater Drainage

The proposed development will increase the current discharge to the local foul system but will be less than the previous (OpenHydro) discharge allowance. This increase is catered for by increased servicing of the foul water storage tank located within the Port and maintained by Uisce Éireann. Uisce Éireann have confirmed that wastewater connection to existing infrastructure is feasible without infrastructural upgrade.

The impact significance of the effects is assessed to be negative and slight.

7.8.2.3 Water Supply

The proposed development will increase water demand on the water supply network. Uisce Éireann have confirmed that water supply connection is feasible without infrastructural upgrade. The impact significance of the effects is assessed to be negative and not significant.

7.8.2.4 Electrical Supply

Without mitigations there exists the possibility of creating excessive energy demand for the local network. This may be due to terrestrial development including the buildings, EV parking and associated service demands.

Provision is being made for future vessel fuelling technologies including Electric Power. Such technologies are in development and without mitigation could cause undue pressure on the electrical network.

The impact significance of the effects is assessed to be negative & significant.

7.8.2.5 Telecommunications

Wired telecommunications may be disrupted by the additional demands placed on them by the proposed facility.

Communications infrastructure will be mounted on a replacement mast to facilitate communication between future tenants and the offshore windfarms and CTV's. The mast will continue to be used by Greenore Port for CCTV and lighting.

The impact significance of the effects is assessed to be negative and moderate.

7.8.3 Cumulative Effects

The zone of influence has been considered as any proposed development utilising the wastewater network at Greenore or any other development within 500m of the site.

7.8.3.1 Extant Permissions outside the Port

A list of planning applications in the vicinity of the proposed development is given in Appendix 1-1. Planning applications of lessor scale including small scale residential projects have been considered as having a neutral, imperceptible effect owing to their insignificant demand on material assets. Planning applications outside of Greenore village are considered to have a neutral, imperceptible effect owing to them having no influence on any material assets relevant to this development. All developments are considered to have a permanent effect.

Table 7.2 Summary of Cumulative Effects

Planning Ref	Description	Date	Comments
LCC 23254	Permission for alterations and extension to existing precision engineering workshop and all associated site works	01/09/2023	Development consists of warehouse extension with no further development of materials assets under consideration. Will have a neutral, imperceptible effect.
LCC 23125	Permission for the change of use of existing building from commercial/residential use to voluntary community workshop and all associated site development works	18/08/2023	The proposed change of use of the commercial building to a voluntary community workshop (men's) shed represents no increased demand on material assets. Will have a neutral, imperceptible effect.
LCC 20362	Permission for development consisting of the installation of a grid connected photovoltaic panel system fitted to the roofs of existing warehouse buildings.	21/07/2020	Installation of photovoltaic panels to existing roofs which will add electrical capacity to the overall electrical grid. Will have a positive, imperceptible effect.

The changes to the stormwater network will have an imperceptible effect on aquaculture and therefore an imperceptible, neutral effect on extant or new licenses listed in Appendix 1-1. The proposed development has a neutral, imperceptible effect on all other applications listed in Appendix 1-1.

7.8.3.2 Extant permissions within the Port

The extant permissions within the Port are not intended to be implemented alongside the proposed development and will therefore have no effect on these developments.

7.8.4 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 7.3 Summary of Demolition & Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Contamination of surface water runoff due to construction activities	Negative	Significant	Local	Likely	Short-term	Worst-case
Improper discharge of foul drainage from contractor's compound	Negative	Slight	Local	Likely	Short-term	Worst-case
Road gullies and associated storm networks to become blocked from 'trackout'	Negative	Slight	Local	Likely	Short-term	Worst-case
Additional utilities demand during construction	Negative	Slight	Local	Likely	Short-term	Worst-case
Damage to existing underground and overhead services due to accidental impact or making of connections	Negative	Slight	Local	Likely	Temporary	Worst-case
Service interruptions may be required for switch over or service diversion purposes	Negative	Slight	Local	Likely	Temporary	Worst-case

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 7.4 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Contamination of the surface water drainage system from hydrocarbons, silt/dust and other chemicals.	Negative	Significant	Regional	Likely	Permanent	Worst-case
Surface water discharge rates may exceed the capacity of the existing network	Negative	Moderate	Local	Likely	Permanent	Worst-case
Increase in surface water volumes from satellite parking area	Negative	Moderate	Local	Likely	Permanent	Worst-case
Connection to existing wastewater infrastructure	Negative	Slight	Local	Likely	Permanent	Worst-case
Connection to water infrastructure	Negative	Slight	Local	Likely	Permanent	Worst-case
Increased electrical demand	Negative	Slight	Local	Likely	Permanent	Worst-case
Improved wired communications demand	Negative	Moderate	Local	Likely	Long-term	Worst-case

7.9 Mitigation

7.9.1 Incorporated Design Mitigation

- All new infrastructure will be designed in accordance with relevant standards and Codes of Practice.
- Surface water drainage systems have been designed in accordance with the Louth County Council Development Plan 2021-2027, Greater Dublin Strategic Drainage Study and CIRIA SuDS Manual 2015. This ensures that the surface water discharges are in line with sustainability standards. Specific measures include:
  - The provision of permeable paving
  - Stormwater attenuation tank provision
  - Rainwater harvesting
  - Flow control devices
  - Chemical interceptors
- Fuel and chemical storage areas will be double skinned and/or bunded in accordance with best practice.
- Wastewater networks have been designed in accordance with current regulations and standards. Efficiencies in water usage will be considered throughout the engineering design of the development.
- Buildings will be designed to achieve TGD Part L, NZEB 2002 compliance which incorporates renewable energy technologies and measures to avoid energy losses. These will have a positive effect on the electrical demand of the proposed development.
- Design phasing ensures the proposed relocation of the substation will be carried out in a phased manner with switchover procedures agreed with ESB. It is expected that any power outages will be planned and coordinated with affected customers (including the Golf club and village residents / business) and will be brief.
- New foul and water connections have received a Confirmation of Feasibility from Uisce Éireann.
- A surface water attenuation system has been designed in the satellite parking area prior to discharge to the existing Shore Road drainage system.
- The proposed substation is sized for the future expected capacity demand including EV charging. Additional duct capacity is designed into buried structures for future EV infrastructure.
- Arrangements will be made with the local utility provider to upgrade telecommunications infrastructure if required to meet wired telecommunications demand of the facility.

7.9.2 Demolition & Construction Phase Mitigation

- A site-specific Construction and Environmental Management Plan will be enacted by the Contractor. The plan will put in place good construction practices to reduce the potential for releases to the surface water environment. These include measures to control run-off and the mobilisation of suspended material especially during key activities such as earthworks, dredging & concreting. Good practice vehicle site exiting procedures will be followed including wheel washes as appropriate.

- Pre-construction consultation and authorisation will be achieved for all the relevant infrastructure connections.
- Any works required to material assets on or around the Site will be carried out in conjunction with the relevant provider to ensure minimal disruption to the existing users.
- Any works required to material assets on or around the Site will be carried out strictly in accordance with the relevant provider's Code of Practices.
- Permanent works will require the alteration of existing ESB networks and subject to pre-development authorisation from ESB. The Contractor will be required to put in place measures to the satisfaction of ESB to ensure that these works are carried out safely and in accordance with the appropriate requirements and ESB guidelines.

7.9.3 Operational Phase Mitigation

- There will be an overall reduction in surface water volumes in the OMF area owing to rainwater harvesting in each of the buildings. Existing drainage systems will be augmented through the use of petrol interceptors resulting in a long-term positive effect on the drainage system and existing outfalls.
- SuDS features will be maintained appropriately throughout the operational phase of the development by the relevant management body.
- Interceptors & COSHH stores will be maintained during the Operational phase of the development by the relevant management body. Potentially harmful chemicals such as fuels and waste oils will be stored in suitably bunded and/or double skinned tanks in designated areas.
- NZEB technologies will be employed to reduce electrical demand from the facility. The following NZEB technologies have been considered for the development; Centralised air to water heat pumps, photovoltaic systems, combined heat and power. Electrical infrastructure within the port will be upgraded as part of this proposed development to cater for increased demand.
- Any future additional power requirement will be agreed with the utility provider.

7.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

7.10.1 Demolition & Construction Phases

A series of mitigation measure have been prepared to minimise ill effects during demolition and construction phases. Provided these measures are employed, residual impacts are short-term, direct, negative and not significant.

7.10.2 Operational Phase

During the Operational Phase of the development infrastructure will continue to be maintained by the appropriate bodies. Provided these items are maintained as designed, residual impacts are long-term, local, negative and not significant.

7.10.3 Summary of Post-mitigation Effects

No significant residual effects during demolition, construction or operational phases are identified.

7.11 Risk of Major Accidents or Disasters

Major accidents or disasters may relate to the provision and storage of fuel on site. Appropriate mitigation measures such as bunding have been employed to avoid major accidents or disasters.

Major accidents or disasters may relate to the provision of sub-stations and power handling on site. Appropriate mitigation measures such as design in accordance with ESB standards and Building Regulations have been employed to avoid major accidents.

7.12 Worst Case Scenario

Worst case estimates have been used as part of this assessment. As a result, the above details the worst case impact for the proposed development.

7.13 Interactions

7.13.1 Land and soils

There are interactions with the land and soils chapter given the proposed infiltration from permeable paving into surrounding soils.

7.13.2 Landscape and Visual

The proposed permeable paving, substation infrastructure and NZEB plant requirements will have an effect on the visual appearance of the development and are therefore considered in the LVIA.

7.13.3 Climate

The built services have been designed with climate impact in mind including NZEB compliant buildings, SuDS drainage design and landscaping.

7.13.4 Water & Hydrology

There are interactions with the water and hydrology chapter due to the proposed discharge of stormwater to existing outfalls.

7.14 Monitoring

No monitoring is proposed in the demolition or construction phases.

Appropriate measures to maintain surface water drainage systems and infrastructure shall be put in place such as tank & bund monitoring alarms.

7.15 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 7.5 Summary of Demolition & Construction Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Contamination of surface water runoff due to construction activities Improper discharge of foul drainage from contractor's compound	A site-specific Construction and Environmental Management Plan will be enacted by the Contractor incorporating all mitigation measures..	None
Additional utilities demand during construction	Pre-construction consultation and authorisation will be achieved for all the relevant infrastructure connections.	none
Damage to existing utilities (under and over ground)	New infrastructure will be designed and constructed in accordance with relevant standards, policy and Codes of Practice.	none
Service interruptions may be required for switch over or service diversion purposes	Works required to material assets on or around the Site will be carried out in conjunction with the relevant provider to ensure minimal disruption to the existing users	none

The following Table summarises the Operational Phase mitigation and monitoring measures.

Table 7.6 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Contamination of surface water runoff due to operation activities	Interceptors will be maintained during the Operational phase of the development by the relevant management body.	Tank monitoring alarms
Surface water discharges in excess of capacity.	Integration of stormwater attenuations systems and SUDs drainage features.	Regular maintenance
Storage of chemicals	Interceptors & COSHH stores will be maintained during the Operational phase of the development by the relevant management body.	Tank monitoring alarms Bund monitoring alarms
Additional electricity demands by new structures and facility uses causing capacity issues.	Provision made in landside infrastructure for future energy demands, future connections subject to necessary permissions. Buildings designed and constructed to NZEB standards	none

Likely Significant Effect	Mitigation	Monitoring
Additional wired telecommunications demand causing capacity issues.	Consultation will take place with utilities providers to determine any inline upgrades required as part of a new connection application.	none

7.16 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the proposed development on material assets. These impacts have been considered for the demolition, construction and operational phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures set out in this chapter are adhered to in full throughout all phases, the overall predicted impact of the proposed development is **long-term, slight** and **negative**.

7.17 References and Sources

- Guidelines on the information to be contained in environmental impact assessment reports. Environmental Protection Agency (EPA, 2022).
- Louth County Development Plan (2021-2027).
- Directive 2014/52/EU (16 April 2014) European Parliament.
- CIRIA 532 (2001). Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.
- CIRIA 650 (2005). Environmental Good Practice on Site.
- CIRIA 753 (2015). The SuDS Manual.
- Greater Dublin Strategic Drainage Study (GDSDS)
- Irish Water, Code of Practice for Wastewater Infrastructure
- BS EN 752 Drain and sewer systems outside buildings
- Building Regulations 2019, Part L
- EU Directive 2010/31/EU
- Greenore Ground Investigation Report, GDG 2024

CHAPTER 8

MATERIAL ASSETS: WASTE

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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8 Material Assets: Waste

8.1 Introduction

This chapter evaluates the impacts, if any, which the proposed development may have on Material Assets - Waste as defined in the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU) and the EPA 2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports during the construction and operational phases of the proposed development, as described in Chapter 2 (Development Description).

A site-specific Resource Waste Management Plan (RWMP) has been prepared by AWN Consulting to guide and manage the waste generated during the construction phase of the proposed development (including excavation / dredging and demolition works) and has been included as Appendix 8.1. The RWMP was prepared in accordance with the Environmental Protection Agency's (EPA) document Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects (2021).

The Chapter has been prepared in accordance with European Commissions Guidelines, Guidance on the preparation of the Environmental Impact Assessment Report (2017), the EPA Guidelines on the Information to be contained in EIAR (2022) and the EU Commission Notice on changes and extensions to projects, 2021.

These documents will ensure the management of wastes arising at the development site in accordance with legislative requirements and best practice standards.

8.2 Expertise & Qualifications

This Chapter has been prepared by Chonaill Bradley (Bsc ENV,PG Dip Circ Econ, AssocCIWM) of AWN Consulting. Chonaill is a Principal Environmental Consultant in the Environment Team at AWN. He holds a BSc in Environmental Science from Griffith University, Australia and a Postgraduate Diploma in Circular Economy Leadership for the Built Environment from the Atlantic Technological University, Galway. He is an Associate Member of the Institute of Waste Management (AssocCIWM). Chonaill has over nine years' experience in the environmental consultancy sector and specialises in waste management.

8.3 Proposed Development

A full description of the proposed development is set out in Chapter 2 of this EIAR. The following is a summary of the proposed works.

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

The proposed development is described in further detail below.

8.4 Proposed Site

The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

1. **'Terrestrial Port Area'**, (c.2ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.
2. **'Nearshore Environment'** (c.2ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
3. **'Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
4. **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

The following is a general location plan of the plots identified above.

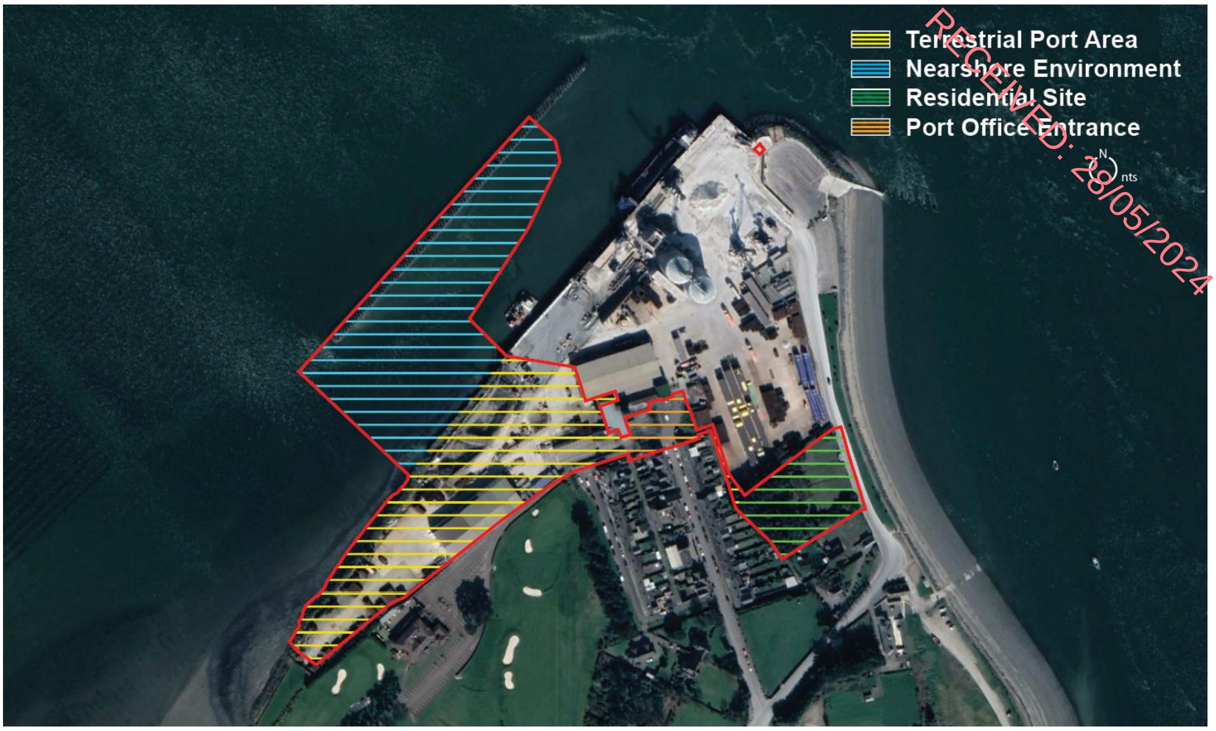

Figure 8.1 Development Areas.

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. Where rock is encountered (estimate max of 1,000m^3), it will be reused on site.

Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residenital Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 of the development.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA). The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine shed wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary,, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

8.4.1 Aspects Relevant to this Chapter

The aspects of the development that will be considered as part of this chapter are the existing site conditions, existing site use and the waste that will be generated as part of the demolition, construction and operation of the proposed development. These aspects will be considered together with the proposed development use. This section should be read in conjunction with the design drawings and reports which accompany this planning application.

8.5 Methodology

The assessment of the impacts of the proposed development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

This Chapter is based on the proposed development, as described in Chapter 2 (Development Description) and considers the following aspects:

- Legislative context;
- Construction phase (including site excavations, dredging and demolitions); and
- Operational phase.

A desktop study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the proposed development have been calculated and are included in Section 8.6 of this chapter. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 8.9.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 9 of this EIAR (Land & Soils).

8.5.1 Relevant Legislation & Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 8.2).

Figure 8.2 Waste Hierarchy (Source: European Commission).

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. (Figure 8.4).

Figure 8.3 Circular Economy (Source: Repak).

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, Waste Action Plan for a Circular Economy (WAPCE) – Waste Management Policy in Ireland, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, A Resource Opportunity, in 2012.

One of the first actions to be taken from the WAPCE was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, using Less' (2021) to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The Circular Economy and Miscellaneous Provisions Act 2022 was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will work to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021). The guidance documents, Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects and Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002), were also consulted in the preparation of this assessment.

There are currently no national guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including the National Waste Management Plan for a Circular Economy 2024 – 2030 (NWMPCE) (2024), BS 5906:2005 Waste Management in Buildings – Code of Practice, the Louth County Council (LCC) Waste Management (Segregation, Storage & Presentation of Household and Commercial Waste) Bye-Laws (2018), the EPA National Waste Database Reports 1998 – 2020, the Circular Economy and National Waste Database Report 2021 (2023) and the EPA National Waste Statistics Web Resource.

8.5.2 Site Surveys/Investigations

Site investigations were carried out by K.T. Cullen & Co Ltd in December 1996. In November 2011, RPS carried out a site investigation on behalf of then "Topaz Energy Group Ltd" on the shallow subsoil and groundwater beneath the decommissioned Topaz fuel storage facility at Greenore Port, Co. Louth. Further site investigations and waste classification of 4 no. soil samples was conducted in 2024 by McCarthy Brown and BHP.

The assessment of the impacts of the proposed development, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

8.5.3 Consultation

Consultation was undertaken with Louth County Council in the form of a pre-application consultation.

8.6 Difficulties Encountered

Until final materials and detailed demolition and construction methodologies have been confirmed, the exact materials and quantities may be subject to some degree of change and variation during the construction process.

There is a number of licensed, permitted and registered waste facilities in the Louth Area, EMR regions and across Ireland and Northern Ireland. However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which may be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability. The waste facilities selected will ultimately be selected to minimise the environmental impacts on the surrounding environment.

8.7 Baseline Environment

8.7.1 Demolition

There will be waste materials generated from the demolition of some existing structures onsite. This will include the demolition of the former 'Open Hydro building', and a small portion of the port's office accommodation, an ESB substation and associated switch room, and an unoccupied dwelling house on site to accommodate the new development and facilitation works. Additionally the existing external concrete pavement within the site will be taken up to facilitate the proposed development. The quay deck pavement, between the proposed buildings and the quayside will also be removed and replaced with a heavy-duty reinforced concrete pavement designed to withstand 50kPa port loading.

Further detail on the waste materials likely to be generated during the demolition works are presented in the project-specific RWMP in Appendix 8.1. The RWMP provides an estimate of the main waste types likely to be generated during the C&D phase of the proposed Development. The reuse, recycling / recovery and disposal rates have been estimated using the EPA National Waste Reports and the developments targeted recycling and reuse rates. The quantities of waste material have been supplied by the project engineers – McCarthy Browne and are summarised in Table 8.1.

Table 8.1 Predicted on and off-site reuse, recycle and disposal rates for demolition waste.

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	10.0	0.0	0.0	85.0	8.5	15.0	1.5
Concrete, Bricks, Tiles, Ceramics	2047.2	40.0	818.9	55.0	1126.0	5.0	102.4
Plasterboard	3.0	0.0	0.0	80.0	2.4	20.0	0.6
Asphalts	75.0	0.0	0.0	25.0	18.8	75.0	56.3
Metals	74.7	2.0	1.5	90.0	67.3	8.0	6.0
Timber	2.0	10.0	0.2	40.0	0.8	50.0	1.0
Total	**2211.9**		**820.6**		**1223.8**		**167.8**

8.7.2 Construction

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated.

There will be soil and stones excavated to facilitate construction of new foundations and the installation of underground services. The project engineers (McCarthy Browne) have estimated that c. 7,225 m^3 of material will need to be excavated to do so. It is currently envisaged that there will be an opportunity to reuse c. 4,265 m^3 of excavated material for use in landscaping and fill. The remining 2,960 m^3 of material, will need to be removed offsite due to the limited opportunities for reuse on site. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

There will be dredging undertaken to facilitate navigable access and suitable berthing for the crew transfer vessels (CTV)s. The project engineers (McCarthy Browne) have estimated that c. 41,000 m^3 of material will need to be dredged to do so with all but 1,000 m^3 of this material to be removed from site. This material will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

When material that requires removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Regulation 27 (By-products), as amended, of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020, (Previously Article 27 of the European Communities (Waste Directive)). For more information in relation to the envisaged management of by-products, refer to the RWMP (Appendix 8.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2019). Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. Any surplus excavated material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific RWMP (Appendix 8.1). The RWMP provides an estimate of the main waste types likely to be generated during the Construction phase of the proposed development. These are summarised in Table 8.2.

Table 8.2 Predicted on and off-site reuse, recycle and disposal rates for construction waste.

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	32.8	10	3.3	80	26.3	10	3.3
Timber	27.9	40	11.1	55	15.3	5	1.4
Plasterboard	9.9	30	3.0	60	6.0	10	1.0
Metals	8.0	5	0.4	90	7.2	5	0.4
Concrete	6.0	30	1.8	65	3.9	5	0.3
Other	14.9	20	3.0	60	9.0	20	3.0
Total	**99.5**		**22.6**		**67.5**		**9.4**

8.7.3 Operation

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site. It is envisaged that waste types will be generated by staff employed and work activities at the facility and from office administration work.

The total estimated waste generation for the proposed development for the main waste types, based on the AWN waste generation model (WGM) incorporating EPA National Waste reports data, EPA National Waste Statistics Web Resource and floor use per m^2 of the proposed development, is presented in Table 8.3, below, and is based on the uses and areas as advised by the project architect.

Table 8.3 Estimated Waste Generation During Operational Phase Main waste types

Waste Type	Waste Volume (m^3 / week)
Organic Waste	0.44
Confidential Paper	0.13
Glass	0.08
Dry Mixed Recyclables	9.72
Mixed Non-Recyclables	4.19
Total	**14.56**

In addition to the typical waste materials that are generated on a daily basis, there will be some additional waste types generated from time to time that will need to be managed separately. A non-exhaustive list is presented below.

Green waste

Green waste may be generated from external landscaping and internal plants/flowers. Green waste generated from landscaping of external areas will be removed by external landscape contractors. Green waste generated from gardens internal plants/flowers can be placed in the organic waste bins.

Batteries

Waste batteries must be separately stored and returned to retailer or collected for recycling and recovery of resources and the operator(s) are responsible for arranging this. Waste batteries generated from the office or warehouse may be returned to any retail outlet where similar batteries are sold, regardless of whether they were originally purchased in that outlet. The operator will be required to store batteries within an internal store. The operator will arrange for return to retailers or collection by an authorised waste contractor, as required.

Waste Electrical and Electronic Equipment (WEEE)

WEEE must be separately stored and returned to manufacturer/retailer or collected for recycling and recovery of resources and the tenant(s) are responsible for arranging this. The *WEEE Directive 2002/96/EC* and associated *European Union (WEEE) Regulations 2014* have been enacted to ensure a high level of recycling of electronic and electrical equipment. It is the manufacturers' responsibility to take back the WEEE, regardless of whether a replacement product is purchased or not and retailers are required to take back WEEE where a similar product is purchased. Operator will be required to store WEEE within an internal store, the operator will arrange for return to retailers or collection by an authorised waste contractor, as required.

Printer Cartridge/Toners

It is recommended that a printer cartridge/toner bin is provided at the print/copy stations in the office. The operator will be required to store this waste within their own unit, the operator will arrange for return to retailers or collection by an authorised waste contractor, as required.

Chemicals (solvents, paints, adhesives, resins, detergents etc)

Chemicals (such as solvents, paints etc.) are largely generated from building maintenance works. Such works are usually completed by external contractors who are responsible for the off-site removal and appropriate recovery/recycling/disposal of any waste materials generated.

Any waste cleaning products or waste packaging from cleaning products generated in the commercial units that is classed as hazardous (if they arise) will be appropriately stored within the operator own space. Facilties management or operator will arrange collection as required.

Light Bulbs (Fluorescent Tubes, Long Life, LED and Lilament bulbs)

Waste light bulbs may be generated by lighting in the warehouse, office and surrounding grounds. It is anticipated that the operator will be responsible for the off-site removal and appropriate recovery/disposal of these wastes. Space will be allocated within an internal store for these items if required. Facilties management or the operator will arrange collection as required.

Textiles

Where possible, waste textiles should be recycled or donated to a charity organisation for reuse.

Furniture (and other bulky wastes)

Furniture and other bulky waste items (such as carpet, pallets etc.) may occasionally be generated by the commercial operators. The collection of bulky waste will be arranged as required by the operator. These collections will be subject to approval with facilities management.

8.8 The 'Do Nothing' Scenario

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no excavation or construction at this site. There would, therefore, be a neutral effect on the environment in terms of waste.

If the proposed development is not to go ahead the potential the existing permissions for Greenore Port could be implemented:

i. Extension and modification of existing Warehouse, **LCC Planning Ref 20268, ABP Ref 307862**
ii. New Warehouse, **LCC Planning Ref Planning ref 20543, ABP Ref 310184**

8.9 Potential Significant Effects

This section details the potential waste effects associated with the proposed development.

8.9.1 Demolition Phase

The proposed Development will generate a range of non-hazardous and hazardous waste materials during site demolition works. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be **short-term, significant and negative.**

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be **long-term, significant and negative.**

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the development site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **short-term, significant and negative.**

8.9.2 Construction Phase

The impact assessment in this section relates to all phases of construction including site excavations, dredging and demolition works.

The proposed Development will generate a range of non-hazardous and hazardous waste materials during site excavation, dredging and construction. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be **short-term, significant and negative.**

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be **long-term, significant and negative.**

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There is a quantity of excavated material and dredged material which will need to be excavated to facilitate the proposed development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 9. It is anticipated that c. 2,960 m^3 of excavated material and 40,000m^3 of dredged material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **short-term, significant and negative.**

8.9.3 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be **long-term, significant and negative.**

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **short-term, significant and negative.**

Waste contractors will be required to service the proposed development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **long-term, significant and negative.**

8.9.4 Cumulative Effects

If waste material is not managed and stored correctly and in the absence of mitigation, the effect on the local and regional environment is likely to be **long-term, significant and negative.**

8.9.5 Summary

The following Table summarises the identified likely significant effects during the construction phase including site excavations, dredging and demolition works)of the proposed development before mitigation measures are applied.

Table 8.4 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Litter Pollution	Negative	Significant	Local	Likely	Short-Term	Indirect & Direct
Unlicensed Waste Collection (Illegal Dumping)	Negative	Significant	Local & Regional	Likely	Long-Term	Direct
Insufficient Waste Facilities	Negative	Significant	Local & Regional	Unlikely	Short-Term	Direct
Lack of waste Classification	Negative	Significant	Local & Regional	Likely	Short-Term	Direct

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 8.5 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Unlicensed Waste Collection (Illegal Dumping)	Negative	Significant	Local & Regional	Likely	Long-Term	Direct
Poor Waste Segregation	Negative	Significant	Local & Regional	Likely	Long-Term	Direct
Litter Pollution	Negative	Significant	Local & Regional	Likely	Short-Term	Direct

8.10 Mitigation

8.10.1 Incorporated Design Mitigation

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

The concept of the 'Waste Hierarchy' and 'Circular Economy' is employed when considering all mitigation measures. The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The circular economy principle aims to keep materials, components, and products in-use in the economy for as long as possible. In circularity, the key objective is to design consumption and production systems to create and retain value. Both principles have been applied and will further be applied during the detailed design, construction and operational phases.

8.10.2 Demolition Phase Mitigation

The following mitigation measures will be implemented during the demolition phase of the proposed development:

As previously stated, a project specific RWMP has been prepared in line with the requirements of EPA Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and is included as Appendix 8.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition phase of the proposed development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 8.1) in agreement with LCC and in compliance with any planning conditions, or submit an addendum to the RWMP to LCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will implement the RWMP throughout the duration of the proposed demolition phase and should treat the document as outlined in the guidance as a live document.

In addition, the following mitigation measures will be implemented:

- On-site segregation of waste materials will be carried out where possible to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
  - Glass
  - Concrete, Bricks, Tiles, Ceramics
  - Plasterboard
  - Asphalts
  - Metals and
  - Timber.
- Any suitable demolition materials to be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;

- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the demolition works;
- All staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

These mitigation measures will ensure that the waste arising from the demolition phase of the proposed development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the NWMPCE (2024). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

8.10.3 Construction Phase Mitigation

The following mitigation measures will be implemented during the excavation, dredging and construction phase of the proposed development:

As previously stated, a project specific RWMP has been prepared in line with the requirements of the EPA Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and is included as Appendix 8.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 8.1) in agreement with LCC and in compliance with any planning conditions, or submit an addendum to the RWMP to LCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases and should treat the document as outlined in the guidance as a live document.

A quantity of topsoil and sub soil will need to be excavated to facilitate the proposed development. The project design team have estimated that c. 2,960 m^3 of excavated material will need to be removed off-site and 45,000m^3 of dredged material will also be required to be removed offsite. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen to 'design out waste';
- On-site segregation of waste materials will be carried out where possible to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
    - Clean Soil & Stone
    - Contaminated Soil & Stone
    - Clean Dredged Material
    - Contaminated Dredged Material
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011-2020). EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the proposed development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the NWMPCE (2024). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

8.10.4 Operational Phase Mitigation

The following mitigation measures will be implemented during the operational phase of the proposed development:

All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins, skips or other suitable receptacles in a designated, easily accessible areas of the site.

- The Operator(s) / Facilities Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – for the authoring and implementation of an Operational Waste Management Strategy, ensuring a high level of recycling, reuse and recovery at the site of the proposed development.
- The Operator / Facilities Manager will regularly audit the onsite waste storage facilities and infrastructure, and maintain a full record of waste documentation for all waste movements from the site.

The following mitigation measures will be implemented:

- The Operator will ensure on-Site segregation of all waste materials into appropriate categories, including (but not limited to):
    - Organic waste;
    - Dry Mixed Recyclables;
    - Mixed Non-Recyclable Waste;
    - Glass;
    - Waste Oil;
    - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
    - Batteries (non-hazardous and hazardous);
    - Light bulbs;
    - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and
    - Bulky Items
- The Operator will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- The Operator will ensure that all waste collected from the site of the proposed development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The Operator will ensure that all waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the proposed development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, the Litter Pollution Act 1997, the NWMPCE (2024) and the LCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

8.11 Residual Impact Assessment

The implementation of the mitigation measures outlined in Section 8.9 will ensure that targeted rates of reuse, recovery and recycling are achieved at the site of the proposed development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

8.11.1 Demolition Phase

A carefully planned approach to waste management as set out in Section 8.9.1 and adherence to the RWMP (which includes mitigation) (Appendix 8.1) during the demolition phase will ensure that the predicted effect on the environment will be **short-term, imperceptible** and **neutral**.

8.11.2 Construction Phase

A carefully planned approach to waste management as set out in Section 8.9.2 and adherence to the RWMP (which includes mitigation) (Appendix 8.1) during the construction phase will ensure that the predicted effect on the environment will be **short-term, imperceptible** and **neutral**.

8.11.3 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 8.9.3 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be ***long-term, imperceptible*** *and* ***neutral.***

8.11.4 Summary of Post-mitigation Effects

The implementation of the mitigation measures outlined in Section 8.9 will ensure that high rates of reuse, recovery and recycling are achieved at the site of the proposed development during the construction and operational phases and the waste will be correctly managed. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

The following Table summarises the identified likely residual significant effects during the construction phase(including site excavations, dredging and demolition works) of the proposed development post mitigation.

Table 8.6 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Litter Pollution	Negative	Not Significant	Local	Unlikely	Short-Term	Indirect & Direct
Unlicensed Waste Collection (Illegal Dumping)	Negative	Significant	Local & Regional	Unlikely	Long-Term	Direct
Insufficient Waste Facilities	Negative	Significant	Local & Regional	Unlikely	Short-Term	Direct
Lack of waste Classification	Negative	Significant	Local & Regional	Unlikely	Short-Term	Direct

The following Table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 8.7 Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Unlicensed Waste Collection (Illegal Dumping)	Negative	Significant	Local & Regional	Unlikely	Long-Term	Direct
Poor Waste Segregation	Negative	Not Significant	Local & Regional	Unlikely	Long-Term	Direct
Litter Pollution	Negative	Not Significant	Local & Regional	Unlikely	Short-Term	Direct

8.11.5 Cumulative Residual Effects

8.11.5.1 Demolition & Construction Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. Multiple developments in the area could potentially be developed concurrently or overlap in the construction phase.

Developments that potentially could overlap during the demolition and construction phase:

Table 8.8 Summary of Development applications that have been considered in the cumulative impacts

Planning Ref	Description	Application type	Decision	Date
LCC 20543	Demolition of existing structures inc. railway and engine room walls and construction of two new stores and an ESB substation.	Permission	Conditional Upheld on Appeal	15/04/2021
LCC 20268	Extension and modifications to the existing former OpenHydro warehouse. The development applied for is within Greenore Port's landholding within the curtilage also exists the watertower, lighthouse and lighthouse keeper's cottage which are all included in the Louth Record of Protected Structures Ref. LH009-01, LH009-043, LH009-044 respectively	Permission	Conditional Upheld on Appeal	18/07/2020
LCC 2360119	Retention of as constructed dwellinghouse previously granted planning permission under planning Ref. No. 97/866 and all associated site development works	Retention	Conditional	14/07/2023
LCC 23234	Retention permission for (a) a domestic store; (b) a domestic outbuilding comprising of a games room, gym and home office and (c) associated site development works	Retention	Conditional	12/01/2024
LCC 2385	Retention permission for extensions and alterations to the existing dwelling, attached domestic garage and associated site development works	Retention	Conditional	21/07/2023
LCC 231	Permission for the following: (1) demolition of a single storey extension and outbuilding to the rear of the existing house; (2) alterations to the rear of the existing house; (3) construction of a one storey extension to the rear of the existing house	Permission	Conditional	24/02/2023
LCC 22614	Permission for elevational changes and alterations to existing dwelling house and all associated site works	Permission	Conditional	04/11/2022
LCC 211439	Retention permission for a single storey extension to the side and rear of the dwelling	Retention	Conditional	11/03/2022

Planning Ref	Description	Application type	Decision	Date
LCC 211331	Permission for a single storey extension to the rear of the dwelling and all associated site works. The existing building is a Protected Structure in the Louth County Council Development Plan Ref. No. LHS009-036B, NIAH Ref. 13831027	Permission	Conditional	17/12/2021
LCC 211223	Retention permission for development that consists of an extension to the rear of dwelling. This building is listed as a protected structure under the Louth County Development Plan 2015-2021 Ref No LHs 009-004	Retention	Conditional	10/11/2021
LCC 19754	Permission for extension to side of existing dwelling house, upgrading of existing effluent treatment system on site and all associated site development works. *Significant Further Information submitted 01/07/20*	Permission	Conditional	28/07/2020
LCC 19727	Permission for one dwelling house, effluent treatment system and all associated site development works.*Significant Further Information submitted 17/6/20*	Permission	Conditional	14/07/2020
LCC 19202	Permission for a one storey extension to rear of the existing dwelling, a protected structure (ID: LHS009-016, NIAH No. 13831014), alterations to the existing layout and associated site works. *Significant Further Information submitted 22/05/2019*	Permission	Conditional	18/06/2019
LCC 18718	The development will consist of (1) Retention of an existing dwelling house, domestic garage and associated site development works and (2) Permission for alterations to an existing dwelling house and part conversion of roof space to habitable accommodation.	Retention	Conditional	19/01/2019
LCC 23218	Permission for extension and alterations to the ground and first floor level of an existing dwelling house, a new waste water treatment system and associated site development works **Significant further information received on 26.9.23**	Permission	Conditional	13/10/2023
LCC 21572	Permission for development that will consist of the construction of a two storey dwelling house, a single storey domestic garage, septic tank with percolation area,	Permission	Conditional	21/12/2021

Planning Ref	Description	Application type	Decision	Date
	use of existing entrance onto public road and all associated site development works. *FI received on 06/12/2021*			
LCC 21732	Permission for a dwelling house, domestic garage, waste water treatment system and associated site development works *Significant Further Information submitted 04/11/21 which includes a revised house design*	Permission	Conditional	24/11/2021
LCC 2360256	Permission for extensions and modifications to existing dwelling house at 15 Euston Street, Greenore, Co. Louth. Permission to include for all associated and ancillary site development works. The existing dwelling house is a Protected Structure, Ref; LHS 009-020, and located within the Greenore Architectural Conservation Area	Permission	Conditional	15/09/2023
LCC 23254	Permission for alterations and extension to existing precision engineering workshop and all associated site works	Permission	Conditional	01/09/2023
LCC 23125	Permission for the change of use of existing building from commercial/residential use to voluntary community workshop and all associated site development works	Permission	Conditional	18/08/2023
LCC 22274	Permission for the demolition of an existing **Coast Guard Lifeboat House** and the replacement of same with a new Lifeboat House to include communication aerials, floodlighting, flag poles and all associated site development works.	Permission	Conditional Under Appeal ABP-315830-23	19/01/2023
LCC 20362	Permission for development consisting of the installation of a grid connected photovoltaic panel system fitted to the roofs of existing warehouse buildings.	Permission	Conditional	21/07/2020
LCC 2360352	Retention and completion of a partially constructed single storey extension permitted under P.A. Ref. No. 17/282 to the existing production building. The existing production building was permitted under P.A. Ref. 93/ 84 and has operated from the site for nearly 30 years. Permission is also sought to retain and complete c. 25 sq.m of additional production floorspace to the southwest of the partially constructed extension. The retention and completion of the extension	Retention	Conditional Under Appeal ABP-318516-23	

Planning Ref	Description	Application type	Decision	Date
	and additional floor area will facilitate the internalisation of part of the production process			
LCC 16852	Permission for development of a managed step down housing community with support facilities. The proposed development will consist of 30 no managed residential units, and associated ancillary facilities designed specifically for older residents. The proposed development is comprised of 9 no single storey 1-bed studio units, 3 no single storey 1-bed units, 11 no 1-bed apartments all with own door access over 2 storeys, 7 no 2-bed units and a 2 storey community and administration facility as well as associated site works (roads, drainage, street lighting, hard & soft landscaping, utility building & services)	Permission	Conditional	24/03/2017
LCC 21728	EXTENSION OF DURATION OF 16/852 - Permission for development of a managed step down housing community with support facilities. The proposed development will consist of 30 no managed residential units, and associated ancillary facilities designed specifically for older residents. The proposed development is comprised of 9 no single storey 1-bed studio units, 3 no single storey 1-bed units, 11 no 1-bed apartments all with own door access over 2 storeys, 7 no 2-bed units and a 2 storey community and administration facility as well as associated site works (roads, drainage, street lighting, hard & soft landscaping, utility building & services)	Extension of Duration	Conditional	09/07/2021
LA07/2016 /1273/F	Demolition of existing dwelling and erection of 3 No. detached dwellings		Granted	16/08/2017
LA07/2022 /1234/F	Renewal of planning approval granted under LA07/2016/1273/F for the demolition of existing dwelling and erection of 3 no. detached dwellings		Granted	22/03/2023

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the effect will be **short-term, not significant** and **neutral.**

8.11.5.2 Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area and the developments planned for the surrounding land will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible** and **neutral**.

8.12 Risk of Major Accidents or Disasters

There is no Risk of Major Accidents or Disasters related to Material Assets Waste and the proposed development.

8.13 Worst Case Scenario

In a worst-case scenario, if no mitigation measures found in section 8.9 are followed, poor onsite waste management, non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste offsite and result in negative environmental impacts or pollution as shown in section 8.8.

8.14 Interactions

This section discusses interactions between this Chapter and other specialist environmental topics considered in this EIAR.

8.14.1 Land & Soils

During the construction phase, excavated soil and stone (c. 7,225 m^3) will be generated from the excavations required to facilitate site levelling, construction of new foundations and installations of site services. It is estimated that 2,960 m^3 of the excavated material will need to be removed off-site with the remaining balance being reused on site.

As well as soil and stone from land-based excavations there will be dredging undertaken to facilitate navigable access and suitable berthing. The project engineers (McCarthy Browne) have estimated that c. 45,000 m^3 of material will need to be dredged to do so with all to be removed from site. The 1,000m^3 of dredged rock will be reused on site.

If material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 8, Chapter 9 (Land and Soils) and the requirements of the RWMP (Appendix 8.1), will ensure the effect is ***long-term, imperceptible*** and ***neutral.***

8.14.2 Traffic & Transport

Local traffic and transport will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the proposed Development. The increase in vehicle movements as a result of waste generated during the construction phase will be *temporary* in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movements will be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts during the construction and operational phases are addressed in Chapter 6 (Material Assets: Traffic and Transport). Provided the mitigation measures detailed in Chapter 6 and Chapter 8 are adhered to, the predicted effects are ***short to long-term, imperceptible*** and ***neutral*****.**

8.14.3 Population & Human Health

The potential impacts on human beings are in relation to incorrect management of waste during construction and / or operation, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity. A carefully planned approach to waste management and adherence to the project specific RWMP and mitigation measures in Chapter 4 (Population & Human Health) and Chapter 8, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be ***long-term*****,** ***imperceptible*** **and** ***neutral****.*

8.15 Monitoring

The management of waste during the construction phase will be monitored by the Contactor's appointed Resource Manager to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation.

The management of waste during the operational phase will be monitored by the Operator / Buildings Manager to ensure effective implementation of the mitigation measures outlined in section 8.9 internally and by the nominated waste contractor(s).

8.15.1 Demolition and Construction Phases

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the excavation, demolition and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting schedule targets. The RWMP specifies the need for a Resource Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the Resource Manager will identify the reasons for this and work to resolve any issues. Recording of waste generation during the demolition phase of the proposed Development will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future developments.

8.15.2 Operational Phase

During the operational phase, waste generation volumes should be monitored by the Operator / Buildings Management. There may be opportunities to reduce the number of bins and equipment required in the Waste Storage Area (WSA's), where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

8.16 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 8.9 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Quality	Significance
Litter Pollution	The Contractor will be required to fully implement the RWMP throughout the duration of the proposed construction phase.	The Contractor will review and maintain waste records and site audits
Unlicensed Waste Collection (Illegal Dumping)	All waste leaving the site will be recorded and copies of relevant documentation maintained.	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Insufficient Waste Facilities	All waste leaving the site will be recorded and copies of relevant documentation maintained.	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Lack of waste Classification	All waste material leaving site will be correctly classified and segregation prior to removal where possible.	An appointed Waste Manager will monitor all onsite waste segregation and classification

The following Table summarises the Operational Phase mitigation and monitoring measures.

Table 8.10 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Quality	Significance
Unlicensed Waste Collection (Illegal Dumping)	The Operator / Buildings Manager will ensure that all waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.	The Operator / Buildings Manager will maintain waste receipts onsite for a period of 7 years and make available to LCC as requested.
Poor Waste Segregation	The Operator / Buildings Manager will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly	Waste generation volumes will be monitored by the Operator / Buildings Manager.

Likely Significant Effect	Quality	Significance
	identified with the approved waste type to ensure there is no cross contamination of waste materials.	
Litter Pollution	The Operator / Buildings Manager will ensure that all waste collected from the Site of the proposed Development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available	Waste storage areas will be monitored by the Operator / Buildings Manager.

8.17 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the proposed development with regards to waste management. These impacts have been considered for both the construction and operational phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures as set out in this chapter and the attached RWMP, the overall predicted impact of the proposed development is **long-term, imperceptible** and **neutral**.

8.18 References and Sources

1. Waste Management Act 1996 - 2021 (No. 10 of 1996) as amended.
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended.
4. The Circular Economy and Miscellaneous Provisions Act 2022
5. Regional Waste Management Planning Offices, National Waste Management Plan for a Circular Economy 2024 – 2030 (2024).
6. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
7. European Commission, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017).
8. Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022)
9. Forum for the Construction Industry – Recycling of Construction and Demolition Waste.
10. Department of Communications, Climate Action and Environment (DCCAE), Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025 (Sept 2020).
11. DCCAE, Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (2021)
12. Environmental Protection Agency (EPA) 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021)
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14. FÁS and the Construction Industry Federation (CIF), Construction and Demolition Waste Management – a handbook for Contractors and site Managers (2002).
15. Louth County Council (LCC) County of Louth (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws, 2018.
16. LCC, Louth County Development Plan 2021 – 2027 (2021).
17. BS 5906:2005 Waste Management in Buildings – Code of Practice
18. Planning and Development Act 2000 (No. 30 of 2000) as amended
19. Environmental Protection Agency (EPA), Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2018)
20. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
21. Environmental Protection Agency (EPA), National Waste Database Reports 1998 – 2020 and the Circular Economy and National Waste Database Report 2021 -
22. US EPA, Characterisation of Building Uses (1998);
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CHAPTER 9

LAND, SOILS & GEOLOGY

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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9 Land, Soils and Geology

9.1 Introduction

This chapter of the EIAR evaluates the likely significant effects, if any, which the proposed development will have on Land, Soils and Geology. This chapter contains necessary information as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

The chapter initially provides a description of the receiving environment of the site and the potential impacts of the development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, the predicted scale and duration of the likely effects.

The chapter also outlines the proposed mitigation measures that will reduce or eliminate the identified potential impacts and defines the residual effects of the proposed development (the effect after the implementation of mitigation measures).

This chapter should be read in conjunction with Chapter 10 Water and Hydrology. A full description of the proposed development is set out in Chapter 2 Development Description of this EIAR.

9.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Alan Wilson and Marcelo Allende in the Water section of AWN Consulting Ltd.

Alan Wilson (BSc) is an Environmental Consultant at AWN. Alan holds a BSc Honours in Environmental Management in Agriculture/ Environmental and Geographical Sciences. Alan has worked on a range of large scale projects involving EIA reports, site specific flood risk assessments, baseline studies, hydrological and hydrogeological risk assessments, environmental due diligence, site investigations and groundwater, surface water and soil monitoring on various operational developments and greenfield and brownfield sites. Alan has over 2 years' experience as an Environmental Consultant including roles in Ecology and Forestry related work. Alan is a member of the International Association of Hydrogeologists (IAH) Irish Group and the Institute of Geologists of Ireland (IGI).

Teri Hayes (BSc MSc PGeol EurGeol, Adv Dip in Environmental & Planning Law) is a Director and Senior Hydrogeologist with AWN Consulting with over 25 years of experience in water resource management, environmental assessment and environmental licensing. Teri is a former President of The International Association of Hydrogeologists (IAH, Irish Group) and is a professional member of the Institute of Geologists of Ireland (IGI) and European Federation of Geologists (EurGeol). She has qualified as a competent person for contaminated land assessment as required by the IGI and EPA. Her project experience includes contributions to a wide range of complex Environmental Impact Statements, planning applications and environmental reports for Industry Infrastructure and residential developments. Teri's specialist area of expertise is water resource management, eco-hydrogeology, hydrological assessment and environmental impact assessment.

9.3 Proposed Development

A full description of the proposed development is set out in Chapter 2 of this EIAR. The following is a summary of the proposed works.

A full description of the proposed development is provided in **Chapter 2** of this EIAR. The following is a summary of the proposed works:

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. Where rock is encountered (estimate max of 1,000m^3), it will be reused on site.

Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 of the development.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA). The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine room wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary,, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

1. **'Terrestrial Port Area'**, (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.
2. **'Nearshore Environment'** (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
3. **'Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
4. **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

The following is a general location plan of the plots identified above.

Figure 9.1 Development Areas

9.3.1 Aspects Relevant to this Chapter

9.3.1.1 Construction Phase

9.3.1.1.1 Ground Works, Dredging and Piling

Bulk excavation will take place during dredge and quay wall construction. It is anticipated that foundations for buildings will be strip footing type supplemented where necessary by concrete piles. The existing external concrete pavement in the port will be removed to facilitate the construction of the port buildings. The existing hardstanding areas, quayside of the proposed buildings will be upgraded on completion of the building works. The quay deck pavement shall be heavy-duty reinforced concrete pavement designed to withstand 50kPa port loading.

A mass concrete footing will be required for the proposed communications mast.

It is confirmed in the Environmental Risk Assessment and Waste Characterisation Report completed for the development (Appendix 9.4) that the bulk of the excavated material is suitable for removal to an inert waste facility and/or a soil and stone recovery facility. Remaining materials will be disposed at non-hazardous licenced facilities. This is documented further in the Outline Construction Environmental Management Plan (CEMP), prepared by McCarthy Browne and submitted under separate cover, and the Resource and Waste Management Plan, prepared by AWN Consulting submitted as appendix 8-1 of this EIAR.

The site does not act as a flood storage zone (A Site Specific Flood Risk Assessment accompanies this application, prepared by McCarthy Browne) and the proposed development will not add any new hardstanding areas within the port. The carpark area will be constructed with permeable paving.

The proposed 'maritime development' generally comprises dredging, development of a pontoon to accommodate Crew Transfer Vessels (CTVs) and improvement works to the existing Berth 3 quay wall. These works will consist of the following:

- The dredge of c.45,000m^3 of soft silty sand material and 1,000m^3 of rock from the existing port berthing area to facilitate navigable access at this location.
- Construction of quay wall at Berth 3 for a 70m length. This will include a new quay wall face and upgraded deck. The new quay wall shall be a steel pile closed face wall and shall replace an existing caisson berthing face.
- 220m of new breakwater pontoons, 5-6m wide and associated pile and collar restraints to accommodate crew transfer vessels (CTVs). The pontoon arrangement shall facilitate 9 no. berths and 2 layby berths for CTVs.
- A 40m gangway shall provide access from a newly extended quay wall.

To facilitate navigable access and suitable berthing for the CTVs it is necessary to carry out dredging in the area shown below between the existing groyne, Berth 2 and proposed Berth 3. The declared depth in this dredge pocket shall be -4m CD. The dredge material shall be c.45,000m^3 of soft dredge (gravel, silt, sand, clay) and c1,000m^3 of rock arisings, with EWC Code 17 05 06.

The existing rock armour supporting the breakwater at the outer edge of the dredging area will be repaired / strengthened during the dredging process, where the need arises. The purpose of this breakwater is twofold, creating a safe wave environment for shipping, which will be of additional benefit to the lighter craft (CTV's) utilising the pontoon. The breakwater also creates a natural 'self-scouring' port and as a result, a regular maintenance dredging programme is not required.

If suitable, excavated material may be re-used within the development for example rock can be crushed and used in pavement areas.

Dredging will be carried out using a backhoe dredger mounted on pontoons. The dredger will deposit the dredge material into a hopper barge which will be towed to the quayside. Material will be dug out of the hopper barge by an excavator standing on the quay side and placed in a bund for onward transfer to a licenced disposal facility by heavy Goods Vehicles with a carrying capacity of 20 tonnes.

The following is an estimated breakdown of the dredge material:

- Soft dredge arisings: 45,000 m^3.
- Rock dredge arisings: 1,000 m^3.

Dredging activities will occur for approximately 8-10 weeks.

9.3.1.1.2 Dewatering

Given the soil, geological and hydrogeological characteristics of the site, it is not expected that significant groundwater will be encountered throughout the site. However, during the ground works, excavation and piling, dewatering (removing of potential perched groundwater within the subsoil) may be necessary to create a dry working environment and prevent water from seeping into the excavation and flooding the construction site. This dewatering could result in the localised lowering of the local shallow (overburden) groundwater table which will not be part of the regional bedrock aquifer.

There may also be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavation is kept relatively dry. Based on the depth to bedrock there is no potential for impact on the aquifer water table.

9.3.1.2 Operational Phase

A fuel store with a capacity of ≥200,000 litres will be provided in a dedicated area that will be maintained and managed by Greenore Port. This quantity of proposed fuel storage is significantly below the applicable threshold of 2,500 tonnes for petroleum products and alternative fuels detailed in Part 2 of Schedule 1 of the Control of Major Accident Hazards (COMAH) Regulations 2015.

The overall volume will be stored in 1-2 bunded tanks and located in a secure area of the site to avoid accidental impact. The tanks will be fitted with overfill prevention, bund alarm and automatic shut off valves to mitigate risk of spills. Surface water will be drained from this area into the proposed network with petrol interceptors included.

CTV fueling infrastructure will be provided at a dedicated service berth on Berth 3. This will be a metered facility monitored and maintained by Greenore Port. Fuel is piped underground to this facility from the fuel store.

9.4 Methodology

9.4.1 Relevant Legislation & Guidance

This section establishes the criteria, and guidance used to rate the significance of the potential impacts of the proposed development project on the land, soil, geological, and hydrogeological aspects of the site and surrounding area.

Alongside the legislation, policy, and guidance outlined in Chapter 1, this chapter is prepared in line with the '*Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022) and due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled '*Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'* (IGI 2013).

The document entitled '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*' by the Transport Infrastructure Ireland (TII) formerly National Roads Authority (NRA) (TII, 2009) is referenced where the methodology for assessment of impact is appropriate. Furthermore, in line with the TII Guidelines, an assessment of the attribute importance has been undertaken in order to provide a basis for the assessment of impact provided. The attribute importance considers the potential as well as the existing use of the surface water features as a water resource i.e., water supply, fisheries and other uses, as well as ecological habitat requirements. The TII criteria for rating the soil and geology, and hydrogeological related attributes, are presented in Appendix 9.1.

The quality, significance, and duration of the potential impacts, residual effects, and cumulative effects are described using standard EIA descriptive terminology, included in Chapter 1 (EPA, 2022).

The principal attributes (and impacts) to be assessed include the following:

- Geological heritage sites in the vicinity of the perimeter of the subject site.
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground.
- The quality, drainage characteristics and range of agricultural uses of soil around the site;
- Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves.
- The extent of topsoil and subsoil cover and the potential use of this material on site or requirement to remove it off-site as waste for recovery or disposal.
- High-yielding water supply springs/ wells in the vicinity of the site to within a 2km radius and the potential for increased risk presented by the Proposed Development.
- Classification (regionally important, locally important etc) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the Proposed Development e.g. removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality.
- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site; and,
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporarily.

9.4.2 Sources of Information

Desk-based geological information on the substrata (both quaternary deposits and bedrock geology) underlying the extent of the site was obtained through accessing national databases and site archives. The collection of baseline regional data was undertaken by reviewing the following sources:

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping.
- Teagasc soil and subsoil database.
- Ordnance Survey Ireland - aerial photographs and historical mapping.
- Environmental Protection Agency (EPA) – website mapping and database information; and
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

Site specific data was derived from the following sources:

- Site plans and drawings submitted with the planning application pack
- Consultation with the engineering team.
- Greenore Port OMF – Engineering Planning Report (Clifton Scannell Emerson Associates, 2024).
- Greenore Port – O & M Facility – Site Specific Flood Risk Assessment (McCarthy Browne, 2024).
- Appendix 9.2 - Targeted Soil and Groundwater Assessment – Ground Investigation at the Topaz Fuel Storage Terminal, Greenore (RPS, 2011).

- Appendix 9.3 - Greenore Port – Geotechnical Interpretive Report (Gavin & Doherty Geosolutions, 2023).
- Appendix 9.4 – Waste Classification Report (BHP, 2024).
- Appendix 9.5 - BRE 365 and Plate Bearing Report (BHP, 2024).
- Appendix 9.6 – WAC Laboratory Report (Eurofins Chemtest Ltd, 2024).

9.4.3 Site Surveys/Investigations

An overview of site investigations carried out in and around the subject site are summarised below:

- IGSL, September 2023
- Causeway Geotechnical, May 2020,
- Ground Investigations Ireland, March 2020
- Causeway Geotechnical, March 2019
- Ground Investigations Ireland, February 2018
- Ground Investigations Ireland, May 2015
- RPS Group (Topaz Fuel Storage Terminal), November 2011
- Glover Site Investigations, May 1999
- KT. Cullen & Co (Topaz Fuel Storage Terminal), December 1996

9.4.3.1 Site Investigations

Site investigation works were conducted within the site by McCarthy Browne and BHP Laboratories Ltd. in 2024. The objective of this site investigation was to further characterise the soil quality; to determine whether the ground conditions are suitable for soakaway installation; and whether the soil is suitable for disposal.

As part of the site investigation works, BHP Laboratories Ltd carried out the following tests:

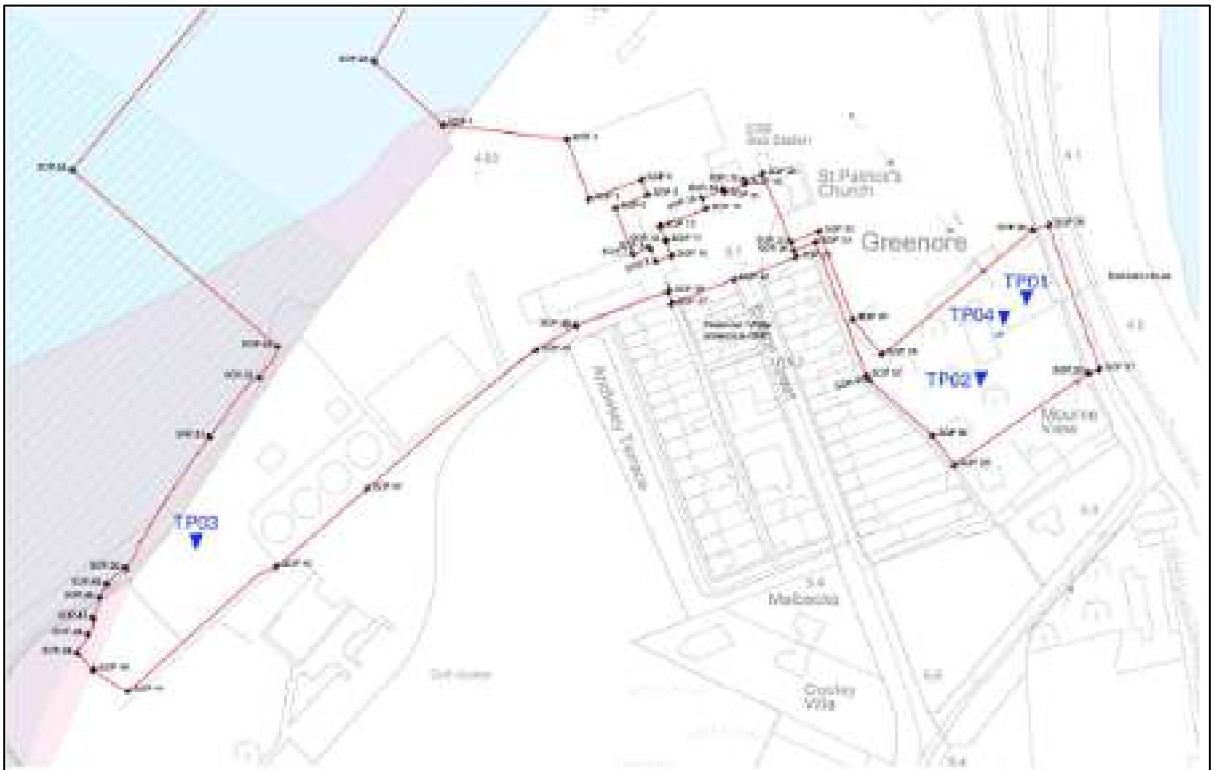
- BRE365 at 4 no. locations (TP01, TP02, TP03 & TP04);
- Plate Bearing Tests; and
- Waste Acceptance Criteria suite in accordance with Council Decision 2003/33/EC (Rilta 2016 Revised WAC suite.

In order to assess materials which may be excavated and removed from site, in terms of waste classification, soil samples collected during the additional site investigations conducted in 2024 were analysed for a suite of parameters which allowed for the assessment of the soils in terms of total pollutant content for classification of materials as hazardous or non-hazardous referred to as the 'RILTA Suite'.

The parameter list for the RILTA suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, lead, nickel, mercury, zinc, chloride, fluoride speciated aliphatic and aromatic petroleum hydrocarbons, pH, soluble sulphate, sulphide, phenols, total dissolved solids, moisture content, soil organic matter and an asbestos screen. The total pollutant content analysis also provides analytical data which can be used to assess the quality of the subsoils underlying the site and allow an assessment of their suitability for a range of proposed uses against generic assessment criteria.

The RILTA Suite also includes those parameters specified in the EU Council Decision Establishing Criteria for the Acceptance of Waste at Landfills (Council Decision 2003/33/EC), referred to as Waste Acceptance Criteria (WAC), which for the solid samples are pH; total organic carbon (TOC); speciated aliphatic and aromatic petroleum hydrocarbons; benzene, toluene, ethylbenzene and xylene (BTEX); phenol; polychlorinated biphenyls (PCB); and polycyclic aromatic hydrocarbons (PAH).

The location of the site investigation works (TP01, TP02, TP03 & TP04) are shown below in Figure 9.2.



	Location	Coordinates		Length (m)	Width (m)	Depth (m)
Soakaway Test Nr.1	TP01	54.032500 N	6.131667 W	2.2	2	1.85
Soakaway Test Nr.2	TP02	54.03213 N	6.13196 W	2.5	1.7	1.45
Soakaway Test Nr.3	TP03	54.0316 N	6.13690 W	1.9	1.6	0.725
Soakaway Test Nr.4	TP04	54.032389 N	6.131861 W	1.5	1.7	1.4

Figure 9.2 Location of Works (McCarthy Browne, 2024)

Table 9.1 below summarises the soil profile of each individual trial hole (TP01, TP02, TP03 and TP04) excavated as part of the ground investigations.

Dark grey, loose, sandy soil and Dark brown, loose, granular soil with cobbles present were encountered in TP01 and TP02, respectively. Compacted gravel and fractures bedrock were encountered at TP03 and TP04, respectively. The maximum depth reached was 1.85m bgl. No field evidence of potential impact from hazardous substances was noted. Soil samples were collected from each of the test holes for laboratory analysis.

Table 9.1 Trial Hole Summary (BHP, 2024)

Summary of Trial Pit No. 1			
From	To	Description	Ground Water
1.85	1.6	Topsoil	Dry
1.6	1	Dark grey, loose, sandy soil, Cobles present	
1	0	Loose Light grey Gravely soil, Cobles present	

Summary of Trial Pit No. 2			
From	To	Description	Ground Water
1.45	1.25	Topsoil (Roots Present)	Dry
1.6	1	Dark Brown, loose, granular soil, Cobles present, Roots Present	
1	0	Dark Brown, loose, granular soil, High level of cobles present,	

Summary of Trial Pit No. 3			
From	To	Description	Ground Water
0.725	0	Compacted Gravel	Dry

Summary of Trial Pit No. 4			
From	To	Description	Ground Water
1.4	0	Fractured Rock	Dry

Refer to Section 9.6.10.1, Appendix 9.4 – Waste Classification Report (BHP, 2024), Appendix 9.5 - BRE 365 and Plate Bearing Report (BHP, 2024) and Appendix 9.6 – WAC Laboratory Report (Eurofins Chemtest Ltd, 2024) of the EIA for further information on soil classification and soil quality results.

9.4.3.2 Geotechnical Interpretive Report - GDG, 2023

Gavin & Doherty Geosolutions Limited (GDG) produced a Geotechnical Interpretive Report (GIR) to be considered in the design and site development for the proposed O&M Facilities This report is presented in Appendix 9.3.

This GIR produced a ground model based on all ground investigations carried out within the proposed development area. Cross-sections of the land and marine development areas extracted from the ground model are also presented in Appendix 9.3– Greenore Port Geotechnical Interpretative Report (GDG, 2023).

This assessment was based on the following:

- Ground investigation data (historic and recent investigations and surveys completed in the harbour area; including bathymetric and geophysical surveys).
- Geotechnical laboratory data, and
- Published and unpublished geological information.

There are no legislated threshold values for soils in Ireland. As such soil samples were compared to a Generic Assessment Criteria (GAC) derived to be protective of human health, water bodies (including groundwater) and also ecology for a resident and commercial/industrial end use.

GAC in the UK has been derived using the Contaminated Land Exposure Assessment (CLEA) model to be protective of human health for a number of different land uses. LQM (Land Quality Management) and the CIEH (Chartered Institute of Environmental Health) developed a document in July 2009 detailing their own research and derivation of their own 'LQM GACs'. A total of 82 substances including many organic substances had LQM GACs derived, for the standard land uses of residential, commercial/industrial and allotments. This was updated in 2015 following further research and the derived results are now called LQM/CIEH Suitable 4 Use Level (S4UL). The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and as transparently derived and cautious "trigger values" above which further assessment of the risks or remedial action may be needed. For each contaminant S4ULs have been derived for six land use scenarios based on assessing exposure pathways in each planning scenario. In this instance the commercial scenario has been considered. Soil type and soil organic matter (SOM) has an influence on the behaviour of contaminants. S4ULs have been derived for three SOM contents (1%, 2.5% and 6%) to cover the likely range in soils. A prudent approach has been taken by considering the lower 1% SOM content.

The UK values do not have any legal standing within the Republic of Ireland and no statutory guidance for assessing the significance of soil contamination currently exists. However, the values do provide a means of placing the data within context when considering magnitude of risk and have been used in that capacity for this assessment.

Refer to Section 9.6.10.2 – Table 9.6 for sample concentrations compared against the threshold values for commercial or residential use of soil.

Site investigations included trial pits, boreholes, rotary cores and cone penetration testing. These investigations allowed an assessment of ground conditions and ground stability.

An overview of the site investigations carried out in and around the subject site as of November 2023 are summarised in 9.2 below.

Table 9.2 Summary of GI's carried out around Greenore Port (GDG, 2023)

SI Campaign Contractor	Year	GI Scope Summary	Report Ref:	Client Representative/ultimate client
Causeway Geotech	May 2020	#6 No of dynamic probe tests	only logs	
Ground Investigations Ireland(GII)	March 2020	#6 No of dynamic probe tests	only logs	
Geotechnical Environmental Services Limited (GES)	December 2019	#2 No. boreholes drilled in soil and rock to a maximum depth of 21.2m below existing ground level (bgl), Boreholes BH01 and BH02, on encountering rock, were continued by HQ wireline core drilling. #6 No. dynamic probes to a maximum depth of 21.9m below existing ground level (bgl). Lab tests: point load x 18, UCSx14	Berth 2Upgrade Works, Factual Report, Report No. 011/ROI/19	Keating Construction Limited
Causeway Geotech	March 2019	#15 No. boreholes, 11 no of cone penetrometer test, standpipe installation, 2 no. of trial pits, 2 no. of plate tests. Lab tests: Atterberg test x6, PSD x 10, Consolidated drained Shear box2, Oedometerx3	Greenore Port Development, Berth 2-Ground Investigation. Report no.18-1305	Arup/Byrne Looby Consulting Engineers, on the behalf of L&M Keating Ltd.
Ground Investigations Ireland (GII)	February 2018	#4 No. boreholes (BH1 to BH4) drilled in soil and rock. Lab tests: shear box tests x 5, UCS x 4, point load x 17	Greenore Port Ground Investigation Report - 7350-01-18	RPS Consulting Engineers
Ground Investigations Ireland (GII)	May 2015	#2 No. boreholes (BH1 & BH2) drilled in soil and rock. Lab tests: PSD x10, Consolidated Shear box testsx4, point load x 6, UCS X4	Greenore Port Land Based SI carried out for RPS, only logs and lab results	RPS Group
Glover Site Investigations Ltd	May 1999	#5 No. of boreholes (10,11,12a,12RC,13) were excavated to bedrock along the existing quay	Greenore Harbour Development Rock Coring Investigation Report No.3309	Kirk McClure Morton on behalf of Greenore Ferry Services Ltd
Glover Site Investigations Ltd	August 1998	#9No. of boreholes (BH1 to BH9) and 15 No. of marine probe boreholes majority of them excavated to bedrock. Lab tests: Triaxial x5, pH and soluble sulphate content x6, Atterberg limit x4 ,PSD X17	Greenore, Co.Louth Harbour Development Site Investigation Report No.3059	Kirk McClure Morton on behalf of Greenore Ferry Services Ltd

The borehole and In-situ tests locations from all the GI campaigns carried out at the site and the wider Greenore Port area are presented in Figure 9.3 below.

Figure 9.3 Site Investigation Point Locations of various GI carried out in Greenore Port (Source: GDG, 2024)

9.4.3.3 Targeted Soil and Groundwater Assessment – Ground Investigation at the Topaz Fuel Storage Terminal, Greenore (RPS, 2011).

On November 14th 2011, RPS carried out a site investigation on behalf of then "Topaz Energy Group Ltd" on the shallow subsoil and groundwater beneath the decommissioned Topaz fuel storage facility at Greenore Port, Co. Louth, with the aim of developing an exit strategy for the site. The refuelling gantry, located within the Terrestrial port area of the current application site, in the vicinity of the proposed Building A, was identified as the primary target for investigation in the RPS 2011 Targeted Soil and Groundwater Assessment Report.

The main objectives of the site investigation were as follows:

- Determine if hydrocarbon contamination exists in the shallow subsoil underlying the site;
- Determine if hydrocarbon contamination exists in the groundwater beneath the site; and
- Provide recommendations on any further works to take place based on the ground investigation results.

As part of the groundwater investigation, 2 no. groundwater monitoring wells (MW3 & MW4) installed by K.T. Cullen & Co Ltd. during site investigations from December 1996 were identified (see below). The monitoring wells were installed in the vicinity of the hardcover area beneath the refuelling gantry.

The 2011 RPS report includes details of historical site investigations carried out by K.T. Cullen & Co Ltd in December 1996. These site investigations identified slight hydrocarbon contamination in the soil in the southern extent of the Topaz site and in the groundwater. To further analyse the hydrocarbon contamination identified in the December 1996 site investigation, an environmental site assessment of the site was carried out by URS in 2004 and identified hydrocarbon contamination in the shallow soils in an area of scrub grassland and to the north-east of the refuelling gantry. No hydrocarbon contamination was detected during the 2004 site investigation.

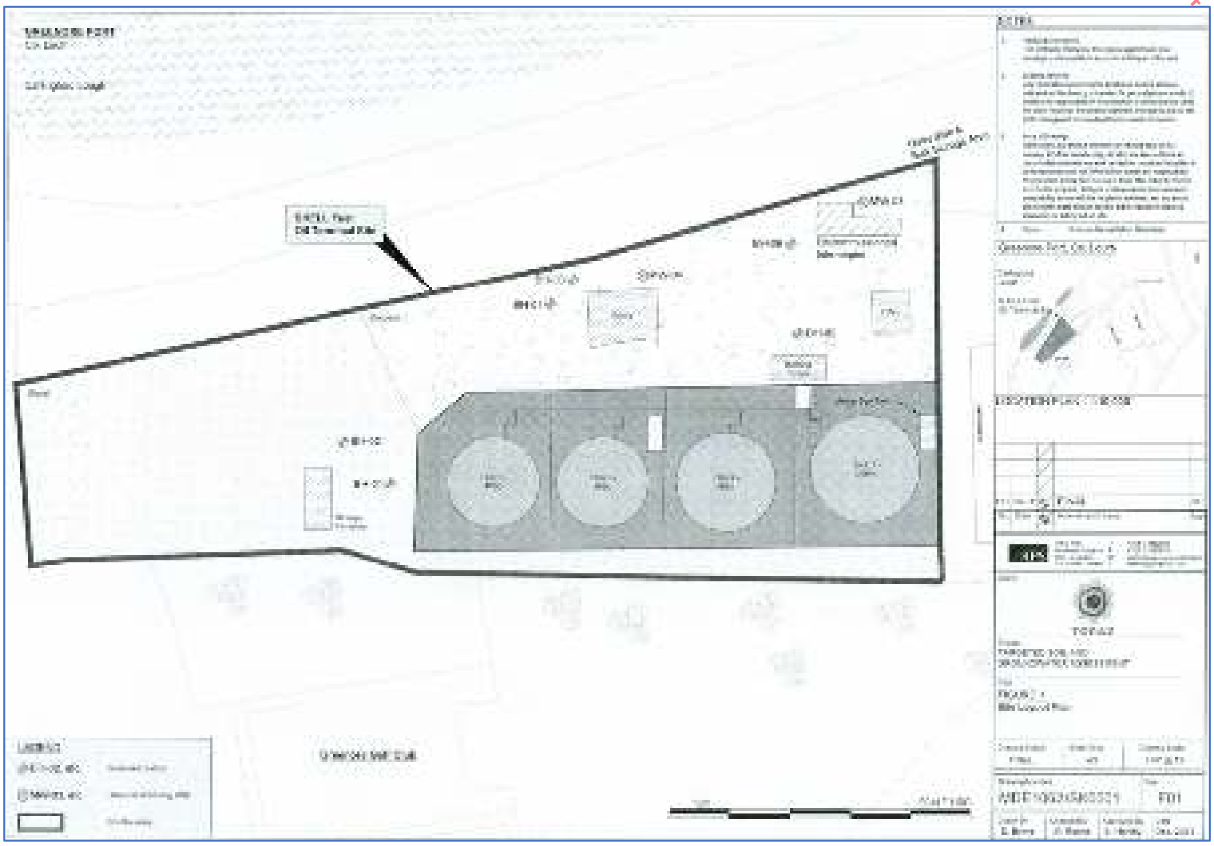


Figure 9.4 Site Layout Plan (RPS, 2011)

9.4.4 Consultation

There was no consultation with internal Local Authority departments, community or stakeholders encountered in compiling the specified information for this EIA chapter.

9.5 Difficulties Encountered

There were no significant difficulties encountered in compiling the specified information for this EIAR chapter.

9.6 Baseline Environment

9.6.1 Site Location & Surrounding Land Use

The proposed development site, located within and adjoining Greenore deep-water Port, is strategically located on Ireland's east coast in Co. Louth. It is situated approximately 20km East of Dundalk and serves as the South entrance to Carlingford Lough. The site comprises of a predominately brownfield with active port lands, public realm areas and residential area along the Shore Road.

The topography of the site is flat with an average elevation of around 4.1m for the site. Access to the proposed site is offered by via Euston Street, with HGV traffic and access to the proposed satellite carpark via Shore Road (R175).

In general, Greenore Port features a single quay facing North-West, protected by a detached breakwater made of a rubble mound rock structure with wooden piles. The exact depth of these piles is currently unknown. The main berthing pocket offers 260m of quayside berthage, with varying water depths at high water (HW) and low water (LW).

The port has a water depth of 9.1m at high water and 4.9m at low water. It can accommodate vessels up to 60,000DWT and has Liebherr port cranes capable of lifting up to 124T. The port handles both container and bulk traffic and offers marine and logistical support services.

In terms of imports, the port receives a variety of products including animal feed, fuel oil, steel, fruit, wood products, coal, timber, fertilizers, and chemicals. Its exports consist of items such as fish cages, milk powder, live cattle, frozen meats, rock, steel, woodchip, and general cargo like wind turbines.

Additionally, Greenore Port is the leading importer of steel reinforcement in Ireland, with storage facilities for steel rebar and dry bulk storage facilities capable of accommodating various dry bulk products.

Refer to Figure 9.5 below for the site location in the context of the surrounding environment and land use.

Figure 9.5 Site Location & Surrounding Land Use (AWN, 2023)

9.6.2 Topography

A detailed topographic survey by Six West was carried out on January 4th 2023 at Greenore Port area and survey details are presented in Appendix 9.3 - Greenore Port – Geotechnical Interpretive Report (Gavin & Doherty Geosolutions, 2023). Based on the topographic survey, the levels typically vary from 4.617mAOD to 4.062mAOD at the proposed development area for the landside quay and office units where the new development will tie into.

Refer to Figure 9.6 below, a modified screenshot from the topography survey carried out by GDG in which shows the topography of the site.

Figure 9.6 Extract from Topographic Survey (GDG, 2023)

The proposed development includes the demolition of an unoccupied single storey dwelling and its boundary wall at the residential site on Shore Road. A search of Louth County Council's planning search tool indicates that the house pre-dates the 1970s, with one planning entry for an extension granted in August 1970, Ref. 70347.

The house has an approx. 240sqm GFA with a ridge height of 6.2m and the existing boundary wall to be demolished is c. 1.0m in height high and c. 64.5m long.

9.6.3 Soils and Subsoils (Quaternary)

According to the EPA and GSI online mapping the principal soil type on-site is Made Ground, which is expected considering the development on the site. Refer to Figure 9.7 below. This was also confirmed through site investigations carried out on the proposed development site, where the top strata recorded in all borehole logs were Concrete, Made Ground and Hardcore Fill. Refer to Appendix 9.3 – Greenore Port Geotechnical Interpretive Report (GDG, 2023) and description below for further information on the soil types encountered.

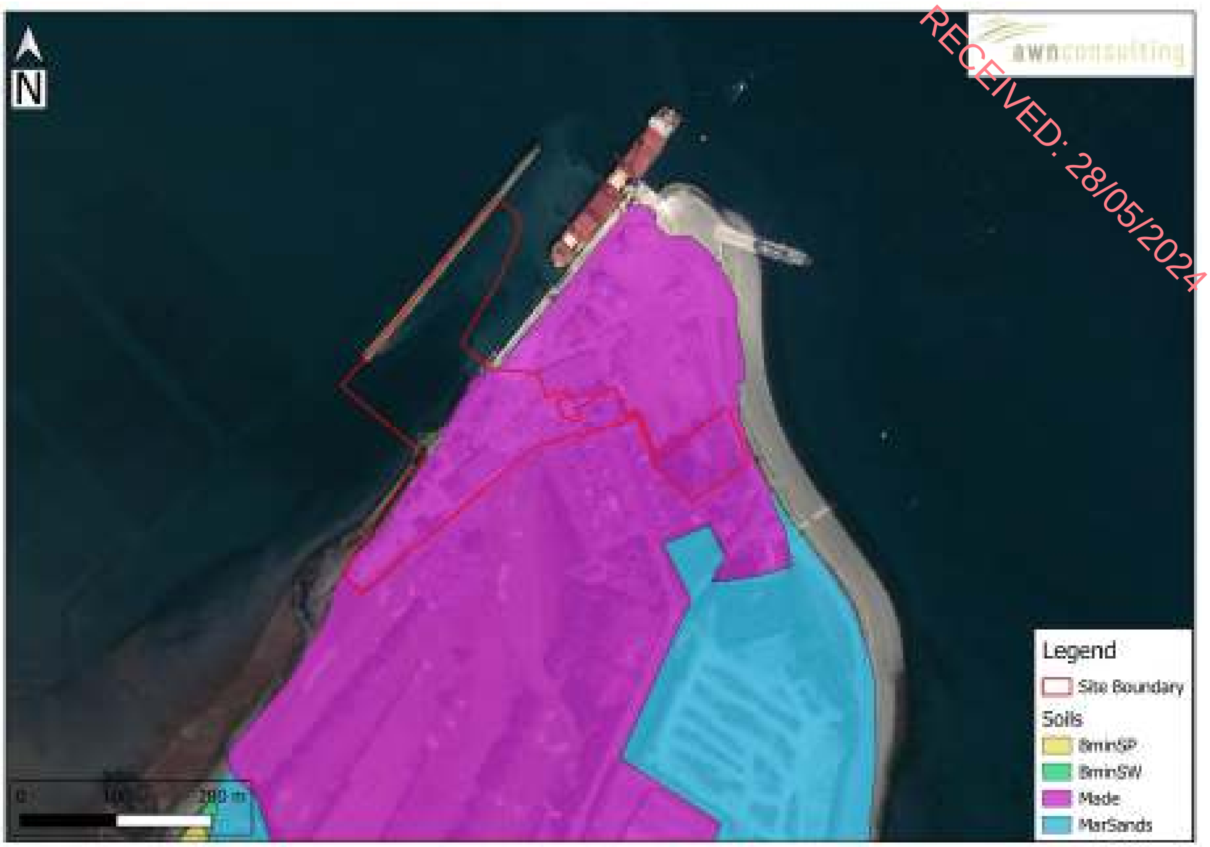


Figure 9.7 Soils Map (EPA, 2023)

The Quaternary geological period extends from about 1.5 million years ago to the present day and can be sub-divided into the Pleistocene Epoch, which covers the Ice Age period, which extended up to 10,000 years ago and the Holocene Epoch, which extends from that time to the present day.

The GSI/ Teagasc mapping database of the subsoils in the area of the proposed development site indicates that the material within the land site area is described as Marine sand and gravels raised beach deposits, as presented in Figure 9.8 below. There is no information available for the sediments within the channel /offshore marine site.

Figure 9.8 Subsoils Map (GSI, 2023)

With regard to the site investigations carried out on the proposed development site, the following subsections detail further information on the soil types encountered. For further information on previous ground investigations carried out at the proposed development site, refer to Table 4-1 "Summary of GI's carried out around the Greenore Port" of Appendix 9.3 - Greenore Port – Geotechnical Interpretive Report (Gavin & Doherty Geosolutions, 2023).

9.6.3.1.1 Geological Profile for Land Development Area

According to the GIR presented in Appendix 9.3 - Greenore Port – Geotechnical Interpretive Report (Gavin & Doherty Geosolutions, 2023) and Appendix 9.5 BRE 365 and Plate Bearing Report (BHP, 2024), the following profile was determined for the land development area.

Overburden Deposit

<u>Gavin & Doherty Geosolutions, 2023</u>

The top strata recorded in all borehole logs for the terrestrial port area were Concrete, Made Ground and Hardcore Fill, followed by '*silty sandy GRAVEL interbedded with gravelly Sand*'. Similarly, the presence of thick layers of cobbles and boulders were also recorded within this unit in BH9 (1998).

This stratum is underlaid by '*SILT/CLAY with some gravel and occasional shells content*'. In the majority of the boreholes, this stratum lies above the bedrock and started to record below -9.0mOD.

Site Investigations, 2024

The strata encountered comprised dark grey, loose, sandy soil and Dark brown, loose, granular soil with cobbles in TP01 and TP02, respectively. Compacted gravel and fractures bedrock were encountered at TP03 and TP04, respectively. The maximum depth reached was 1.85m bgl. No groundwater strikes or ingresses were encountered in any of the trial pits

Bedrock

Limestone is encountered in BH9 from the 1998 SI at 20.70mBGL or -16.10mOD (i.e. -19.15mCD). Bedrock is described as moderately strong fine grained Carboniferous Limestone.:

- P7 at 4.40mBGL -8.5mAOD (i.e. -11.55mCD);
- BH5(1998) at 17.90mBGL -13.4mAOD (i.e. -16.45mCD); and
- BH6(1998) at 17.60mBGL -13.00mAOD (i.e. -16.05mCD).

Table 9.3 below summarises the ground profile for the Land Development Area.

Table 9.3 Geology Unit Summary for Land-Based Ground Model (GDG, 2023)

Material Name/ Soil Geological Unit	Elevation (mAOD)		Thickness (m)	
	Top	Base	Min	Max
Concrete	4.5	4.0	0.15	0.4
Made Ground/ Hardcore Fill	4.6	-1.5	0.5	6.1
Granular Deposits (silty sandy Gravels)	4.0	-9.5	4.2	6.5
Cohesive Deposits (Silt/Clay)	-8.3	Unproven	1.3	4.6
Granular Deposits (sandy Gravels)	-13.5	Unproven	2.7	Unproven
Bedrock	-16.10	Unproven	Unproven	

9.6.3.1.2 Ground Profile for Nearshore Development Area

According to the GIR (Appendix 9.2 - Greenore Port – Geotechnical Interpretive Report (Gavin & Doherty Geosolutions, 2023), the following profile was determined for the nearshore development area.

Overburden Deposit

Generally, the main overburden material is described as '*silty sandy GRAVEL interbedded with gravelly sand*'. The proportion of the silt and sand composition varies slightly between borehole to boreholes based on the log descriptions.

The presence of thick layers of cobbles and boulders were recorded in P13(1998). In P9, P7 and P4 cohesive layer of '*sandy silty CLAY'* as top strata is noted. The presence of cohesive material '*silty CLAY with some gravel and occasional shells*' content is recorded in boreholes especially at the centre of the harbour. In P14 and P13 boreholes this layer appeared as interbedded unit – '*very stiff SILT/CLAY with some gravel and occasional shells content*'.

Bedrock

Moderately strong grey fine grained Carboniferous Limestone was encountered in the following boreholes:

- P7 at 4.40mBGL -8.5mAOD (i.e. -11.55mCD);
- BH5(1998) at 17.90mBGL -13.4mAOD (i.e. -16.45mCD); and
- BH6(1998) at 17.60mBGL -13.00mAOD (i.e. -16.05mCD).

Error! Reference source not found..4 below summarises the ground profile for the Marine Development Area.

Table 9.4 Geology Unit Summary for Marine-Based Ground Model (GDG, 2023)

Material Name/ Soil Geological Unit	Elevation (mAOD)		Thickness (m)	
	Top	Base	Min	Max
Granular Deposits (silty sandy Gravels)	2.5	-8.5	1.5	7.3
Cohesive Deposits (Silt/Clay)	-4.5	-13.0	0.6	4.6
Granular Deposits (sandy Gravels)	-5.5	Unproven	2.3	Unproven
Bedrock	-8.5	Unproven	Unproven	

For the nearshore development area, the GI data used are from 1998 and 1991 SI campaigns. Even though the boreholes are spread well to cover the site area to understand the ground conditions, majority of these boreholes go maximum depth of 6mBGL.

9.6.4 Bedrock Geology

Inspection of the available GSI (2023) records (Data Sheet 16 and on-line mapping database) that the site is underlain by Dinantian Limestones (undifferentiated) - Rock Unit Code: CDDIN. This formation is from the Palaeozoic, Carboniferous and Mississippian age bracket. Refer to Figure 9.9 below.

Site investigations carried out on the site confirmed the above, where limestone was encountered. The bedrock was described as moderately strong fine grained Carboniferous Limestone and was encountered at depths from 4.4 mbgl. Refer to Appendix 9.2 – Geotechnical Interpretive Report (GDG, 2023) and Section 9.6.3 above for further information on the geological characteristics of the proposed development site.

Figure 9.9 Bedrock Geology Map (GSI, 2023)

9.6.5 Economic Geology

The EPA Extractive Industry Register and the GSI mineral database were consulted to determine whether there are any mineral sites close to the proposed development site. There are no active quarries or mineral localities within the immediate vicinity of the proposed development site. The closest mineral site is located c. 0.9 km south-west of the site (Mineral Location Ref: 3908) comprising of Clay, described by the GSI as blue plastic marine mud described as making an excellent puddling clay.

The proposed development site is located entirely within the Geological Heritage Audited Site – Greenore Raised Beach (Site Code: LH019) which is described by the GSI as a wide, flat-topped feature adjacent to the shoreline around Greenore. The remains of a beach deposited in the locality when sea level was 3m-5m higher than it is today.

9.6.6 Radon

According to the EPA online maps (now incorporating the Radiological Protection Institute of Ireland) the site is located in an area where between one and 10 per cent of the homes in the 10 km grid square are estimated to be above the Reference Level (200 bq/m3).

9.6.7 Geo-Hazards

In general, risk of landslides in this area of Ireland is considered to be low, as the land is not located in a region with high seismic activity or large mountain ranges. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The landslide susceptibility map (GSI spatial map viewer) identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers the location of landslides and what causes them (slope, soil type and the impact of the flow of water).

Based on the GSI spatial map viewer, the site is not in an area susceptible to landslides, with a GSI Landslide Susceptibility Classification of *Low*. This is consistent with the topography and the geology across the site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies, has been recording seismic events in Ireland since 1978 (www.dias.ie). This network consists of several seismometers that are located throughout Ireland. Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity. However, earthquakes can still occur in Ireland, although they are typically small and have little impact. There is a very low risk of seismic activity to the site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity at the site.

9.6.8 Areas of Conservation

The proposed development site is partially within Carlingford Shore SAC (Site code: 002306) and Carlingford Lough SPA (Site code: 004078). Currently there is a direct hydrological linkage between the proposed development sites and these sites through the existing stormwater drainage network which outfalls into the Carlingford Lough. Refer to Figure 9.10 below.

The Carlingford Lough receives water from the Newry catchment, which is a transboundary catchment, and more specifically from the Newry Estuary transitional waterbody (WFD Code: UKGBNI5NB030010).

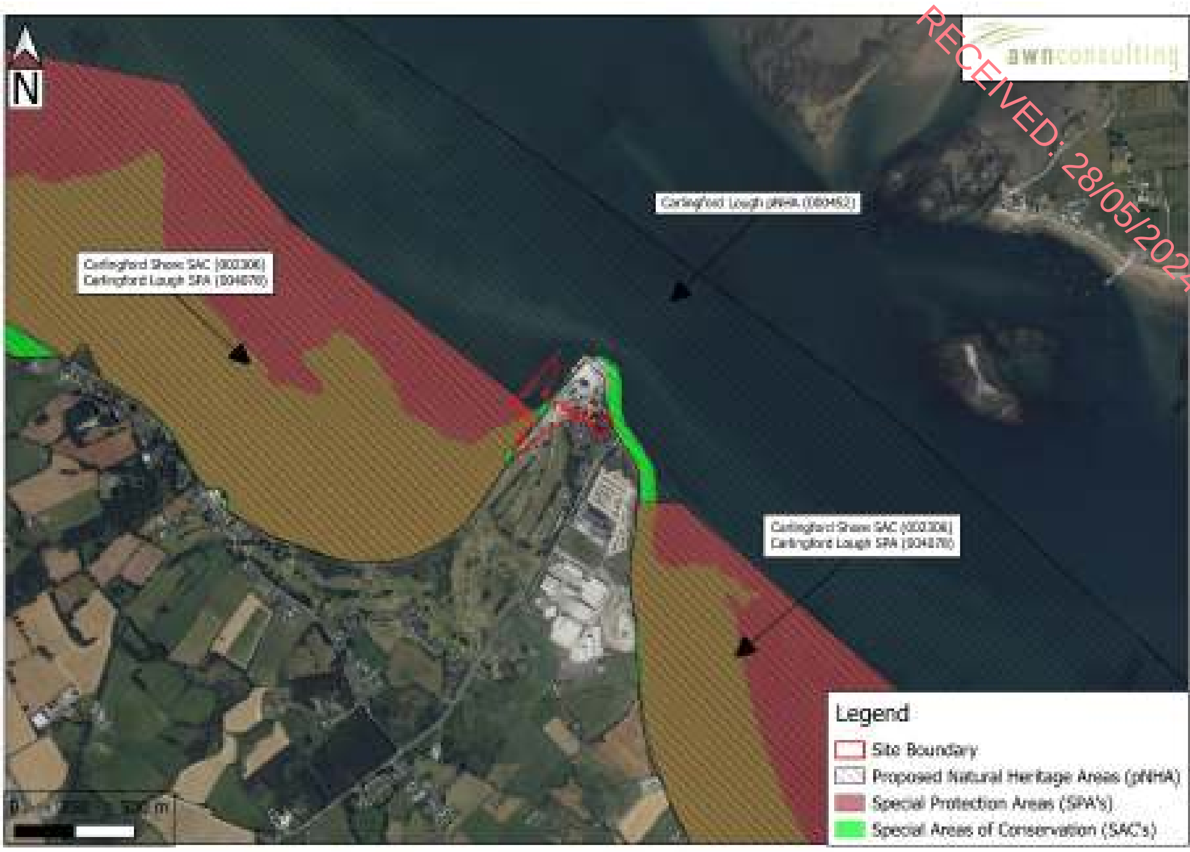


Figure 9.10 Site Location with Areas of Conservation (NPWS, 2023)

Note: Proposed Natural Heritage Areas (pNHAs) are designations introduced under the Wildlife Act 1976 (as amended). Although many NHA designations are not yet fully in force under this legislation, they are offered protection in the meantime under planning legislation which requires that planning authorities give due regard to their protection in planning policies and decisions.

9.6.9 Site History and Previous Land Use

The Port played a vital maritime role in the area for the past 150 years. In 1860s London and North Western Railway (LNWR), who recognised the area's natural port characteristics, in terms of shelter of its approach and natural water depth. The Port was opened in 1873, with a railway line connecting it to Dundalk and Newry. Other facilities also opened in the area including a hotel for passengers, a village to accommodate employees, and later even a golf club.

From the 1960s both conventional and container traffics were developed. When container traffic started to move to the larger developing ports of Dublin, Belfast and Cork, the Port began handling large volumes of bulk cargoes as well as playing a vital role in the export of live cattle and frozen beef to the Middle East during the 1980s and 1990s.

Historical Ordnance Survey (OSi, 2023) maps were examined for the purpose of this study. OS maps were available for the period from 1830 to 1913 and included the historic 6" Cassini maps (c.1845), Historic Map 6-inch Colour (1837-1842), and the historic 25" maps (1888-1913). More recent aerial mapping (1995-to present date) was also used in this assessment.

Figure 9.11 below, a historic 25" map (1888-1913) shows the site is developed with a light house, harbour station, pier and rail line by 1969.

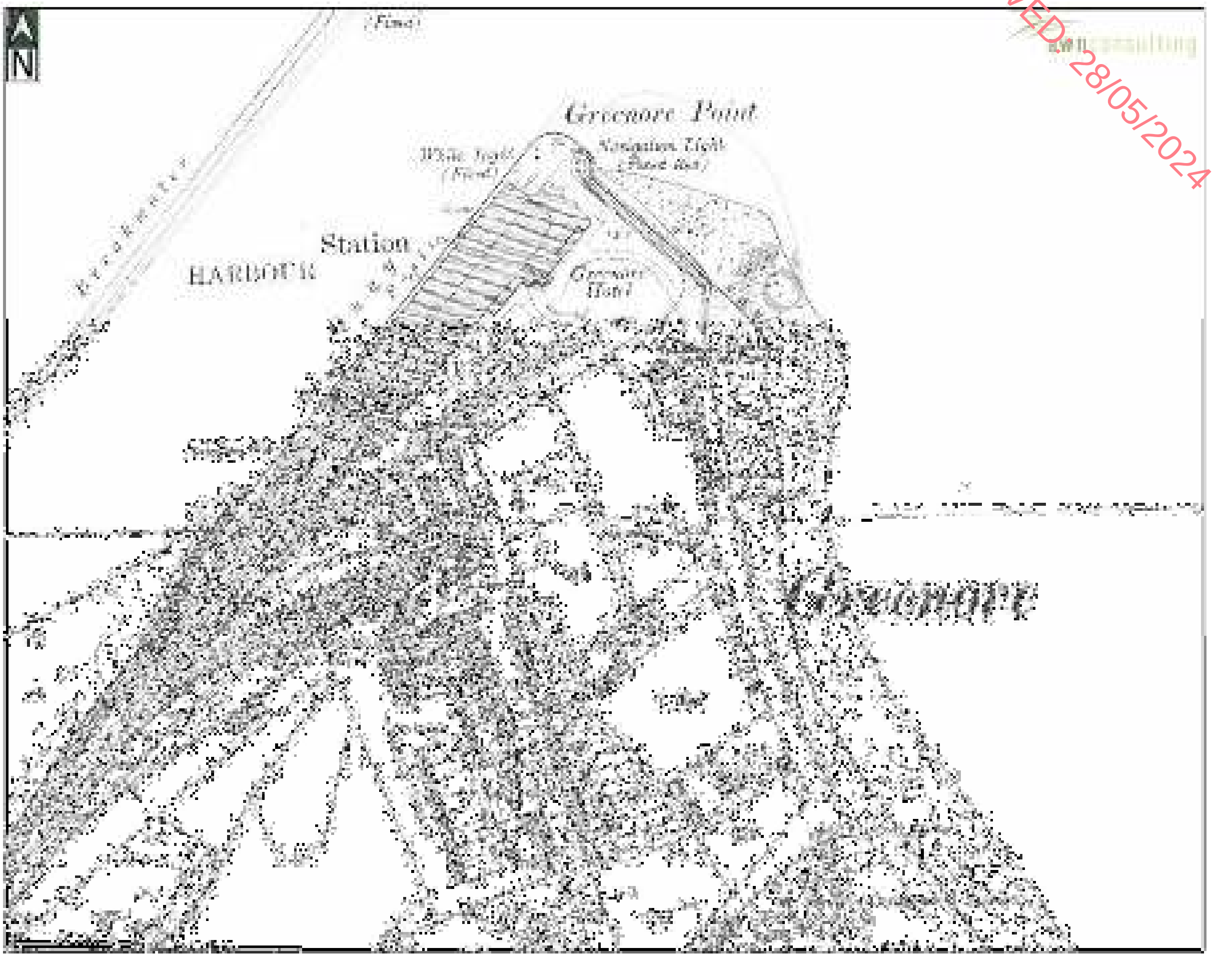


Figure 9.11 Historic 25" Map - 1888-1913 (OSi, 2023)

Aerial image displayed in Figure 9.12(2006-2012) and Figure 9.13 (2022) shows that all the railway lines shown in Figure 9.11 have above been removed and Greenore Port now has more container storage facilities. The development of Greenore Golf Club to the south of the proposed development is also shown, which was founded in 1896.

Figure 9.12 2006-2012 Aerial Map (OSi, 2023)

Figure 9.13 2022 Aerial Map (Google Earth Pro, 2023)

9.6.10 Soil Quality

9.6.10.1 Site Investigations, 2024

During the site investigations conducted at Greenore Port , the 4 no. soil samples from trial holes (TP01, TP02, TP03 & TP04) were analysed for Waste Acceptance Criteria suite in accordance with Council Decision 2003/33/EC (Rilta 2016 Revised WAC suite, see Table 9.5 below).

Table 9.5 RILTA 2016 Suite

Test Method	Code	Rilta Suite	ISO 17025	MDL	CEN references - EN/TS/TR
TM065	Asb	Fibre screen/ asbestos ID (HSG 248)	Y		
073S	pH	pH using Metrohm	Y	0.01pH units	
PM01	MC	Moisture content as % wet weight			
021S	TOC	TOC by combustion - carbonates removed with acid by citra	Y	0.2%	EN 13137 Method B
030S		metals(As,Ba,Cd,Cr,Cu,Hg,Mo,Ni,Pb,Sb,Se,Zn)	Y	various	
016S	Hex Cr	Hexavalent Chromium plus Trivalent Chromium by calculation	N	0.3mg/kg	
001S	BTEX S	BTEX/MTBE by GC-FID	Y	5ug/kg	
085S	PCB-7 S	PCBs (7 congeners) by GC-MS	Y	5ug/kg	EN 15308 analysis GC-MS
008/005S	CWG	TPH CWG (Aliphatics C5-6,>6-8,>8-10,>10-12,>12-16,>16-21,>21-35, >35-40) (Aromatics >C5-7,>7-8,>8-10,>10-12,>12-16,>16-21,>21-35, >35-40) Extra banding Aliphatics C8-10,C10-25, C25-35, Aromatics C8-10, C10-C25, C25-35	Y	various - see lab	
004S	PAH 17 S	PAH 17 by GC-MS (inc coronene) plus PAH (total 16)	Y	various	EN 15527 PAH GC-MS
		Benzo(j)fluoranthene	N	1mg/kg	
CEN 10: leachate preparation (results expressed as mg/kg)					EN 12457-2 :2002
030W	Metals	As(0.025),Ba(0.03),Cd(0.005),Cr(0.015),Cu(0.07),Mo(0.02), Ni(0.02),Pb(0.05),Sb(0.02),Se(0.03),Zn(0.03)	Y	various (mg/kg)	EN 12506 / EN ISO 11885 - ICP-OES
061W		Mercury by Cold Vapour Atomic Fluorescence	Y	0.1ug/kg	EN 13370 / EN 1483 CVAAS
073W	pH	Determination of pH (Metrohm)	Y	0.01pH units	
027W/173W		Chloride(3), Fluoride(3), Sulphate (0.5)	N	various (mg/kg)	EN 12506 /EN ISO 10304-1-2 liquid chromatography
026W		Phenol HPLC	Y	0.1mg/kg	
060W		DOC	N	20mg/kg	EN 1484
020W		TDS	N	350mg/kg	EN 15216

Based on the laboratory results of the material sampled across the site all samples can be classified as non-hazardous.

Refer to Appendix 9.4 – Waste Classification Report (BHP, 2024), Appendix 9.5 - BRE 365 and Plate Bearing Report (BHP, 2024) and Appendix 9.6 – WAC Laboratory Report (Eurofins Chemtest Ltd, 2024) for further information on soil classification and soil quality results.

9.6.10.2 Geotechnical Interpretive Report - GDG, 2023

As part of the site investigation carried out by RPS (2011; refer to Section 9.4.3.2 above), soil samples were analysed for Special Petroleum Hydrocarbons by STL, a UKAS accredited laboratory. Petroleum hydrocarbons were detected in the soil samples taken from BH1-1, BH4-1, BH4-2 and BH5-1. A large range of petroleum hydrocarbons (C8-C40) were detected in the upper subsoil at 0.5 mbgl of BH1 (BH1-1) Petroleum hydrocarbons of the range c12-c40 were detected in BH4-1 at 0.5 mbgl and C21-C40 in BH4-2 at 3.0 mbgl located to the north and west of the proposed extensions where the former refuelling gantry was located. Petroleum hydrocarbons of the range C12-C40 were detected in BH5-1 at 0.5 mbgl located downgradient of the decommissioned oil water receptor. Refer to Figure 9.3 above for the borehole locations which were samples during the ground investigations carried out by RPS in 2011.

For further information on the proposed modifications and extensions to the former OpenHydro Building in relation to the borehole locations listed above (BH1-1, BH4-1, BH4-2 and BH5-1), refer to Appendix A of Appendix 10.3 – Design Package for Alterations & Extensions to Some Buildings at Greenore Port, Greenore, Co. Louth – Services Design Report (Rockwood Chartered Engineers, March 2020)

As shown in Table 9.6 below, none of the detected levels exceeded the Dutch Intervention values for mineral oil (5000mg/kg) which may be applied to petroleum hydrocarbons in soil. All other samples were below the laboratories limit of detection (LOD).

Table 9.6 Detected Petroleum Hydrocarbon Concentrations (RPS, 2011)

Concentration (mg/kg)	LQM/CIEH S4ul for HHRA Residential Threshold (mg/kg)	LQM/CIEH S4ul for HHRA Commercial Threshold (mg/kg)	BH1-1	BH4-1	BH4-2	BH5-1
C8-C10	27	2,000	4.5	<1.0	<1.0	<1.0
C10-C12	130	9,700	5.1	<1.0	<1.0	<1.0
C12-16	1,100	59,000	22	6.1	<1.0	5.4
C16-C21	65,000	1,600,000	69	17	<1.0	17
C21-C40	65,000	1,600,000	350	210	23	50

As can be seen in Table 9.6 above, none of the samples exceed the threshold values for commercial or residential use of soil.

Hydrocarbon levels were below the laboratories limit of detection (LOD) in the groundwater sampled for all ranges. Refer to Chapter 10 – Water and Hydrology of this EIAR for further information on the groundwater quality results and data.

Refer to Appendix 9.3 - Greenore Port – Geotechnical Interpretive Report (Gavin & Doherty Geosolutions, 2023) for site investigation locations on the site area.

9.6.11 Conceptual Site Model

To summarise the current conceptual site model (CSM), local cross section are presented in Figures 9.14 and 9.15 of the terrestrial (land) development area and the nearshore development area, respectively. These cross sections are based on the site investigation data outlined in Table 9.1 of this EIAR and Appendix 9.3 of the EIAR.

The location of previous site investigation points and the direction of the cross sections for the terrestrial (land) development area and the nearshore development area are displayed in Figures 9.13 and 9.14 below. The key points of the CSM for the site include the following:

- The ground levels typically vary from 4.617mAOD to 4.062mAOD at the proposed development area for the landside quay and proposed buildings.
- The site is underlain by Made Ground, hardcore fill, cohesive deposits and granular deposits.
- Local aquifer vulnerability is classed as 'High' which indicates that the bedrock is c. 3-5m depth with a moderate thickness of subsoil acting as a protective layer for the underlying aquifer.

- The bedrock beneath the site comprises Carboniferous Limestones and is classified as hosting a Locally Important Aquifer (Lm).
- The site is geologically and hydrogeologically connected to the Areas of Conservation (Carlingford Lough SPA and Carlingford Shore SAC), partially located within the proposed development site.

Refer to Appendix 9.3 - Greenore Port – Geotechnical Interpretive Report (Gavin & Doherty Geosolutions, 2023) for further information on the land, soils, geological and hydrogeological data from previous site investigations carried out at Greenore Port.

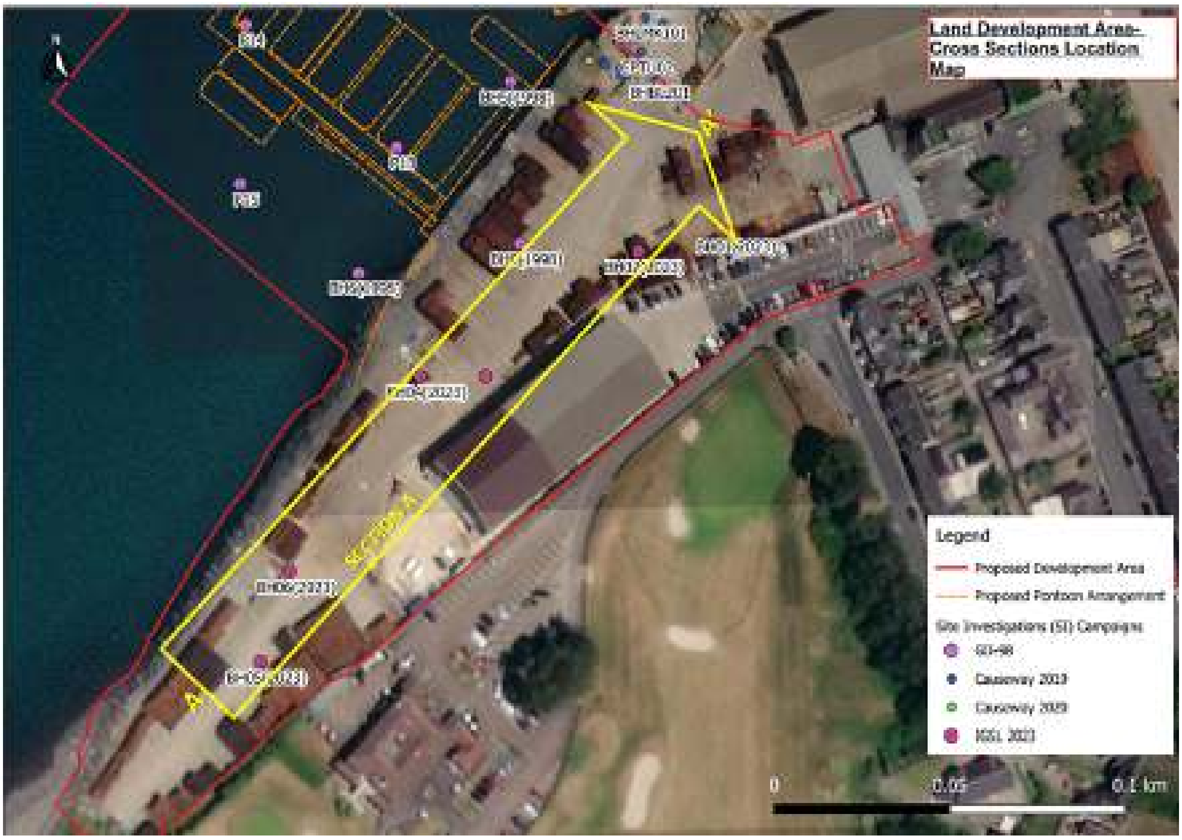


Figure 9.14 Terrestrial Development Area – Cross Section and SI Locations

Figure 9.15 Nearshore Development Area – Cross Section and SI Location

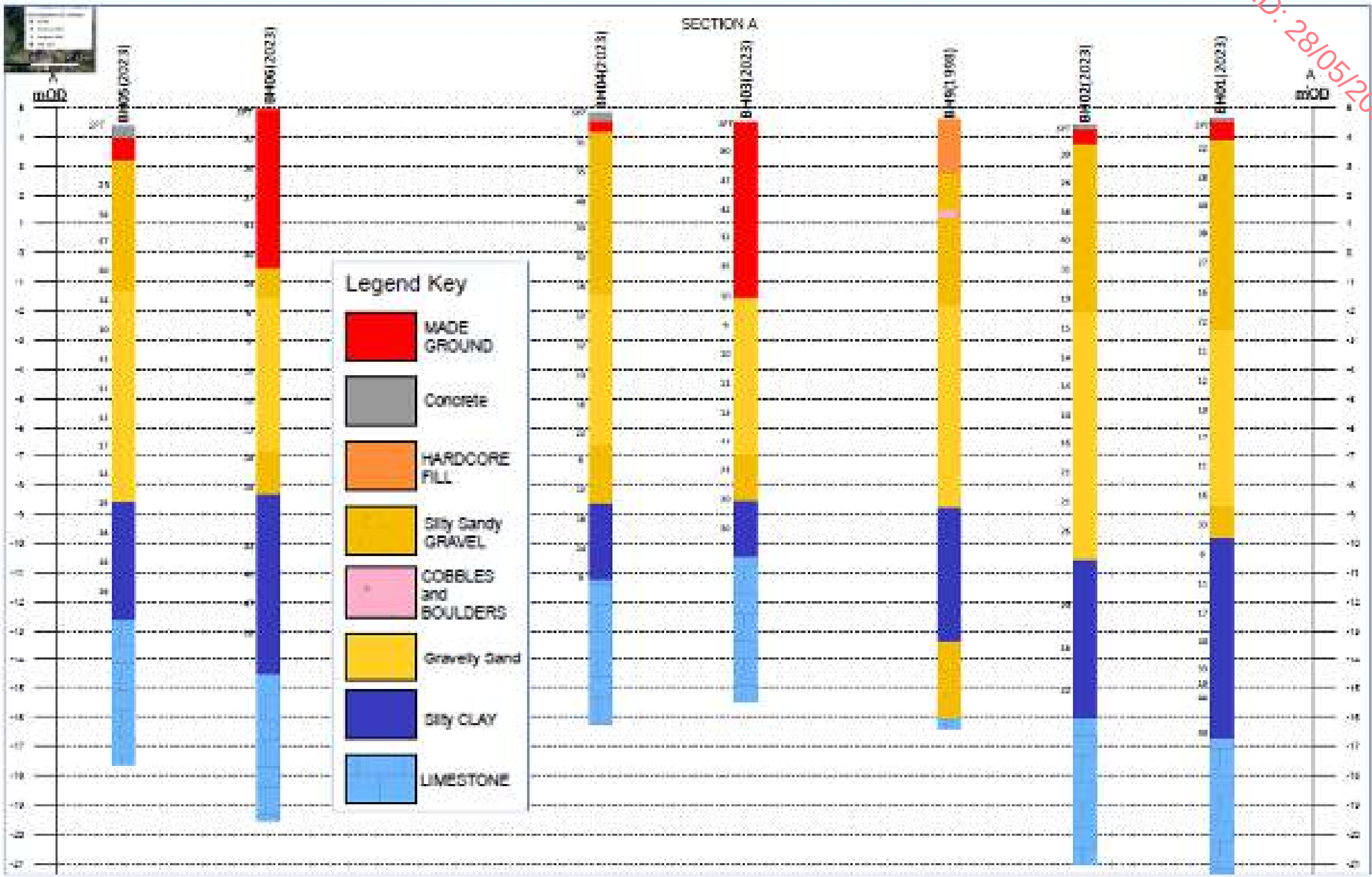


Figure 9.16 Geological Cross Section of Terrestrial Development Area

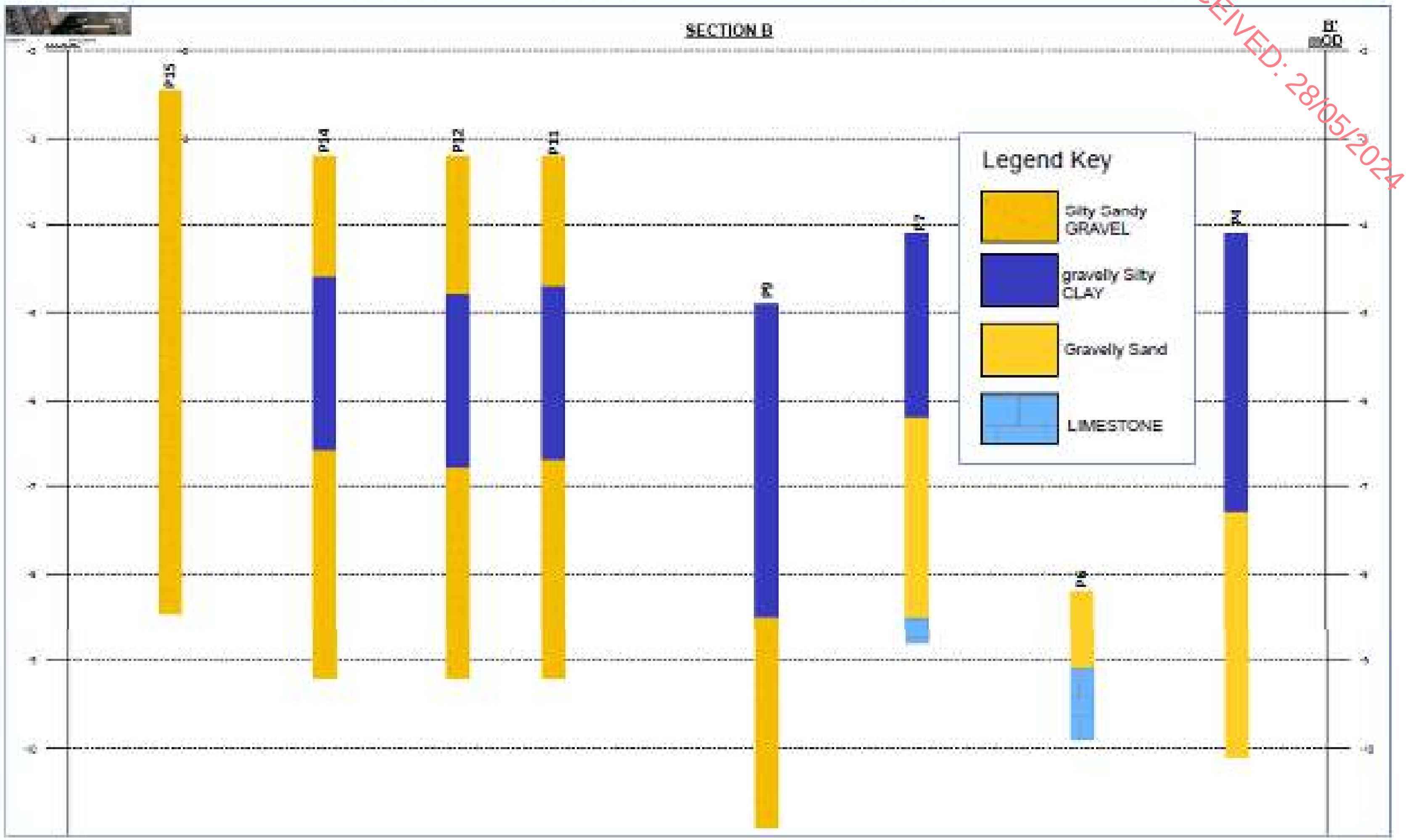


Figure 9.17 Geological Cross Section of Nearshore Development Area

9.6.12 Rating of Site Importance of the Geological Features

Based on the NRA/IGI methodology, the criteria for rating the importance of geological features, the importance of the bedrock and soil features at this site is rated as '*High*' Importance (refer to Appendix 9.1).

This is based on the assessment that the attribute has a high quality, or value on a local scale. The site is located within a geological feature of high value on a local scale (Geological Heritage Audited Site – Greenore Raised Beach).

9.7 The 'Do Nothing' Scenario

If the proposed development was not to go ahead (i.e. in a Do-Nothing scenario) the baseline environment in terms of land, soils, and geology would remain unchanged as there would be no excavations or construction. Therefore, in a "Do Nothing" scenario, there would be a neutral effect on the land, soils and geological environment at the site. The likelihood in a temporary and short-term basis is the existing natural state of the area would persist, without any alterations or disturbances caused by the development.

However there are a number existing permitted developments at the site and on adjoining lands within Greenore Port. It should be noted that in the event that the proposed development does not go ahead, the extant permissions for warehousing (new and extensions) Greenore Port can be implemented.
It is likely that in the absence of the proposed development, that a development of a similar nature would be progressed on the site that accords with national and regional policies and therefore the likely significant effects would be similar to this proposal.

9.8 Potential Significant Effects

An analysis of the potential effects of the proposed development on the land, soils and geological environment during the demolition, construction and operational phases are outlined below. Due to the inter-relationship between land, soils, geology, hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapter 9 and 10 of this EIA Report. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 9.9.

9.8.1 Demolition Phase

To facilitate the development, demolition works are required. This will include the demolition of the former 'Open Hydro building'. quay deck and a small portion of the port's office accommodation, an ESB substation, and an unoccupied dwelling house. The likelihood of significant effects on the land, soils and geology during the demolition phase is minimal due to the demolition works of the proposed development being limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction. As a result, the impact on the land and soils is minimal and no significant effects on the land's composition, stability, or fertility are anticipated.

Overall, the surface-level demolition works will have a negligible impact on the land, soils and geology preserving their integrity and minimizing any potential environmental consequences. In the absence of mitigation, the effect on land, soils and geology is likely to be **short-term, *Imperceptible* and negative.**

Refer to Chapter 8 – Material Assets – Waste of this EIAR for further information on predicted on and off-site reuse, recycle and disposal rates for demolition waste.

9.8.2 Construction Phase

9.8.2.1 Accidental Spills, Leaks and Discharges

There is potential for the underlying soils, geology and groundwater to become contaminated with pollutants associated with construction activity. If a spill occurs, contaminated water and collected surface water run-off which arises from construction sites can pose a short-term risk to the underlying rock if contaminated water is allowed percolate to the aquifer unmitigated. The potential of contamination is associated with the following sources:

- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates) – arising from dewatering, excavation and ground disturbance);
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or stored fuels, oils, and materials.
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms.

In the absence of mitigation, rainfall run-off and dewatering water during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may in turn impact on local infiltration capacity, or surface waterbodies. There is also the potential risk of unintentional discharge from construction traffic or stored materials like fuels and oils which could have negative impacts on both surface waters on-site and downstream from the site and the underlying groundwater. Moreover, construction activities often involve the use of chemicals, such as paints, adhesives, solvents, and pesticides, which can also pose a risk of contamination if not handled and disposed of properly. These chemicals can seep into the soil or be carried by rainwater or other runoff, ultimately contaminating groundwater. It is necessary for the measures (set out in Section 9.9.3) to be implemented to reduce and prevent accidental discharges from occurring during construction, including the implementation of effective containment and monitoring procedures.

Accidental discharges can also occur from welfare facilities during construction activities. Wastewater can contain high levels of bacteria, chemicals and organic matter, which could contaminate nearby water sources if discharged incorrectly. The establishment and use of welfare facilities and use of sealed containment, ensures that there are no potential significant impacts; therefore, no additional mitigation is required.

In addition to the unintentional spillages of the primary sources of contaminants mentioned above, there is also a risk that rainfall run-off and dewatering water from excavation activities becoming contaminated by these sources. If not appropriately mitigated through containment, management, and monitoring, this could result in the mobilisation of these contaminants, leading to more widespread impacts on the surrounding environment. It is the intent to take necessary measures (set out in Section 9.9.3) to prevent such accidental discharges from occurring during construction, including the implementation of effective containment and monitoring procedures.

However, in the absence of mitigation, the effects on land, soils and geology are likely to be **short-term, significant and negative.**

9.8.2.2 Earthworks and Excavations

Removal and reinstatement (including infilling) of the 'protective' tarmac, concrete and subsoil cover across localised areas of the proposed development site will be undertaken during excavation and trenching works (including works for additional drainage and attenuation areas). The proposed development requires soil and stones to be excavated to facilitate construction of new foundations and the installation of underground services. The project engineers (McCarthy Browne) have estimated that c. 7,225 m^3 of material will need to be excavated to do so. It is currently envisaged that there will be an opportunity to reuse c. 4,265 m^3 of excavated material for use in landscaping and fill. The remaining 2,960 m^3 of material will be removed offsite for appropriate offsite reuse, recovery, recycling and / or disposal.

There will be dredging undertaken to facilitate navigable access and suitable berthing for the crew transfer vessels (CTV)s. Bedrock may be encountered in these areas and temporarily exposed for the duration of the excavation works and will temporarily increase the vulnerability category for the site which is classified by the GSI as 'High' indicating a general overburden depth potential between 3-5m, suggesting a moderate to good natural protection of the aquifer by high permeability marine gravel and sands and is consistent with local site investigations, as carboniferous limestones have been encountered at depths from 4.4 m below ground level (refer to Section Chapter 10 – Section 10.6.3.2). Given the anticipated size of the excavations, it is expected that they will involve only the uppermost strata and will not affect the bedrock associated to Dundalk groundwater body and locally important aquifer.

However, these works are temporary only. The overall duration of the construction works is estimated to be c.35 months (16 months per phase 1 and 19 months for phase 2). It is anticipated that c. 2,960 m^3 of excavated material and 45,000m^3 of dredged material will need to be removed off-site as stated above. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

However, in the absence of mitigation, the effects on land, soils and geology are likely to be **short-term, significant and negative.**

9.8.3 Operational Phase

9.8.3.1 Hardstanding Areas

Once operational, the proposed development will not result in the addition of any new hardstanding areas within the port as such there will be no change to the land, soils and geology.

In the absence of mitigation measures, the potential effects during the operational phase on land, soils andgeology are **long-term, imperceptible and neutral.**

9.8.3.2 Storage of Hazardous Material

A fuel storage facility with a capacity of ≥200,000 litres will be provided in a dedicated area that will be maintained and managed by Greenore Port. There is limited potential for leaks or spills of petroleum hydrocarbons during site maintenance activities during the operation of the development. Unmitigated leaks or spills may lead to contamination of soil and/or groundwater. Soils that are contaminated by petroleum hydrocarbons can affect soil health.

In the absence of mitigation, measures the potential effects during the operational phase on land and soils are **long-term, significant and negative.**

9.8.3.3 Drainage

The port has an existing foul drainage network in place comprising a foul collection tank and foul lines servicing buildings in the port. This includes an existing 150mm connection to the foul collection tank from the former Open Hydro building.

A new network of foul sewers will be installed to serve the proposed development, discharging to the existing collection tank.

There are two separate surface water drainage proposals for the proposed development, one for the O&M facility development at the terrestrial port area and a separate system for the satellite carpark at the residential site on Shore Road.

There is no discharge to ground proposed as part of the surface water drainage strategy from the O&M Facility and the existing outfall into Carlingford Lough will be utilised. A bypass separator will be installed to intercept pollutants such as petroleum and oil before the Surface water outfalls to sea.

There is no discharge to ground proposed as part of the surface water drainage strategy from the shore road car park. Surface water will discharge to the public surface water pipe on Shore Road. A bypass interceptor will be installed to capture pollutants such as petroleum and oil and prevent their entry to the public drainage system.

There will be no disruption to land, soils and geology during operational phase, hence there will be no potential effects.

In the absence of mitigation measures, the potential effects during the operational phase on land and soils are **long-term, imperceptible and neutral.**

9.8.4 Cumulative Effects

This section needs to consider the cumulative (combined) effects of the proposed development with the following:-

- ➔ There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. Multiple developments in the area could potentially be developed concurrently or overlap during the demolition, construction and operational phases. There will be no effects on land soils and geology as each development will adhere to their own CEMP and mitigation plan. There is no pathway and connectivity to land soils and geology to each development.

9.8.5 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied. If the mitigation measures outlined in Section 9.9 below are not implemented and adhered to in full, the effect on the land and soils is likely to be **long-term, significant and negative.**

Table 9.7 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Accidental Spills, Leaks and Discharges	Negative	Significant	Local & Regional	Likely	Long-Term	Direct
Soil Erosion & Compaction	Negative	Significant	Local	Likely	Short-Term	Direct
Increased Sediment Run Off during excavation works carrying Sediment and Pollutants into the Soil and Bedrock	Negative	Significant	Local & Regional	Likely	Short-Term	Direct & Indirect
Soil Contamination from Construction Waste, Materials & Chemicals	Negative	Significant	Local	Likely	Long-Term	Direct
Lack of waste Classification & Improper disposal of Construction Waste increasing the risk of Soil Contamination	Negative	Significant	Local	Likely	Long-Term	Direct

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 9.8 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Accidental Spills, Leaks and Discharges	Negative	Significant	Local & Regional	Likely	Long-Term	Direct
Increased Sediment Run Off from Hardstanding Areas carrying Sediment and Pollutants into the Soil and Bedrock Off-Site	Negative	Significant	Local & Regional	Likely	Short-Term	Direct
Future Maintenance Works on Underground Services and Infrastructure involving Soil Excavations and Soil Disturbance and Disposal	Negative	***Imperceptible***	Local & Regional	Likely	Short-Term	Direct

9.9 Mitigation

9.9.1 Incorporated Design Mitigation

This section outlines the measures that will be employed in order to ensure the project has minimal adverse effects on the surrounding environment, in this case land, soils and geology. These measures include appropriate design measures such as the proper storage and containment of hazardous substances and proper drainage systems in line with best practice, standard details, policies and guidelines already incorporated into the proposed design. For further information on design refer to the Engineering Planning Report (CSEA, 2023) submitted with this application.

9.9.2 Demolition Phase Mitigation

To facilitate the development, demolition works are required. This will include the demolition of the former 'Open Hydro building' to, and a small portion of the port's office accommodation, an ESB substation, and an unoccupied dwelling house. The demolition works of the proposed development are limited to surface-level activities and do not involve any excavation works. As a result, the impact on the land and soils is minimal.

The demolition process focuses on dismantling and removing structures, buildings and infrastructure (i.e. Open Hydro building, office accommodation, ESB substation and associated switch room, unoccupied dwelling house etc.) to accommodate the new development and facilitation works, without disturbing the underlying soil or altering the landscape. This approach ensures that there are no significant effects on the land's composition, stability, or fertility. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction.

In addition, all waste materials will be dealt with in accordance with regional and national legislation, time and resources will be dedicated to ensuring efficient waste management practices and waste arisings will be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate.

Refer to Chapter 8 – Material Assets – Waste – Section 8.9.2 of the EIA for further information on predicted on demolition phase mitigation in terms of off-site reuse, recycle and disposal rates for demolition waste.

Overall, minimal mitigation measures are required during the demolition phase due to the surface level nature of the works. The surface-level demolition works will have a negligible impact on the land and soils, preserving their integrity and minimizing any potential environmental consequences.

9.9.3 Construction Phase Mitigation

In order to reduce impacts on the land, soils and geological environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation and export from site;
- Sources of fill and aggregates for the proposed development;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

9.9.3.1 Construction Environmental Management Plan

The project engineer (McCarthy Browne) have prepared a Construction Environmental Management Plan (CEMP) that is included with the application documentation.

The main purpose of a CEMP is to provide a mechanism for implementation of the various mitigation and monitoring measures which are described in the EIAR. The CEMP demonstrates the applicant's commitment to implementing the proposed development in such a way as to avoid or minimise the potential environmental effects arising from construction activities. All personnel will be required to understand and implement the requirements of the plan.

Construction works and the proposed mitigation measures outlined in the CEMP are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741);
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005); and
- Guidelines for the crossing of watercourses during the construction of national road schemes (National Roads Authority; 2008).

The CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

The CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site. All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to consent conditions which may be imposed.

During the project planning phase, a comprehensive emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process. This plan will include for events such as:

- Pollution incidents: These may involve spillages, the malfunction of temporary structures, embankment collapse, acts of vandalism, fires, and other related events.
- Extreme weather occurrences: Events such as heavy rainfall, flooding, are important factors to consider due to their potential impact on the construction process.

The construction contractor will be required to implement emergency response procedures that align with industry best practice guidance. All personnel working on the site will be informed of the emergency procedures in place.

9.9.3.2 Soil Excavation, Removal and Infill

There will be soil and stones excavated to facilitate construction of new foundations and the installation of underground services. The project engineers (McCarthy Browne) have estimated that c. 7,225 m^3 of material will need to be excavated to do so. It is currently envisaged that there will be an opportunity to reuse c. 4,265 m^3 of excavated material for use in landscaping and fill. The remining 2,960 m^3 of material, will need to be removed offsite due to the limited opportunities for reuse on site. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

There will be dredging undertaken to facilitate navigable access and suitable berthing for the crew transfer vessels (CTV)s. McCarthy Browne have estimated that c. 45,000 m^3 of material to be dredged. This material will be taken for appropriate offsite reuse, recovery, recycling and / or disposal. A further 1,000 m^3 of possible rock dredge material will be reused on site.

Material that is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments. Contractors should prepare and adhere to a method statement indicating the extent of the areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.

Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction.

Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

Previous site investigations carried out by RPS in 2011 identified petroleum hydrocarbons in a number of soil samples (refer to Section 9.4.3.2 above or Appendix 9.2 - Targeted Soil and Groundwater Assessment – Ground Investigation at the Topaz Fuel Storage Terminal, Greenore). Any excavation works should be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil will be tested and classified as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication, HazWasteOnline tool or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with *EC Decision 2003/33/EC*. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.

9.9.3.3 Sources of Engineering Fill and Aggregates

All imported fill and aggregate that may be required for the proposed development will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development;
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company

9.9.3.4 Fuel and Chemical Handling

The following mitigation measures will be taken at the construction stage in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or water quality impacts:

- Designation of a bunded refuelling areas on the site if refuelling cannot be undertaken off site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers to carry a spill kit;
  - Operatives must have spill response training; and
  - Drip trays used on any required mobile fuel units.

In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they will be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

All contractors will be required to implement mitigation measures discussed above.

All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash-down and washout of concrete transporting vehicles will take place at a designated wash out point on site.

9.9.3.5 Environmental Procedures

There will be comprehensive emergency response procedures and standard operating procedures to respond to chemical spillage all types. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures.

The predicted impact on land and soils during the construction phase is ***neutral, imperceptible*** and ***short-term,*** the magnitude of impact is considered ***negligible***.

9.9.4 Operational Phase Mitigation

9.9.4.1 Increased Run-Off and Sediment Loading

The proposed development will not add any new hardstanding areas within the port. Therefore, there will be no requirements for mitigations against increased run-off and sediment loading post construction phase of the development.

9.9.4.2 Drainage

There are no direct or indirect foul water discharges to ground or Carlingford Lough as part of the existing or proposed waste water drainage design.

The port has an existing foul drainage network in place comprising a foul collection tank and foul lines servicing buildings in the port. This includes an existing 150mm connection to the foul collection tank from the former Open Hydro building.

A new network of foul sewers will be installed to serve the proposed development, discharging to the existing collection tank. Therefore, as there are no effects on the land, soils and geology at the proposed development, no mitigation is required.

There are two separate surface water drainage proposals for the proposed development, one for the O&M facility development at the terrestrial port area and a separate system for the satellite carpark at the residential site on Shore Road.

There is no discharge to ground proposed as part of the surface water drainage strategy from the O&M Facility and the existing outfall into Carlingford Lough will be utilised. Therefore, as there are no effects on the land, soils and geology at the proposed development, no mitigation is required.

There is no discharge to ground proposed as part of the surface water drainage strategy from the shore road car park. Surface water will discharge to the public surface water pipe on Shore Road. A bypass interceptor will be installed to capture pollutants such as petroleum and oil and prevent their entry to the public drainage system. Therefore, as there are no effects on the land, soils and geology at the proposed development, no mitigation is required.

9.9.4.3 Storage of Hazardous Material

A fuel storage facility with a capacity of ≥200,000 liters will be provided in a dedicated area that will be maintained and managed by Greenore Port. This quantity of proposed fuel storage is significantly below the applicable threshold of 2,500 tonnes for petroleum products and alternative fuels detailed in Part 2 of Schedule 1 of the Control of Major Accident Hazards (COMAH) Regulations 2015.

In addition to this the tanks will be bunded or double skinned so in the event of a spill no discharge to ground will occur.

As part of integrated design mitigation, Surface water will be drained from this area into the proposed network with petrol interceptors included to ensure no hydrocarbon contamination exits the site through the surface water drainage system. Hence, no mitigation will be required during the operational phase.

9.10 Residual Impact Assessment

The implementation of mitigation measures outlined in Section 9.9 will ensure that the potential impacts on the land, soils and geological environment do not occur during the demolition, construction and operational phases of the proposed development. Due to the inter-relationship between land, soils, geology, hydrogeology and surface water the following impacts discussed will be considered applicable to both Chapter 9 (Land and Soils) & Chapter 10 (Hydrology) of the EIAR.

9.10.1 Demolition Phase

A carefully planned approach during the demolition phase in particular waste management, as set out in Section 9.9.2 and full adherence to the RWMP presented in Appendix 8.1 and Chapter 8 – Material Assets & Waste of the EIAR, will ensure that the predicted effect on the land, soils and geological environment will be **short-term, imperceptible** and **neutral**. Following the TII criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

9.10.2 Construction Phase

9.10.2.1 Soil Excavation, Removal and Infill

The implementation of mitigation measures outlined in Section 9.9.3.2 will ensure that the potential impacts on the land, soils and geological environment do not occur during the construction phase and that the residual effect will be ***short-term-imperceptible-neutral***. Following the TII criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

9.10.2.2 Sources of Engineering Fill and Aggregate

The implementation of mitigation measures outlined in Section 9.9.3.3 will ensure that the potential impacts on the land, soils and geological environment do not occur during the construction phase and that the residual effect will be ***short-term-imperceptible-neutral***. Following the TII criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

9.10.2.3 Fuel and Chemical Handling

The implementation of mitigation measures outlined in Section 9.9.3.4 will ensure that the potential impacts on the land, soils and geological environment do not occur during the construction phase and that the residual effect will be ***short-term-imperceptible-neutral***. Following the TII criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

9.10.3 Operational Phase

9.10.3.1 Increased Run-Off and Sediment Loading

The implementation of mitigation measures highlighted in Section 9.9.4.1 will ensure that the potential impacts on the land, soils and geological environment do not occur during the operational phase and that the residual effect will be ***short-term-imperceptible-neutral.*** Following the TII criteria (Appendix 9.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

9.10.3.2 Waste Water Drainage

The implementation of mitigation measures highlighted in Section 9.9.4.2 will ensure that the potential impacts on the land, soils and geological environment do not occur during the operational phase and that the residual effect will be ***short-term-imperceptible-neutral.*** Following the TII criteria (Appendix 9.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

9.10.3.3 Surface Water Drainage

The implementation of mitigation measures highlighted in Section 9.9.4.3 will ensure that the potential impacts on the land, soils and geological environment do not occur during the operational phase and that the residual effect will be ***short-term-imperceptible-neutral.*** Following the TII criteria

(Appendix 9.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

9.10.3.4 Storage of Hazardous Material

The implementation of mitigation measures highlighted in Section 9.9.4.4 will ensure that the potential impacts on the land, soils and geological environment do not occur during the operational phase and that the residual effect will be ***short-term-imperceptible-neutral.*** Following the TII criteria (Appendix 9.1) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

9.10.4 Summary of Post-mitigation Effects

The implementation of mitigation measures outlined in Section 9.9 will ensure that the potential impacts on the land, soils and geological environment do not occur during the demolition, construction and operational phases of the proposed development. Due to the inter-relationship between land, soils, geology, hydrogeology and surface water the following impacts discussed will be considered applicable to both Chapter 9 (Land and Soils) & Chapter 10 (Hydrology) of the EIAR.

The following Table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 9.9 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Accidental Spills, Leaks and Discharges	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Soil Erosion & Compaction	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Increased Sediment Run Off carrying Sediment and Pollutants	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Soil Contamination from Construction Waste, Materials & Chemicals	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Lack of waste Classification & Improper disposal of Construction Waste	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
increasing the risk of Soil Contamination off-site						

The following Table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 9.10 Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Accidental Spills, Leaks and Discharges	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Unlicensed Waste Collection (Illegal Dumping)	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Increased Sediment Run Off from Hardstanding Areas carrying Sediment and Pollutants into the Soil and Bedrock Off-Site	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct & Indirect
Future Maintenance Works on Underground Services and Infrastructure involving Soil Excavations and Soil Disturbance and Disposal	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct & Indirect
Discharge of Water to Ground	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct

9.10.5 Cumulative Residual Effects

The following Table summarises the cumulative residual effects of the proposed development post mitigation.

Table 9.11 Summary of Cumulative Residual Effects Post Mitigation

Planning Ref	Description	Application type	Decision	Date
LCC 20543	Demolition of existing structures inc. railway and engine room walls and construction of two new stores and an ESB substation.	Permission	Conditional Upheld on Appeal	15/04/2021
LCC 20268	Extension and modifications to the existing former OpenHydro warehouse. The development applied for is within Greenore Port's landholding within the curtilage also exists the watertower, lighthouse and lighthouse keeper's cottage which are all included in the Louth Record of Protected Structures Ref. LH009-01, LH009-043, LH009-044 respectively	Permission	Conditional Upheld on Appeal	18/07/2020
LCC 2360119	Retention of as constructed dwellinghouse previously granted planning permission under planning Ref. No. 97/866 and all associated site development works	Retention	Conditional	14/07/2023
LCC 23234	Retention permission for (a) a domestic store; (b) a domestic outbuilding comprising of a games room, gym and home office and (c) associated site development works	Retention	Conditional	12/01/2024
LCC 2385	Retention permission for extensions and alterations to the existing dwelling, attached domestic garage and associated site development works	Retention	Conditional	21/07/2023
LCC 231	Permission for the following: (1) demolition of a single storey extension and outbuilding to the rear of the existing house; (2) alterations to the rear of the existing house; (3) construction of a one storey extension to the rear of the existing house	Permission	Conditional	24/02/2023
LCC 22614	Permission for elevational changes and alterations to existing dwelling house and all associated site works	Permission	Conditional	04/11/2022
LCC 211439	Retention permission for a single storey extension to the side and rear of the dwelling	Retention	Conditional	11/03/2022

Planning Ref	Description	Application type	Decision	Date
LCC 211331	Permission for a single storey extension to the rear of the dwelling and all associated site works. The existing building is a Protected Structure in the Louth County Council Development Plan Ref. No. LHS009-036B, NIAH Ref. 13831027	Permission	Conditional	17/12/2021
LCC 211223	Retention permission for development that consists of an extension to the rear of dwelling. This building is listed as a protected structure under the Louth County Development Plan 2015-2021 Ref No LHs 009-004	Retention	Conditional	10/11/2021
LCC 19754	Permission for extension to side of existing dwelling house, upgrading of existing effluent treatment system on site and all associated site development works. *Significant Further Information submitted 01/07/20*	Permission	Conditional	28/07/2020
LCC 19727	Permission for one dwelling house, effluent treatment system and all associated site development works.*Significant Further Information submitted 17/6/20*	Permission	Conditional	14/07/2020
LCC 19202	Permission for a one storey extension to rear of the existing dwelling, a protected structure (ID: LHS009-016, NIAH No. 13831014), alterations to the existing layout and associated site works. *Significant Further Information submitted 22/05/2019*	Permission	Conditional	18/06/2019
LCC 18718	The development will consist of (1) Retention of an existing dwelling house, domestic garage and associated site development works and (2) Permission for alterations to an existing dwelling house and part conversion of roof space to habitable accommodation.	Retention	Conditional	19/01/2019
LCC 23218	Permission for extension and alterations to the ground and first floor level of an existing dwelling house, a new waste water treatment system and associated site development works **Significant further information received on 26.9.23**	Permission	Conditional	13/10/2023
LCC 21572	Permission for development that will consist of the construction of a two storey dwelling house, a single storey domestic garage, septic tank with percolation area,	Permission	Conditional	21/12/2021

Planning Ref	Description	Application type	Decision	Date
	use of existing entrance onto public road and all associated site development works. *FI received on 06/12/2021*			
LCC 21732	Permission for a dwelling house, domestic garage, waste water treatment system and associated site development works *Significant Further Information submitted 04/11/21 which includes a revised house design*	Permission	Conditional	24/11/2021
LCC 2360256	Permission for extensions and modifications to existing dwelling house at 15 Euston Street, Greenore, Co. Louth. Permission to include for all associated and ancillary site development works. The existing dwelling house is a Protected Structure, Ref; LHS 009-020, and located within the Greenore Architectural Conservation Area	Permission	Conditional	15/09/2023
LCC 23254	Permission for alterations and extension to existing precision engineering workshop and all associated site works	Permission	Conditional	01/09/2023
LCC 23125	Permission for the change of use of existing building from commercial/residential use to voluntary community workshop and all associated site development works	Permission	Conditional	18/08/2023
LCC 22274	Permission for the demolition of an existing **Coast Guard Lifeboat House** and the replacement of same with a new Lifeboat House to include communication aerials, floodlighting, flag poles and all associated site development works.	Permission	Conditional Under Appeal ABP-315830-23	19/01/2023
LCC 20362	Permission for development consisting of the installation of a grid connected photovoltaic panel system fitted to the roofs of existing warehouse buildings.	Permission	Conditional	21/07/2020
LCC 2360352	Retention and completion of a partially constructed single storey extension permitted under P.A. Ref. No. 17/282 to the existing production building. The existing production building was permitted under P.A. Ref. 93/ 84 and has operated from the site for nearly 30 years. Permission is also sought to retain and complete c. 25 sq.m of additional production floorspace to the southwest of the partially constructed extension. The retention and completion of the extension	Retention	Conditional Under Appeal ABP-318516-23	

Planning Ref	Description	Application type	Decision	Date
	and additional floor area will facilitate the internalisation of part of the production process			
LCC 16852	Permission for development of a managed step down housing community with support facilities. The proposed development will consist of 30 no managed residential units, and associated ancillary facilities designed specifically for older residents. The proposed development is comprised of 9 no single storey 1-bed studio units, 3 no single storey 1-bed units, 11 no 1-bed apartments all with own door access over 2 storeys, 7 no 2-bed units and a 2 storey community and administration facility as well as associated site works (roads, drainage, street lighting, hard & soft landscaping, utility building & services)	Permission	Conditional	24/03/2017
LCC 21728	EXTENSION OF DURATION OF 16/852 - Permission for development of a managed step down housing community with support facilities. The proposed development will consist of 30 no managed residential units, and associated ancillary facilities designed specifically for older residents. The proposed development is comprised of 9 no single storey 1-bed studio units, 3 no single storey 1-bed units, 11 no 1-bed apartments all with own door access over 2 storeys, 7 no 2-bed units and a 2 storey community and administration facility as well as associated site works (roads, drainage, street lighting, hard & soft landscaping, utility building & services)	Extension of Duration	Conditional	09/07/2021
LA07/2016 /1273/F	Demolition of existing dwelling and erection of 3 No. detached dwellings		Granted	16/08/2017
LA07/2022 /1234/F	Renewal of planning approval granted under LA07/2016/1273/F for the demolition of existing dwelling and erection of 3 no. detached dwellings		Granted	22/03/2023

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. Multiple developments in the area could potentially be developed concurrently or overlap during the demolition, construction and operational phases.

9.10.5.1 Demolition Phase

The potential residual effects on the land, soils and geological environment surrounding the development are expected to be minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works. As a result, there will be minimal impact on the land, soils and geological environment, and no significant effects on the composition, stability, or fertility of the land are anticipated. The absence of excavation works also means that there will be no disturbance to the natural soil structure, thus preventing potential soil erosion or compaction and increased run-off rates.

Any developments proposed in the area will have to adhere to their own CEMP and Mitigation plans. There are no pathway connecting the sites in terms of land, soils and geology.

Overall, the surface-level demolition works will have a negligible impact on the land, soils and geology environment, preserving their integrity and minimizing any potential environmental consequences.

The implementation of mitigation measures outlined in Section 9.9.2 will ensure the residual effect on the land, soils and geology environment during the demolition phase is likely to be **short-term, Imperceptible and negative.**

9.10.5.2 Construction Phase

The implementation of mitigation measures outlined in Section 9.9.3 will ensure the residual effect on the land, soils and geological environment during the construction phase detailed in Section 9.8.2 will be **short-term, imperceptible** and **neutral**.

Following the TII criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

9.10.5.3 Operational Phase

The implementation of mitigation measures highlighted in Section 9.9.4 will ensure that the potential effects detailed in Section 9.8.3 on the land, soils and geological environment do not occur during the operational phase and that the residual effect will be ***short-term-imperceptible-neutral.*** Following the TII criteria (Appendix 5.1) for rating the magnitude and significance of impacts on the geological attributes, the magnitude of impact is considered ***negligible***.

9.11 Risk of Major Accidents or Disasters

The EPA Guidelines, 2022, state that:

> *"To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other legislation e.g. a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.*

The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required."

In general, risk of landslides in Ireland is considered to be low, as the country is not located in a region with high seismic activity or large mountain ranges. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The landslide susceptibility map (GSI spatial map viewer) identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers the location of landslides and what causes them (slope, soil type and the impact of the flow of water). Based on the GSI spatial map viewer, the proposed development site is not in an area susceptible to landslides, with a GSI Landslide Susceptibility Classification of "*Low*". This is consistent with the topography and the geology across the site.

The nearest landslide was c.16.5km to the north-west of the proposed development, referred to as the Drumad2013 (Event ID: GSI_LS13-0005) which occurred on March 22nd 2013. There have been no recorded landslide events at Greenore Port or in the vicinity.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies, has been recording seismic events in Ireland since 1978 (www.dias.ie). This network consists of several seismometers that are located throughout Ireland. Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity. However, earthquakes can still occur in Ireland, although they are typically small and have little impact. There is a very low risk of seismic activity to the proposed development site.

The most recent earthquake was in the Irish Sea (0.9 Magnitude) on the September 30th 2023 c. 130km to the south-east of the proposed development. There are no active volcanoes in Ireland so there is no risk from volcanic activity.

9.12 Worst Case Scenario

In a worst-case scenario, if the mitigation measures outlined in Section 9.9 aren't fully followed, there's a chance of contamination and pollution during the demolition, construction, and operational phases of the proposed development to occur. This could happen through accidental spills and leaks, increased run-off, sediment loading, excavation and maintenance works.

The mitigation measures set out in Section 9.9 above are in place to prevent any negative impacts on the land, soil, and geology. This will help minimize the likelihood of these issues occurring and protect the surrounding environment.

9.13 Interactions

This section discusses interactions between this Chapter and other specialist environmental topics considered in this EIAR.

9.13.1 Water and Hydrology

9.13.1.1 Demolition Phase

The likelihood of significant effects on the hydrogeological and hydrological regime at the proposed development during the demolition phase is minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works.

As a result, no significant effects on the land's composition, stability, or fertility are anticipated. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction. Therefore, there is no risk of increased sediment loading and run off entering nearby surface waterbodies during this phase.

As well as the mitigation measures outlined in this section, the development should adhere to the mitigation measures set out in Section 10.9.2 of the EIAR .

Full adherence to the RWMP presented in Appendix 8.1 and Chapter 8 – Material Assets Waste of the EIAR.

9.13.1.2 Construction Phase

The construction phase of the proposed development has the potential to result in increased sediment runoff which has the potential to interact negatively on groundwater and surface water quality. The proposed construction phase mitigation outlined in Section 10.9 - Chapter 10 – Hydrology of the EIA, means that the proposed development will not result in significant negative impact on groundwater and surface water quality in the local area. The interaction is considered to be ***neutral***, ***Imperceptible***, and ***short term***.

9.13.1.3 Operational Phase

The operational phase of the proposed development has the potential to interact negatively on groundwater and surface water quality via the proposed surface water network which involves discharging to Carlingford Lough during high tide periods. The proposed operation phase mitigation outlined in Section 10.9 - Chapter 10 – Hydrology of the EIA, means that the proposed development will not result in significant negative impact on groundwater and surface water quality in the local area. The interaction is considered to be ***neutral***, ***Imperceptible***, and ***short term***.

9.13.2 Biodiversity

9.13.2.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities on predominately existing buildings and infrastructure and do not involve any excavation works. As a result, the impact on biodiversity is minimal.

Overall, the surface-level demolition works will benefit the local biodiversity, preserving their integrity and minimizing any potential environmental consequences. The interaction is considered to be **short-term, *Imperceptible* and neutral.**

9.13.2.2 Construction Phase

In the absence of standard mitigation measures to control the construction phase there is potential for silt laden material or pollution to enter nearby surface waterbodies (and impact on local biodiversity and European sites downstream from the works. Furthermore, dust emissions from exposed earthworks have the potential to settle on plants causing impacts to local ecology.

Taking into account the mitigation measures outlined in this Section 9.9.3, there still remains a residual negative interaction between land and soils with and biodiversity during the construction phase. The interaction is considered to be ***negative***, ***Imperceptible***, and ***short term***.

9.13.2.3 Operational Phase

The proposed work is expected to have no significant impact on the local designated areas and their conservation objectives. The interaction is considered to be ***long-term, imperceptible*** and ***neutral.***

9.13.3 Air Quality

9.13.3.1 Demolition & Construction Phase

Demolition and construction phase activities such as excavations and stockpiling of materials etc. have the potential for interactions between air quality and the land and soils environment (hydrology) in the form of dust emissions. Mitigation measures are proposed to prevent fugitive dust emissions from construction activities including excavated soils or dredged material.

9.13.3.2 Operational Phase

There are no interactions identified between land and soils and air quality during the operational phase.

9.13.4 Material Assets: Transport and Built Services

9.13.4.1 Demolition & Construction Phase

During the construction phase, excavated soil and stone (c. 7,225 m^3) will be generated from the excavations required to facilitate site levelling, construction of new foundations and installations of site services. It is estimated that 2,960 m^3 of the excavated material will need to be removed off-site with the remaining balance being reused on site.

As well as soil and stone from land-based excavations there will be dredging undertaken to facilitate navigable access and suitable berthing. The project engineers (McCarthy Browne) have estimated that c. 45,000 m^3 of material will be removed from site.

If material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort.

9.13.4.2 Operational Phase

There are no potentially significant interactions identified between land and soils and Transport during the operational phase.

9.13.5 Waste

9.13.5.1 Construction Phase

During the construction phase, excavated soil and stone (c. 7,225 m3) will be generated from the excavations required to facilitate site levelling, construction of new foundations and installations of site services. It is estimated that 2,960 m3 of the excavated material will need to be removed off-site with the remaining balance being reused on site.

As well as soil and stone from land-based excavations there will be dredging undertaken to facilitate navigable access and suitable berthing. The project engineers (McCarthy Browne) have estimated that c. 45,000 m3 of material will need to be dredged to do so with all to be removed from site. The 1,000m3 of dredged rock will be reused on site.

If material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 8, Chapter 9 (Land and Soils) and the requirements of the RWMP (Appendix 8.1), will ensure the effect is long-term, imperceptible and neutral.

Adherence to the mitigation measures in Chapter 8 and the requirements of the RWMP (Appendix 8.1), will ensure the interactions is ***long-term***, ***imperceptible*** and ***neutral.***

9.14 Monitoring

9.14.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction.

In addition, all waste materials will be dealt with in accordance with regional and national legislation, time and resources will be dedicated to ensuring efficient waste management practices and waste arisings will be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate.

Therefore, no monitoring is required.

9.14.2 Construction Phase

During construction phase the following monitoring measures will be implemented:

- Regular inspection of surface water run-off and sediments controls (e.g., silt traps);
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off;

- Excavation works to be monitored to record any signs of potentially contaminated soil; and
- Regular inspection of construction / mitigation measures outlined in the CEMP should be adhered to during the construction phase. (e.g., concrete pouring, refuelling, etc).
- Soil sampling of excavated soils and monitoring of surface water run off will be required in case of accidental discharges to underlying geology.

9.14.3 Operational Phase

Maintenance of the surface water drainage system, including separators / interceptors, and foul sewers is recommended to minimise any accidental discharges to soil or groundwater.

Monitoring of surface water run off will be required in case of accidental discharges to underlying geology.

9.15 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 9.12 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Accidental Spills, Leaks and Discharges	Regular inspection of surface water run-off and sediments controls to ensure no accidental discharge occurs to underlying geology. Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). Full adherence to and implementation of the CEMP.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the construction phase of the proposed development.
Soil Erosion & Compaction	Regular inspection of surface water run-off and sediments controls to ensure no accidental discharge occurs to underlying geology. Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). Full adherence to and implementation of the CEMP.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the construction phase of the propose development.
Increased Sediment Run Off carrying Sediment and Pollutants into the Soil and Bedrock	Regular inspection of surface water run-off and sediments controls to	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best

Likely Significant Effect	Mitigation	Monitoring
	ensure no accidental discharge occurs to underlying geology. Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). Full adherence to and implementation of the CEMP.	practice guidelines throughout the course of the construction phase of the propose development.
Soil Contamination from Construction Waste, Materials & Chemicals	Regular inspection of surface water run-off and sediments controls to ensure no accidental discharge occurs to underlying geology. Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). Full adherence to and implementation of the CEMP.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the construction phase of the propose development.
Lack of Waste Classification & Improper disposal of Construction Waste increasing the risk of Soil Contamination	Regular inspection of surface water run-off and sediments controls to ensure no accidental discharge occurs to underlying geology. Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). Full adherence to and implementation of the CEMP.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the construction phase of the propose development.

Table 9.13 Summary of Operational Phase Mitigation and Monitoring

The following Table summarises the Operational Phase mitigation and monitoring measures.

Likely Significant Effect	Mitigation	Monitoring
Accidental Spills, Leaks and Discharges	Negative	Imperceptible
Unlicensed Waste Collection (Illegal Dumping)	Negative	imperceptible
Increased Sediment Run Off from Hardstanding Areas carrying Sediment	Negative	Imperceptible

Likely Significant Effect	Mitigation	Monitoring
and Pollutants into the Soil and Bedrock Off-Site		
Future Maintenance Works on Underground Services and Infrastructure involving Soil Excavations and Soil Disturbance and Disposal	Negative	Imperceptible
Discharge of Water to Ground	Negative	Imperceptible

9.16 Conclusion

This chapter has reviewed and analysed the potential and the predicted effects of the proposed development on the land, soils and geological environment (Land and Soils). These effects have been considered for the demolition, construction and operational phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures set out in this chapter are adhered to in full throughout all phases, the overall predicted effect of the proposed development is **long-term, imperceptible** and **neutral**.

9.17 References and Sources

- Guidelines on the information to be contained in environmental impact assessment reports. Environmental Protection Agency (EPA, 2022).
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements. Institute of Geologists of Ireland (2013).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)
- Geological Survey Ireland Map Viewer (https://www.gsi.ie)
- Environmental Protection Agency (EPA) Map Viewer (https://gis.epa.ie/EPAMaps/)
- Teagasc Map Viewer (http://gis.teagasc.ie/soils/map.php)·
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (2000).
- Louth County Development Plan (2021-2027).
- Directive 2014/52/EU (16 April 2014) European Parliament.
- TII, (2009). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes; June 2009. Transport Infrastructure Ireland, Dublin.
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CHAPTER 10

WATER & HYDROLOGY

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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10 Water & Hydrology

10.1 Introduction

This chapter of the EIAR evaluates the likely significant effects, if any, which the proposed development will have on Hydrology (surface water) and hydrogeology (groundwater). This chapter contains necessary information as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2023).

The chapter initially provides a description of the receiving environment of the site and the potential impacts of the development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, and the predicted scale, and duration of the likely effects.

The chapter also outlines the proposed mitigation measures that will reduce or eliminate the identified potential impacts and defines the residual effects of the proposed development (the effect after the implementation of mitigation measures).

This chapter should be read in conjunction with Chapter 9 "Land and Soils" submitted with the planning application. A full description of the proposed development is set out in Chapter 2 "Development Description" of this EIAR.

10.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Alan Wilson and Marcelo Allende in the Water section of AWN Consulting Ltd.

Alan Wilson (BSc) is an Environmental Consultant at AWN. Alan holds a BSc Honours in Environmental Management in Agriculture/ Environmental and Geographical Sciences. Alan has worked on a range of large scale projects involving EIA reports, site specific flood risk assessments, baseline studies, hydrological and hydrogeological risk assessments, environmental due diligences, site investigations and groundwater, surface water and soil monitoring on various operational developments and greenfield and brownfield sites. Alan has over 2 years' experience as an Environmental Consultant including roles in Ecology and Forestry related work. Alan is a member of the International Association of Hydrogeologists (IAH) Irish Group and the Institute of Geologists of Ireland (IGI).

Teri Hayes (BSc MSc PGeol EurGeol, Adv Dip in Environmental & Planning Law) is a Director and Senior Hydrogeologist with AWN Consulting with over 25 years of experience in water resource management, environmental assessment and environmental licensing. Teri is a former President of The International Association of Hydrogeologists (IAH, Irish Group) and is a professional member of the Institute of Geologists of Ireland (IGI) and European Federation of Geologists (EurGeol). She has qualified as a competent person for contaminated land assessment as required by the IGI and EPA.

Her project experience includes contributions to a wide range of complex Environmental Impact Statements, planning applications and environmental reports for Industry Infrastructure and residential developments. Teri's specialist area of expertise is water resource management, eco-hydrogeology, hydrological assessment and environmental impact assessment.

10.3 Proposed Development

A full description of the proposed development is set out in Chapter 2 of this EIAR. The following is a summary of the proposed works.

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. Where rock is encountered (estimate max of 1,000m^3), it will be reused on site.

Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 of the development.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA). The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine shed wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary,, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

- **'Terrestrial Port Area'**, (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.
- **'Nearshore Environment'** (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
- **'Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
- **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

The following is a general location plan of the plots identified above.

Figure 10.1 General Location Plan of the Scheme

10.3.1 Aspects Relevant to this Chapter

10.3.1.1 Construction Phase

10.3.1.1.1 Ground Works, Dredging and Piling

Bulk excavation will take place during dredge and quay wall construction. It is anticipated that foundations for structures will be strip footing type supplemented where necessary by concrete piles. The existing external concrete pavement within the site will be taken up to facilitate the proposed development. The quay deck pavement, between the proposed buildings and the quayside will also be removed and replaced with a heavy-duty reinforced concrete pavement designed to withstand 50kPa port loading.

A mass concrete footing will be required for the proposed communications mast.

It is confirmed in the Environmental Risk Assessment and Waste Characterisation Report that the bulk of the excavated material is suitable for removal to an inert waste facility and/or a soil and stone recovery facility. Remaining materials will be disposed at non-hazardous licenced facilities. This is documented further in the Outline Construction Environmental Management Plan (CEMP), prepared by McCarthy Browne and the Construction and Demolition Waste Management Plan, prepared by AWN Consulting.

The site does not act as a flood storage zone and the proposed development will not add any new hardstanding areas within the port. The carpark area will be constructed with permeable paving.

The proposed 'maritime development' generally comprises dredging, development of a pontoon to accommodate Crew Transfer Vessels (CTVs) and improvement works to the existing Berth 3 quay wall.

To facilitate navigable access and suitable berthing for the CTVs it is necessary to carry out c.45,000m3 of soft dredging and 1,000m^3 of rock in the area between the existing groyne, Berth 2 and proposed Berth 3. The declared depth in this dredge pocket shall be -4m OD. The dredge material shall be soft dredge (gravel, silt, sand, clay) and rock arisings, with EWC Code 17 05 06.

10.3.1.1.2 Dewatering

Given the soil, geological and hydrogeological characteristics of the site, it is not expected that significant groundwater will be encountered throughout the site. However, during the ground works, excavation and piling, dewatering (removing of potential perched groundwater within the subsoil) may be necessary to create a dry working environment and prevent water from seeping into the excavation and flooding the construction site. This dewatering could result in the localised lowering of the local shallow (overburden) groundwater table which will not be part of the regional bedrock aquifer.

There may also be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavation is kept relatively dry. Based on the depth to bedrock there is no potential for impact on the aquifer water table. Potential dewatering (removing of potential perched groundwater within the subsoil) may be necessary to create a dry working environment and prevent water from seeping into the excavation and flooding the construction site. This dewatering could result in the localised lowering of the local shallow (overburden) groundwater table which will not be part of the regional bedrock aquifer.

10.3.1.1.3 Surface Water Run-off

Surface water run-off and dewatering from excavations will be discharged to local sewer or outfall to Carlingford Lough following settlement and treatment (if required).

10.3.1.2 Operational Phase

Fuel storage facilities ≥200,000 litres will be provided in the communal zone of the OMF facility. This will be maintained and managed by Greenore Port. CTV fuelling infrastructure will be provided at the Push On / service berth located on the new Berth 3 upgrade. This will be a metered facility monitored and maintained by Greenore Port.

The proposed development will not add any new hardstanding areas within the port.

An **Engineering Planning Report** prepared by Clifton Scannell Emerson Associates, Consulting Engineers accompanies this application and should be referenced for a comprehensive description of the proposed surface water, foul water and water supply strategies. Surface water, wastewater drainage and water supply for the proposed development is designed to comply with the Irish Water Code of Practice, standard details, policies and guidelines and the requirements of Louth County Council. A Confirmation of Feasibility has been received from Uisce Éireann and is included with this application.

10.3.1.2.1 Wastewater

The port currently has an existing foul drainage network in place comprising of a foul septic tank and foul lines servicing buildings in the port. The foul collection tank is located under the floor of an existing warehouse north of the port office and collects foul effluent from the port and the village. The collection tank is a Uisce Eireann asset, and they are given access to the site to allow tankers enter and empty the chamber for off-site disposal.

There is an existing 150mm connection to the public Louth County Council/ Uisce Éireann collection foul network from an existing building to be demolished. It is intended to continue this connection and repurpose it for the new development. This foul network in the port and the surround town and hinterland is collected in public network that terminates in the aforementioned Uisce Éireann collection tank in Greenore port (in the warehouse). This tank is then emptied with a tanker periodically and sent to Dundalk Wastewater Treatment Plant (WWTP). There will be no direct foul water discharge into Carlingford Lough. A service berth is included along the quay wall to facilitate loading parts, maintenance, loading equipment onto CTV's refuelling and collection of waste water for disposal into the waste water network.

10.3.1.2.2 Surface Water

The port currently has an existing stormwater drainage network in place. This serves as a drainage network for both yard surface water and roof water from buildings. The system drains via gravity to a bypass separator and discharges via one existing outfall into Carlingford Lough.

The Shore Road Carpark site is a greenfield sloping eastward towards Euston Road. A 100mm diameter existing surface water uPVC pipe system is located on Shore Road.

The proposed surface water drainage is designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), Water Services Guidelines for Planning Authorities Draft (2018) and CIRIA SuDS Manual, 2015. The proposed surface water drainage will not include new outfalls into Carlingford Lough as part of the development; the existing outfall will be used, and its capacity will not be increased in size.

The surface catchment area will increase in comparison with the existing situation; however, it is intended to attenuate storm volumes and ultimately outfall them at a restricted greenfield runoff rate. A petrol bypass interceptor is proposed before the discharge point.

he proposed surface water drainage system designed for this development includes a number of Sustainable Urban Drainage Systems (SuDS) measures such as permeable paving/ grasscrete, filter drains and attenuation systems. These measures will be incorporated to reduce run-off volumes and improve run-off water quality. The design of the attenuation storage system has been carried out for the 1 in 100-year event with a 20% allowance for climate change. The design of the 2no. attenuation systems has been completed as follows:

- *Underground Arch-Type Attenuation Storage:* The attenuation storage systems shall comprise of underground Arch-type storage units, i.e., stormtech systems or similar approved. Its final discharge destination will be Irish Sea through by-pass petrol separators.
- *Underground Stone-Fill Reservoir Attenuation System:* Surface water drainage from the Satellite Car Park shall discharged into an underground stone-fill reservoir designed using the results of soakaway tests in accordance with BRE 365, 2016. Its final discharge destination will be the 100mm diameter pipe along Shore Road.

The catchment at the Shore Road carpark will be connected to the public Louth County Council surface water collection on the public road. It is proposed to limit the surface water discharge from the Shore Road carpark catchment zone of the development to the equivalent Qbar value to 2.13 l/s/ha in compliance with the Greater Dublin Strategic Drainage Study (GDSDS), Water Services Guidelines for Planning Authorities Draft (2018) and CIRIA SuDS Manual, 2015. It is proposed to use a "Hydrobrake Optimum" (downstream of each attenuation unit) vortex flow control devices to restrict the flows to the amounts calculated.

10.3.1.2.3 Water Supply

There is an existing 100mm diameter watermain parallel to the southern boundary of the development site. There is also a significant watermain network within the Port serving the existing infrastructure and quayside operations.

A pre-connection enquiry (PCE) form was submitted to Uisce Éireann which addressed design population, proposed water demand applicable to the development for proposed connection point. The average water demand for the development was calculated as 0.39 litres/sec whilst peak water demand was calculated as 1.95 litres/sec. It is proposed to use HDPE watermain size of 100mm to service the three buildings. Each proposed building will have a separate flow meter/ boundary box as per IW standards.

Uisce Éireann have issued their Confirmation of Feasibility letter for the above.

10.3.1.2.4 Flooding

A Site Specific Flood Risk Assessment (SSFRA) has been carried out by McCarthy Browne and accompanies this planning application under separate cover. This SSFRA confirms the location of the proposed development is predominantly within Flood Zone C (i.e., where the probability of flooding from rivers and coastal is less than 0.1% or 1 in 1000 years – probability of fluvial flooding is low risk).

The final design for Buildings A, B and C has a finished floor level of no lower than 5.05m OD which is a safe freeboard above the water level estimated for Flood Zone C. Therefore, any flood events will not cause flooding of the proposed buildings.

The site does not act as a flood storage zone and the proposed development will not add any new hardstanding areas within the port. The Shore Road carpark area will be constructed with permeable paving. On this basis, it can be stated that the development will not affect the flood storage volume or increase flood risk elsewhere.

10.4 Methodology

Alongside the legislation, policy, and guidance outlined in Chapter 1, the following relevant legislation, policy, and guidance has informed the preparation of this Chapter:

10.4.1 Relevant Legislation & Guidance

The section establishes the criteria, and guidance used to rate the significance of the potential impacts on the hydrological aspects of the site and surrounding area.

The document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII, 2009, previously NRA) is referenced where the methodology for assessment of impact is appropriate.

Furthermore, in line with this TII Guidelines, an assessment of the attribute importance has been undertaken in order to provide a basis for the assessment of impact provided. The attribute importance considers the potential as well as the existing use of the surface water features as a water resource (i.e., water supply, fisheries and other uses) as well as ecological habitat requirements. The TII criteria for rating the hydrological related attributes are presented in Appendix 10.1 of this EIAR.

The quality, significance, and duration of the potential impacts, residual effects, and cumulative effects are described using standard EIA descriptive terminology set out in Chapter 1 of this EIAR.

The principal attributes (and effects) to be assessed include the following:

- Water Framework Directive (WFD) Status and potential for increased risk of deterioration of this status due to the activities of the site.
- River and stream water quality in the vicinity of the site (where available).
- Surface, transitional and coastal watercourses near the site and potential impact on surface water quality arising from Proposed Development related works including any discharge of surface water run-off.
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any); and
- Surface water features within the area of the site.

10.4.2 Water Framework Directive (WFD) Status

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, commonly known as the Water Framework Directive (WFD), establishes a framework for community action in the field of water policy.

The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. In 2009 the first River Basin Management Plan (RBMP) 2009-2015 was published. The second cycle river basin management plan was carried out between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD). The third cycle (2022-2027) is currently being undertaken.

During the development of this Plan, a prioritisation exercise was undertaken by the local authorities, the EPA and other stakeholders to identify those water bodies that require immediate action within this plan cycle to 2021. During the catchment characterisation, the EPA identified those water bodies either *'At Risk'* of not achieving their objectives or *'Under Review'*. The outcome of this prioritisation process was the selection of 190 Areas for Action across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water bodies identified as being *'At Risk'* of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2022-2027. The draft 3rd cycle RBMP has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the Proposed Development.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation, regulations and guidelines. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003).
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014).
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019).
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016).
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010).
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011).
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988.
- Local Government (Water Pollution) Acts 1977-1990.
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998.
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board).
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers.
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.
- CIRIA C648 Control of Water Pollution from Constructional Sites; and
- Water Services Guidelines for Planning Authorities Draft (Department of Housing, Planning and Local Government, 2018)
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA/TII, 2006).

10.4.3 Sources of Information

Desk-based hydrological information in the vicinity of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Latest EPA Envision water quality monitoring data for watercourses in the area.
- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping.
- River Basin Management Plan for Ireland 2018-2021 (Department of Housing, planning and Local Government, 2018).
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW), 2009).
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie).
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports.
- Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites (Eastern Regional Fisheries Board (ERFB), YEAR).

- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters' (Inland Fisheries Ireland, 2016).
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (CIRIA 532, 2001).
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

Site specific data was derived from the following sources:

- Various design site plans and drawings, as submitted with this planning application .
- Consultation with the engineering team, Greenore Port – O & M Facility – Site Specific Flood Risk Assessment (McCarthy Browne, 2024).
- Appendix 10.2 – Design Package for Alterations & Extensions to Sote Buildings at Greenore Port, Greenore, Co. Louth – Services Design Report (Rockwood Chartered Engineers, March 2020).
- Greenore Port OMF – Engineering Planning Report (Clifton Scannell Emerson Associates, 2024).
- Appendix 9.5 - BRE 365 percolation test results, Shore Road Carpark site (McCarthy Browne, 2024).
- Appendix 10.3 – Greenore Port Hydrological Risk Assessment (AWN, 2023).
- Appendix 10.4 – Greenore Port – WFD Assessment Report (AWN, 2023).

10.4.4 Site Surveys/Investigations

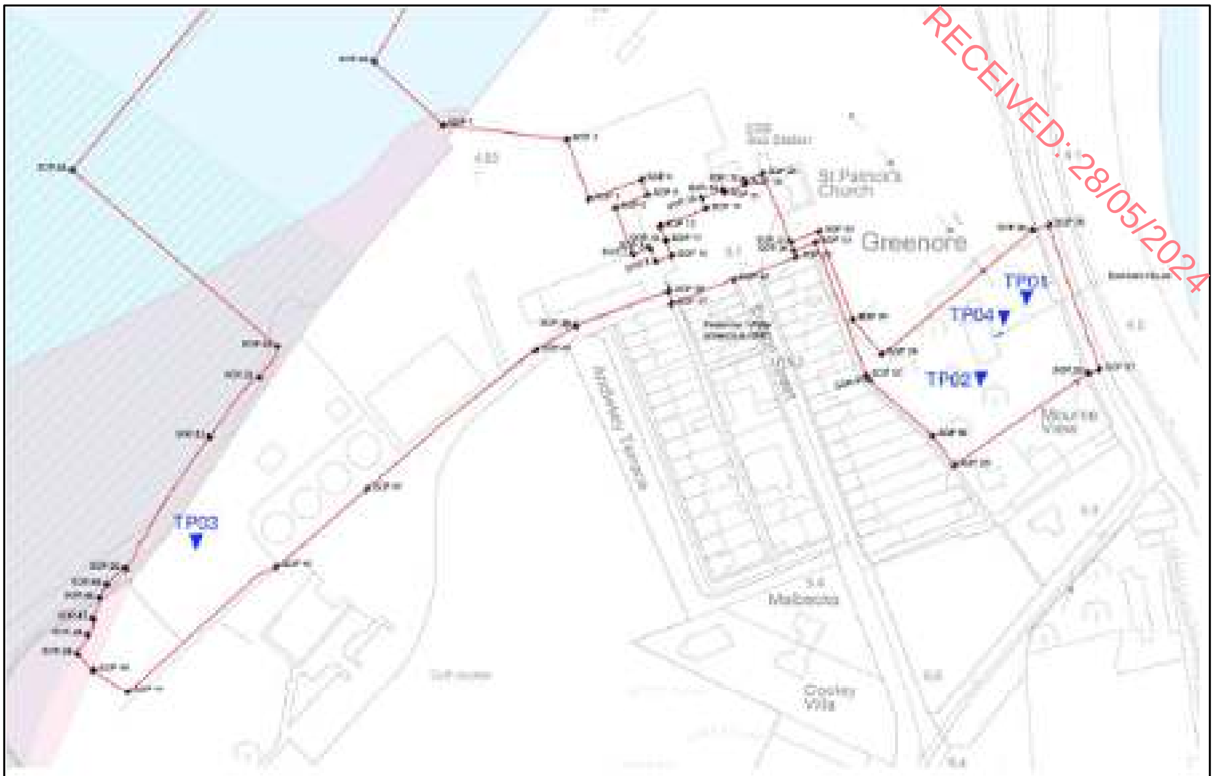
10.4.4.1 McCarthy Browne and BHP, 2024

Additional site investigation works conducted at Greenore Port, Co. Louth in 2024. The objective of this site investigation was to further characterise the soil quality at Greenore Port and determine whether the ground conditions are suitable for soakaway installation and the soil is suitable for disposal.

As part of the site investigation works, BHP Laboratories Ltd were contracted by McCarthy Browne were required to carry out the following tests:

- BRE365 at 4 no. locations (TP01, TP02, TP03 & TP04);
- Plate Bearing Tests; and
- Waste Acceptance Criteria suite in accordance with Council Decision 2003/33/EC (Rilta 2016 Revised WAC suite.

The location of the site investigation works (TP01, TP02, TP03 & TP04) are shown below in Figure 10.2 below.



	Location	Coordinates		Length (m)	Width (m)	Depth (m)
Soakaway Test Nr.1	TP01	54.032500 N	6.131667 W	2.2	2	1.85
Soakaway Test Nr.2	TP02	54.03213 N	6.13196 W	2.5	1.7	1.45
Soakaway Test Nr.3	TP03	54.0316 N	6.13690 W	1.9	1.6	0.725
Soakaway Test Nr.4	TP04	54.032389 N	6.131861 W	1.5	1.7	1.4

Figure 10.2 Location of Works (McCarthy Browne, 2024)

Dark grey, loose, sandy soil and Dark brown , loose, granular soil with cobbles present were encountered in TP01 and TP02, respectively. Compacted gravel and fractures bedrock were encountered at TP03 and TP04, respectively. The maximum depth reached was 1.85m bgl. No field evidence of potential impact from hazardous substances was noted. Soil samples were collected from each of the test holes for laboratory analysis.

No water strikes / ingresses were encountered in any of the trial holes.

Refer to Appendix 9.4 – Waste Classification Report (BHP, 2024) and Appendix 9.6 – WAC Laboratory Report (Eurofins Chemtest Ltd, 2024) of the EIA for further information on soil classification and soil quality results.

Refer to Appendix 9.5 - BRE 365 and Plate Bearing Report (BHP, 2024) of the EIA for further information on percolation test results.

10.4.4.2 Greenore Port Geotechnical Interpretive Report - GDG, 2023

Gavin & Doherty Geosolutions Limited (GDG) produced a Geotechnical Interpretive Report (GIR) to be considered in the design and site development for the proposed development. This report is presented in Appendix 9.3 of the EIAR.

This GIR produced a ground model based on all ground investigations carried out within the proposed development area. Cross-sections of the land and marine development areas extracted from the ground model are presented in Appendix 9.3. Refer to Chapter 9 – Land and Soils for further information on the land-based site investigation data.

This assessment was based on the following:

- Ground investigation data (historic and recent investigations and surveys completed in the harbour area; including bathymetric and geophysical surveys).
- Geotechnical laboratory data, and
- Published and unpublished geological information.

Site investigations included trial pits, boreholes, rotary cores and cone penetration testing. These investigations allowed an assessment of ground conditions and ground stability.

An overview of the site investigations carried out in and around the subject site is summarised in Table 10.1 below.

Table 10.1 Summary of GI's carried out around Greenore Port (GDG, 2023)

SI Campaign Contractor	Year	GI Scope Summary	Report Ref:	Client Representative/ultimate client
Causeway Geotech	May 2020	#6 No of dynamic probe tests	only logs	
Ground Investigations Ireland(GII)	March 2020	#6 No of dynamic probe tests	only logs	
Geotechnical Environmental Services Limited (GES)	December 2019	#2 No. boreholes drilled in soil and rock to a maximum depth of 21.2m below existing ground level (bgl), Borehole BH01 and BH02, on encountering rock, were continued by HQ wireline core drilling. #6 No. dynamic probes to a maximum depth of 21.9m below existing ground level (bgl). Lab tests: point load x 18, UCSx14	Berth 2Upgrade Works, Factual Report, Report No. 011/ROI/19	Keating Construction Limited
Causeway Geotech	March 2019	#15 No. boreholes, 11 no of cone penetrometer test, standpipe installation, 2 no. of trial pits, 2 no. of plate tests. Lab tests: Atterberg test x6, PSD x 10, Consolidated drained Shear box2, Oedometerx3	Greenore Port Development, Berth 2-Ground investigation. Report no.18-1305	Arup/Byrne Looby Consulting Engineers, on the behalf of L&M Keating Ltd.
Ground Investigation Ireland (GII)	February 2018	#4 No. boreholes (BH1 to BH4) drilled in soil and rock. Lab tests: shear box tests x 5, UCS x 4, point load x 17	Greenore Port Ground Investigation Report - 7350-01-18	RPS Consulting Engineers
Ground Investigations Ireland (GII)	May 2013	#2 No. boreholes (BH1 & BH2) drilled in soil and rock. Lab tests: PSD x10, Consolidated Shear box testsx4, point load x 6, UCS X4	Greenore Port Land Based SI carried out for RPS, only logs and lab results	RPS Group
Glover Site Investigations Ltd	May 1999	#5 No. of boreholes (10,11,12a,12RC,13) were excavated to bedrock along the existing quay	Greenore Harbour Development Rock Coring Investigation Report No.3309	Kirk McClure Morton on behalf of Greenore Ferry Services Ltd
Glover Site Investigations Ltd	August 1998	#9No. of boreholes (BH1 to BH9) and 15 No. of marine probe boreholes majority of them excavated to bedrock. Lab tests: Triaxial x5, pH and soluble sulphate content x6, Atterberg limit x4 ,PSD X17	Greenore, Co.Louth Harbour Development Site Investigation Report No.3059	Kirk McClure Morton on behalf of Greenore Ferry Services Ltd

The borehole and In-situ tests locations from all the GI campaigns carried out at the site and the wider Greenore Port area are presented in Figure 10.3 below.

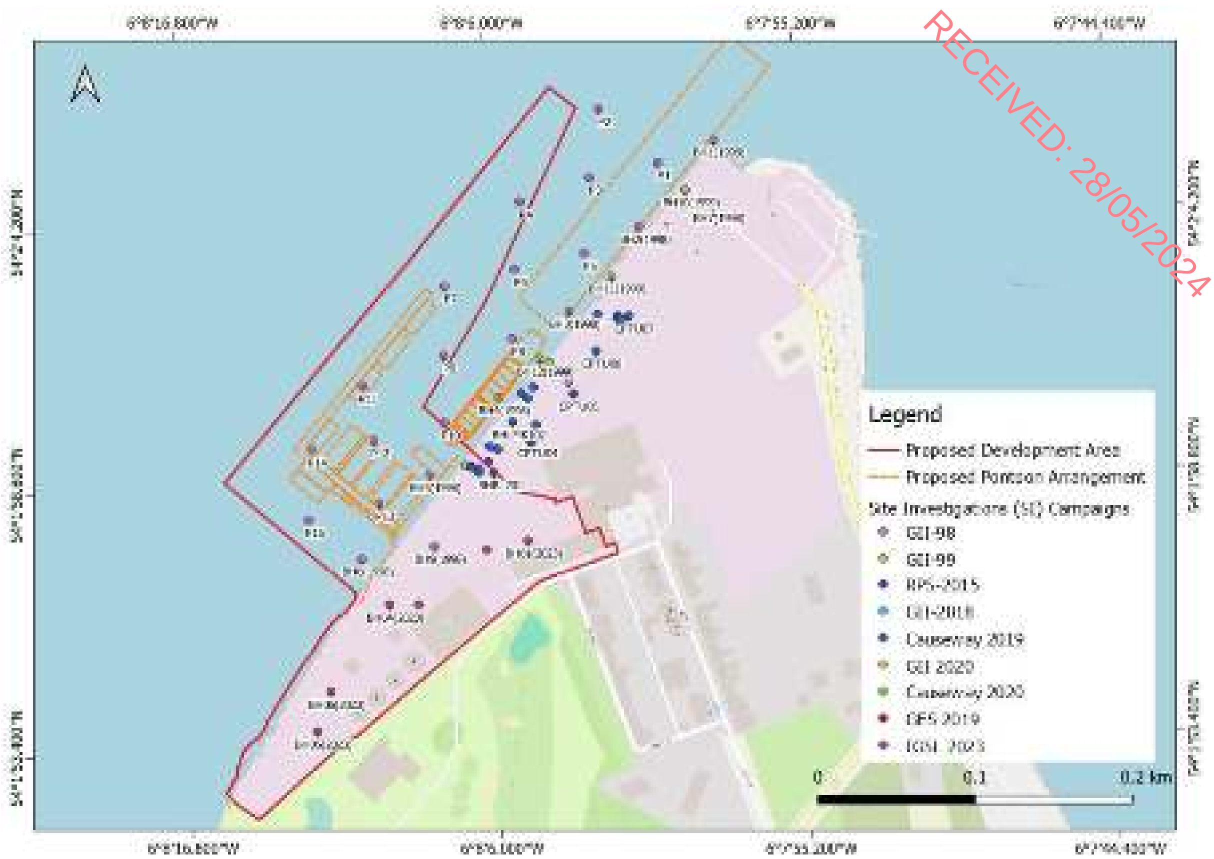


Figure 10.3 Site Investigation Point Locations of various GI carried out in Greenore Port (Source: GDG, 2023)

10.4.4.3 Soil and Groundwater Assessment Report – RPS 2011

Site investigations were carried out by K.T. Cullen & Co Ltd in December 1996 which identified slight hydrocarbon contamination in the soil in the southern extent of the site and in the groundwater. To further analyse the hydrocarbon contamination identified in the December 1996 site investigation, an environmental site assessment of the site was carried out by URS in 2004 and identified hydrocarbon contamination in the shallow soils in an area of scrub grassland and to the north-east of the refuelling gantry. No hydrocarbon contamination was detected during the 2004 site investigation.

On November 14th 2011, RPS carried out a site investigation on behalf of then "Topaz Energy Group Ltd" on the shallow subsoil and groundwater beneath the decommissioned Topaz fuel storage facility at Greenore Port, Co. Louth, with the aim of developing an exit strategy for the site. The refuelling gantry was identified as the primary target for investigation in the RPS 2011 Targeted Soil and Groundwater Assessment Report. .

The main objectives of the site investigation were as follows:

- Determine if hydrocarbon contamination exists in the shallow subsoil underlying the site;
- Determine if hydrocarbon contamination exists in the groundwater beneath the site; and
- Provide recommendations on any further works to take place based on the ground investigation results.

As part of the groundwater investigation, 2 no. groundwater monitoring wells (MW3 & MW4) installed by K.T. Cullen & Co Ltd. during the December 1996 site investigation were identified. The monitoring wells were installed in the vicinity of the hardcover area beneath the refuelling gantry.

10.4.5 Consultation

There was no consultation with internal Local Authority departments community or stakeholder encountered in compiling the specified information for this EIA chapter.

10.5 Difficulties Encountered

There were no significant difficulties encountered in compiling the specified information for this EIAR chapter.

10.6 Baseline Environment

10.6.1 Site Location & Surrounding Land Use

Greenore Port is located on Ireland's east coast in Co. Louth and serves as the south entrance to Carlingford Lough. It benefits from its proximity to the Dublin-Belfast economic corridor and is conveniently positioned near the M1 motorway.

The proposed development site, Greenore deep-water Port, is strategically located on Ireland's east coast in Co. Louth. It is situated approximately 20km East of Dundalk and serves as the South entrance to Carlingford Lough.

The topography of the site is flat with an average elevation of around 4.1m of the site. Access to the proposed site is offered by the existing Shore Road (R175) and Euston Street.

The port features a single quay facing North-West, protected by a detached breakwater made of a rubble mound rock structure with wooden piles. The exact depth of these piles is currently unknown. The main berthing pocket offers 260m of quayside berthage, with varying water depths at high water (HW) and low water (LW).

The port has a water depth of 9.1m at high water and 4.9m at low water. It can accommodate vessels up to 60,000DWT and has Liebherr port cranes capable of lifting up to 124T. The port handles both container and bulk traffic and offers marine and logistical support services.

In terms of imports, the port receives a variety of products including animal feed, fuel oil, steel, fruit, wood products, coal, timber, fertilizers, and chemicals. Its exports consist of items such as fish cages, milk powder, live cattle, frozen meats, rock, steel, woodchip, and general cargo like wind turbines.

Additionally, Greenore Port is the leading importer of steel reinforcement in Ireland, with storage facilities for steel rebar and dry bulk storage facilities capable of accommodating various dry bulk products.

Refer to Figure 10-4 below for the site location in the context of the surrounding environment and land use.

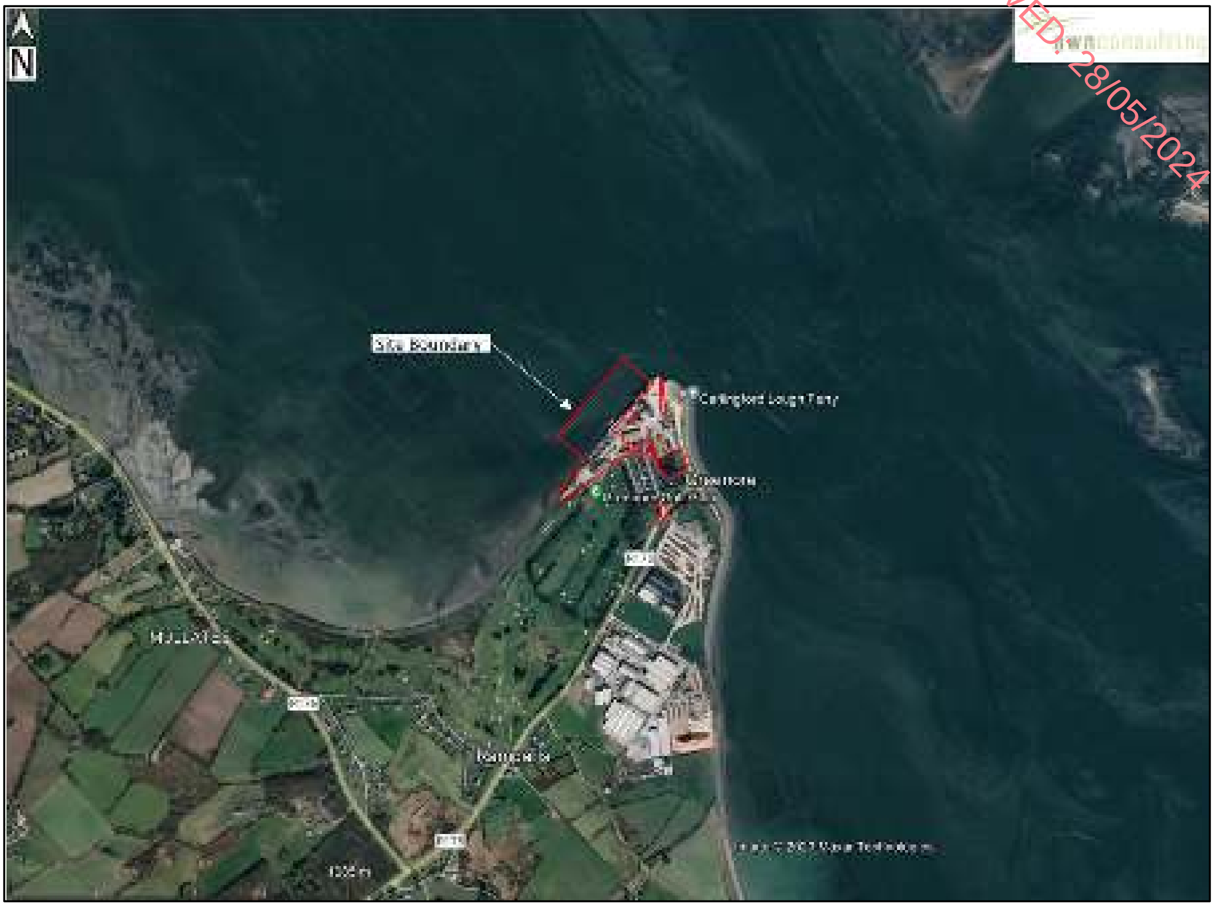


Figure 10.4 Site Location & Surrounding Land Use (AWN, 2023)

10.6.2 Water & Hydrology

10.6.2.1 Regional Hydrological Environment

The proposed development site lies within the Newry, Fane, Glyde and Dee Catchment 06 and Big [Louth]_SC_10 WFD sub-catchment 06-9 (Greenore_010 WFD River Sub Basin). According to the EPA river network (EPA maps, https://gis.epa.ie/EPAMaps/ accessed on 12-10-2023), the nearest surface water receptor is the Carlingford Lough coastal waterbody (WFD code: GBNIIE6NB030) which is a transboundary waterbody located adjacent to the proposed development site. The application site is located at Greenore Port and is largely within the Port confines. Refer to Figure 10-5 below showing the regional hydrological environment in context of the proposed development site.

Figure 10.5 Site Location and Regional Hydrological Environment (EPA, 2023)

The port currently has an existing stormwater drainage network in place. This serves as a drainage network for both yard surface water and roof water from buildings. A site survey conducted (Refer to Engineering Planning Report) shows gullies alongside the road and around buildings. The gravity system discharges through a bypass separator before discharging into Carlingford Lough coastal waterbody through one existing outfall. The outfall (Outfall 1) is a 225mm diameter uPVC pipe that discharges through a 225mm diameter tide lock. it should be noted that this system includes hydrocarbon interceptors prior to discharge into the waterbody.

10.6.2.2 Surface Water Quality

The Environmental Protection Agency (EPA, 2023) on-line mapping presents the available water quality status information for water bodies in Ireland. The most recent WFD Status score (2016-2021) states that the Carlingford Lough coastal waterbody has an '*Unassigned*' status while its WFD risk score is '*Under Review*' (refer to www.catchments.ie).

Nevertheless, the Northern Ireland Environment Agency (NIEA) Catchment Data Viewer also presents the water quality status for water bodies in Northern Ireland. As such, the Carlingford Lough coastal waterbody has a '*Moderate*' status for the period 2016-2021.

Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. However, it should be noted that the Carlingford coastal waterbody and its tributary, the Newry Estuary transitional waterbody are not currently monitored by the EPA. The portal www.catchments.ie presented water quality data for the Carlingford waterbody at a single station named '*ambient monitoring TPEFF2100D0268SW001*' but only for the period 2016-2017.

Figure 10-6 below presents a waterbody risk EPA map for the Newry Fane, Glyde and Dee WFD Catchment.

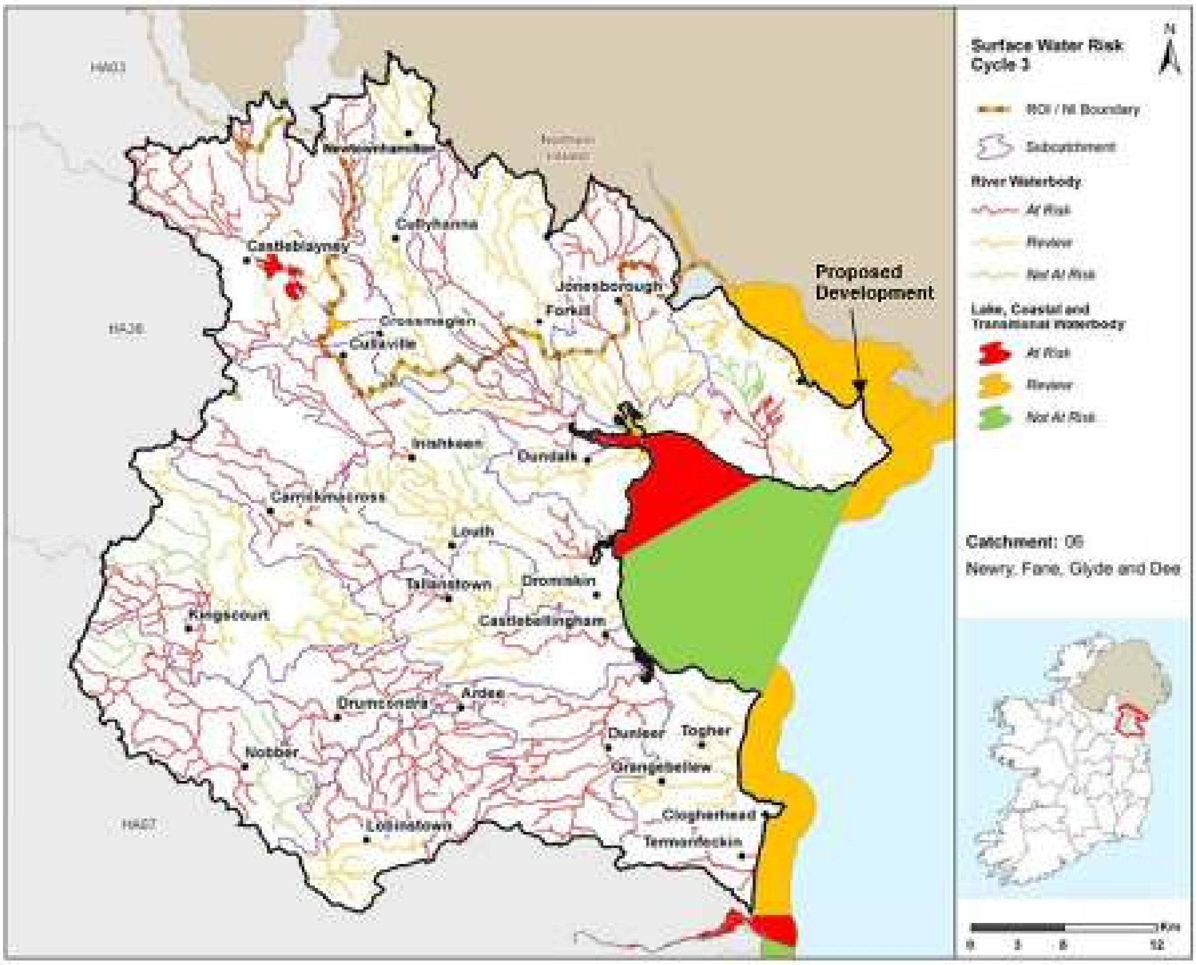


Figure 10.6 Surface Water 'Risk of not achieving WFD good status' Map (EPA, 2023)

The Greenore_010 waterbody is considered to have an ecological status of 'Poor' through modelling assessment technique.

According to the sub-catchment assessment of the Big[Louth]_SC_010 subcatchment carried out by the EPA in September 2022, there are a number of pressures within this sub-catchments that impact on the hydrological environment (refer to www.catchments.ie). All the water bodies considered within this subcatchment have a WFD risk score of 'At Risk' or under review. According to this assessment, the Greenore_010 and Carlingford Lough are under anthropogenic pressures.

10.6.2.3 Surface Water Local Drainage

As mentioned on Section 10.3.1 above, the port currently has an existing stormwater drainage network in place. This serves as a drainage network for both yard surface water and roof water from buildings. The system drains via gravity and discharges via two existing outfalls into Carlingford Lough.

10.6.2.4 Wastewater

As mentioned on Section 10.3.1 above, the port currently has an existing foul drainage network in place comprising of a foul septic tank and foul lines servicing buildings in the port. The foul collection tank is located under the floor of an existing warehouse north of the port office and collects foul effluent from the Port and the village. The collection tank is a Uisce Éireann asset and is emptied with a tanker periodically and sent to Dundalk Wastewater Treatment Plant (WWTP).

10.6.2.5 Water Supply

As mentioned on Section 10.3.1 above, there is an existing 100mm diameter watermain parallel to the southern boundary of the Main Greenore OMF. There is also a significant watermain network within the Port serving the existing infrastructure and quayside operations.

10.6.2.6 Flood Risk

As part of the planning application for the scheme, McCarthy Browne conducted a Stage 3 Site Specific Flood Risk Assessment (SSFRA) in line with current flooding guidelines which is submitted with this application.

As part of the assessment the Louth County Development Plan was reviewed which designated the application area as being outside a flood zone and within “Port/Port Related Activity.” There have also been no recorded flood events near the proposed development, according to the Office of Public Works (OPW) Flood Hazard Mapping website and discussions with Greenore Port.

The North Western - Neagh Bann CFRAM Flood Risk was also reviewed and identified Greenore town as an Area for Further Assessment (AFA) for fluvial and coastal flooding. Preliminary Flood Risk Assessment (PFRA) mapping indicates that the site is unlikely to be at risk from coastal flooding.

According to the DCFPP the increase in water level due to a fluvial component during a combined tidal and fluvial 1 in 200 event is up to approximately 100mm. The 1 in 200 year tidal flood level is estimated at 4.25 OD Malin.

For this reason, McCarthy Browne recommends an absolute minimum freeboard of 300mm, which includes tolerances associated with the ICPSS extreme water levels and accounts for an additional fluvial component. The recommended finish floor level of warehouses and offices within the proposed development is recommended to be no lower than 5.05m OD Malin, that the quay wall level and quayside facility be no lower than 4.25m OD and that the level of the proposed satellite carpark be no lower than 4.25m OD Malin.

S/N	Flood zone	Elevation reference (mOD)	Colour code
1	A	<4.25	
2	B	Between 4.25 and 4.47	
3	C	>4.47	

Figure 10.7 Flood Zone Map (McCarthy Browne, 2024)

The assessment confirms that the proposed development is located predominately in Flood Zone C, which means the probability of flooding from rivers and coastal areas is less than 0.1% or 1 in 1000 years. The assessment concludes with the appropriate mitigation measures outlined in the Site Specific Flood Risk Assessment (McCarthy Browne, 2024), the proposed development is not at risk of fluvial or coastal flooding. Refer to Figure 10.7 above showing the flood zones in relation to Greenore Port.

10.6.2.7 Areas of Conservation

The proposed development site is partially within Carlingford Shore SAC (Site code: 002306) and Carlingford Lough SPA (Site code: 004078). Currently there is a direct hydrological linkage between the proposed development and these sites through the existing stormwater drainage network which outfalls into the Carlingford Lough. Refer to Figure 10.8 below.

The Carlingford Lough receives water from the Newry catchment, which is a transboundary catchment, and more specifically from the Newry Estuary transitional waterbody (WFD Code: UKGBNI5NB030010).

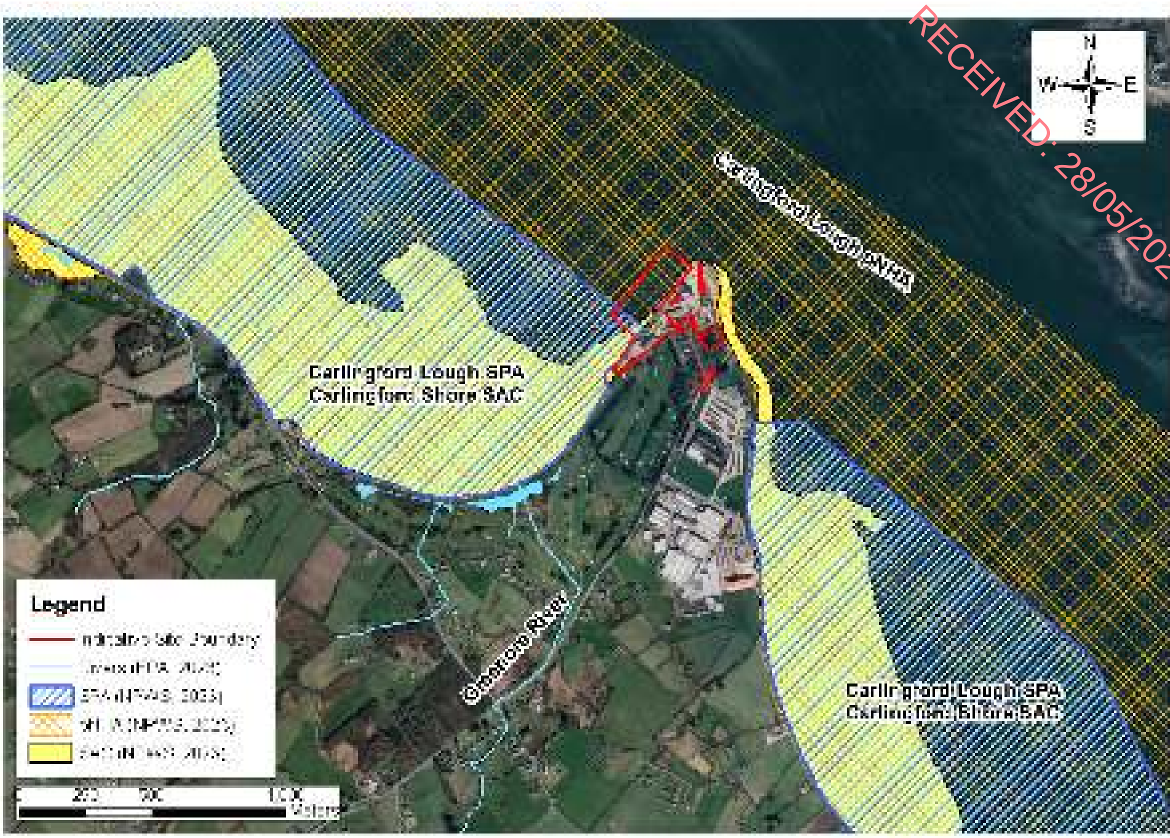


Figure 10.8 Site Location with Areas of Conservation (NPWS, 2023)

Note: Proposed Natural Heritage Areas (pNHAs) are designations introduced under the Wildlife Act 1976 (as amended). Although many NHA designations are not yet fully in force under this legislation, they are offered protection in the meantime under planning legislation which requires that planning authorities give due regard to their protection in planning policies and decisions.

10.6.2.8 Rating of Site Importance of the Hydrological Features

Based on the NRA (2009) methodology (refer to Appendix 10.1) and criteria for rating the importance of hydrological features, the importance of the hydrological features at this site is rated as '*Extremely High*' Importance.

This is based on the assessment that the attribute has a high quality, or value on an international scale. The site directly connected with a surface water body ecosystem protected by EU legislation (Carlingford Lough SPA/ Carlingford Shore SAC).

10.6.3 Hydrogeology

10.6.3.1 Aquifer Classification

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well yield (m^3 /d), specific capacity (m^3 /d/m) and groundwater transmissivity (mm^3 /d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

The GSI (2024) classifies the principal aquifer types in Ireland as:

Bedrock Aquifer

- Rkc – Regionally Important Aquifer – Karstified (conduit)
- Rkd – Regionally Important Aquifer – Karstified (diffuse)
- RK – Regionally Important Aquifer – Karstified
- Rf – Regionally Important Aquifer – Fissured bedrock
- Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive
- Lk – Locally Important Aquifer – Karstified
- Ll – Locally Important Aquifer – Bedrock which Moderately Productive only in Local Zones
- Pl – Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones
- PU – Poor Aquifer – Bedrock which is generally Unproductive

Gravel Aquifer

- Lg – Locally Important Aquifer – Sand & Gravel
- Rg – Regionally Important Aquifer – Sand & Gravel
-

Presently, from the GSI (2023) National Bedrock Aquifer Map, the GSI classifies the bedrock aquifer beneath the subject site as a Locally Important Aquifer (Lm). The potential for vertical or horizontal migration within this type of aquifer could be significant in the presence of regional scale fractures. The GSI map does not identify structural faults underneath the area of the subject site. Refer to Figure 10.9 below.

Figure 10.9 Aquifer Classification Map (GSI, 2023)

10.6.3.2 Aquifer Vulnerability

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures, the main feature that protects groundwater from contamination, and therefore the most important feature in protection of groundwater, is the subsoil (which can consist solely or of mixtures of peat, sand, gravel, glacial till, clays or silts). The aquifer vulnerability class in the region of the site is presented in Figure 10.10 below and Table 10.2 presents its corresponding guidelines.

Groundwater vulnerability is based on the thickness of the subsoil overlying the bedrock aquifer. The GSI (2023) guidance presently classifies the bedrock aquifer in the region of the subject site as having '*High*' vulnerability which indicates a general overburden depth potential between 3-5m, suggesting a moderate to good natural protection of the aquifer by high permeability marine gravel and sands. This is consistent with local site investigations, as carboniferous limestones have been encountered at depths from 4.4 m below ground level.

Figure 10.10 Aquifer Vulnerability Map (GSI, 2023)

Table 10-2 Vulnerability Mapping Criteria (GSI, 2023)

Depth to Rock	Hydrogeological Requirements for Vulnerability Categories				
	Diffuse Recharge		Point Recharge	Unsaturated Zone	
	High Permeability (sand/gravel)	Moderate Permeability (sandy subsoil)	Low Permeability (clayey subsoil)	(swallow holes, losing streams)	(sand/gravel aquifers only)
0-3 m	Extreme	Extreme	Extreme	Extreme (<30m radius)	Extreme
3-5 m	High	High	High	>3 m	High
5-10 m	High	High	Moderate	N/A	N/A
>10 m	High	Moderate	Low	N/A	N/A

Notes:

(1) N/A: Not applicable

(2) Permeability classifications relate to the engineering behaviour as described by BS5930.

(3) Release point of contaminants is assumed to be 1-2 below ground surface.

(4) Outcrop and shallow subsoil (i.e. generally <1.0 m) areas are shown as a sub-category of extreme vulnerability.

10.6.3.3 Local Hydrogeological Environment

10.6.3.3.1 Geological Profile for Land Development Area

According to the GIR (refer to Appendix 9.3 - Greenore Port Geotechnical Interpretive Report (Gavin & Doherty Geosolutions, 2023), the following profile was determined for the land development area.

Overburden Deposit

The top strata recorded in all borehole logs were Concrete, Made Ground and Hardcore Fill, followed by '*silty sandy GRAVEL interbedded with gravelly Sand*'. Similarly, the presence of thick layers of cobbles and boulders were also recorded within this unit in BH9 (1998).

This stratum is underlaid by '*SILT/CLAY with some gravel and occasional shells content*'. In majority of the boreholes this stratum lies above the bedrock and started to record below -9.0mOD.

Bedrock

Limestone is encountered in BH9 from the 1998 SI at 20.70mBGL or -16.10mOD (i.e. -19.15mCD). Bedrock is described as moderately strong fine grained Carboniferous Limestone.:

- P7 at 4.40mBGL -8.5mAOD (i.e. -11.55mCD);
- BH5(1998) at 17.90mBGL -13.4mAOD (i.e. -16.45mCD); and
- BH6(1998) at 17.60mBGL -13.00mAOD (i.e. -16.05mCD).

Table 10-3 below summarises the ground profile for the Land Development Area.

Table 10.3 Geology Unit Summary for Land-Based Ground Model (GDG, 2023)

Material Name/ Soil Geological Unit	Elevation (mAOD)		Thickness (m)	
	Top	Base	Min	Max
Concrete	4.5	4.0	0.15	0.4
Made Ground/ Hardcore Fill	4.6	-1.5	0.5	6.1
Granular Deposits (silty sandy Gravels)	4.0	-9.5	4.2	6.5
Cohesive Deposits (Silt/Clay)	-8.3	Unproven	1.3	4.6
Granular Deposits (sandy Gravels)	-13.5	Unproven	2.7	Unproven
Bedrock	-16.10	Unproven	Unproven	

10.6.3.3.2 Ground Profile for Marine Development Area

According to the GIR in Appendix 9.3, the following profile was determined for the marine development area.

Overburden Deposit

Generally, the main overburden material is described as '*silty sandy GRAVEL interbedded with gravelly sand*'. The proportion of the silt and sand composition varies slightly between borehole to boreholes based on the log descriptions.

The presence of thick layers of cobbles and boulders were recorded in P13(1998). In P9, P7 and P4 cohesive layer of '*sandy silty CLAY*' as top strata is noted. The presence of cohesive material '*silty CLAY* *with some gravel and occasional shells*' content is recorded in boreholes especially at the centre of the harbour. In P14 and P13. boreholes this layer appeared as interbedded unit – '*very stiff SILT/CLAY with some gravel and occasional shells content*'.

Bedrock

Moderately strong grey fine grained Carboniferous Limestone was encountered in the following boreholes:

- P7 at 4.40mBGL -8.5mAOD (i.e. -11.55mCD);
- BH5(1998) at 17.90mBGL -13.4mAOD (i.e. -16.45mCD); and
- BH6(1998) at 17.60mBGL -13.00mAOD (i.e. -16.05mCD).

Table 10.2 below summarises the ground profile for the Marine Development Area.

Table 10.2 Geology Unit Summary for Marine-Based Ground Model (GDG, 2023)

Material Name/ Soil Geological Unit	Elevation (mAOD)		Thickness (m)	
	Top	Base	Min	Max
Granular Deposits (silty sandy Gravels)	2.5	-8.5	1.5	7.3
Cohesive Deposits (Silt/Clay)	-4.5	-13.0	0.6	4.6
Granular Deposits (sandy Gravels)	-5.5	Unproven	2.3	Unproven
Bedrock	-8.5	Unproven	Unproven	

For the marine development area, the GI data used are from 1998 and 1991 SI campaigns. Even though the boreholes are spread well to cover the site area to understand the ground conditions, majority of these boreholes go maximum depth of 6mBGL.

10.6.3.3.3 Groundwater Strikes

Water strikes were recorded in all boreholes drilled for IGSL 2023 SI and water strikes details are provided in Table 10.3 below. Groundwater conditions observed in the borings are those appertaining to the 20-minute period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Table 10.3 Water Strikes Summary Table (GDG, 2023)

Location	Depth Strike-Rose to (mBGL)	Depth Strike-Rose to (mAOD)	Geological Unit
BH01 (2023)	4.8 – 4.4	-0.16 – 0.24	Granular Deposits (silty sandy Gravel)
BH02 (2023)	5.4 – 4.2	-0.98 – 0.22	Granular Deposits (silty sandy Gravel)
BH03 (2023)	4.5 – 4.4	0.02 – 0.12	Made Ground (sandy clayey Gravel)
BH04 (2023)	4.5 – 4.4	0.32 – 0.42	Granular Deposits (silty sandy Gravel)

Location	Depth Strike-Rose to (mBGL)	Depth Strike-Rose to (mAOD)	Geological Unit
BH05 (2023)	4.8 – 4.5	-0.44 – -0.04	Granular Deposits (silty sandy Gravel)
BH06 (2023)	5.5 – 4.2	-0.57 – 0.73	Granular Deposits (silty sandy Gravel)

Note: Additional site investigation works conducted at Greenore Port, Co. Louth in 2024. The objective of this site investigation was to further characterise the soil quality at Greenore Port and determine whether the ground conditions are suitable for soakaway installation and the soil is suitable for disposal. No water strikes / ingresses were encountered in any of the trial holes. Refer to Appendix 9.5 - BRE 365 and Plate Bearing Report (BHP, 2024) of the EIA for further information on percolation test results.

10.6.3.4 Groundwater Quality

The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater, transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. 'Good Status' was to be achieved in all waters by 2015, as well as maintaining 'high status' where the status already exists. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

The Groundwater Body (GWB) underlying the site is the Dundalk GWB (EU Groundwater Body Code: IE_NB_G_015). Currently, the EPA (2023) classifies the Dundalk GWB as having '*Good Status*', and a WFD Risk Score of '*Not at risk of not achieving good status*'. The Dundalk GWB has a Good Status for chemical and quantitative categories. Therefore, the overall status is considered Good.

10.6.3.4.1 Local Groundwater Quality Results

As part of the site investigation carried out by RPS (2011; refer to Section 10.4.4.2 above), groundwater samples were taken from MW3 only, as MW4 was found to be dry at the time of sampling. The samples were analysed for Special Petroleum Hydrocarbons by STL, a UKAS accredited laboratory. Hydrocarbon levels were below the laboratories limit of detection (LOD) in the groundwater sampled from MW3 for all ranges.

Refer to Appendix 9.3 of the EIAR - Greenore Port – Geotechnical Interpretive Report (Gavin & Doherty Geosolutions, 2023) for site investigation locations on the site area.

10.6.3.5 Groundwater Wells

The Geological Survey of Ireland (GSI) Well Index is a record of known wells drilled in Ireland, kept by the Geological Survey of Ireland. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in Ireland.

While much useful information can be obtained from this Index, it is important to note that it is by no means exhaustive, as it requires individual drillers to submit details of wells in each area. There is no licencing system for wells in Ireland at present and as such no complete data set available.

The well card data presented in Table 10.4 shows the occurrence of 1 No. recorded well within a 2 km radius of the overall development site, information regarding the depth to bedrock, and hence the depth of overburden is noted; no information is provided by the GSI online mapping on the yield class, yield m^3/d or usage at well 3231SWW001, which is located within 1km of the overall development site.

There is a significant watermain network within the Port serving the existing infrastructure and quayside operations.

Table 10.4 GSI Well Card Data for the Site Location and Surrounding Areas (GSI, 2023)

GSI Name	Type	Depth (m)	Depth to Bedrock (m)	Townland
3231SWW001	Borehole	19.9	3.3	Greenore

The well card data shows that well 3231SWW001 recorded close to the site location indicate the depth of overburden to be c. 3.3m below ground level (bgl). Refer to Figure 10.11 below for well locations in relation to the overall development site.

Figure 10.11 GSI Well Search Map (GSI, 2023)

10.6.3.6 Source Protection Areas

Within a 2 km radius of the overall development site, there are no recorded source protection areas. The nearest source protection area, Cooley Carlingford, is located approximately 2.7 km west of the development site. Additionally, there is a second source protection area, Ardtullybeg PWS, situated approximately 4.4 km southwest of the proposed development site. It is important to note that both of these source protection areas are positioned upgradient of the development site. As a result, there is no potential for negative effects on these sites from the proposed development.

10.6.3.7 Rating of Site Importance of the Hydrogeological Features

Based on the NRA (2009) methodology (refer to Appendix 10.1) and criteria for rating the importance of hydrological features, the importance of the hydrogeological features at this site is rated as '*Extremely High*' Importance.

This is based on the assessment that the attribute has a high quality, or value on an international scale. The aquifer underlying the site supports a surface water ecosystem protected by EU legislation (Carlingford Lough SPA/ Carlingford Shore SAC).

10.7 The 'Do Nothing' Scenario

If the proposed development at Greenore Port was not to go ahead (i.e. in a Do-Nothing scenario) the baseline environment in terms of hydrogeology and hydrology would remain unchanged as there would be no excavations or construction. Therefore, in a "Do Nothing" scenario, there would be a neutral effect on the hydrogeological and hydrological environment at the site. The likelihood in a temporary and short-term basis is the existing natural state of the area would persist, without any alterations or disturbances caused by the development.

However, there are a number existing permitted developments at the site and Greenore Port area. It should be noted that in the event that the proposed development does not go ahead, the extant permissions for Greenore Port can still go ahead. It is likely that in the absence of the proposed development that a development of a similar nature would be progressed on the site that accords with national and regional policies and therefore the likely significant effects would be similar to this proposal.

10.8 Potential Significant Effects

An analysis of the potential effects of the proposed development on the hydrological and hydrogeological environment during the demolition, construction and operational phases are outlined below. Due to the inter-relationship between land, soils, geology, hydrogeology and surface water (hydrology) the following effects discussed will be considered applicable to both Chapter 9 and 10 of the EIA Report. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 10.9.

10.8.1 Demolition Phase

The development project requires demolition works, including the demolition of the former 'Open Hydro building', a portion of the port's office accommodation, an ESB substation, and an unoccupied dwelling house. However, the potential impacts on the hydrogeological and hydrological environment surrounding the development are expected to be minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works. As a result, there will be minimal impact on the hydrogeological and hydrological environment, and no significant effects on the composition, stability, or fertility of the land are anticipated. The absence of excavation works also means that there will be no disturbance to the natural soil structure, thus preventing potential soil erosion or compaction and increased run-off rates.

For more detailed information on the predicted reuse, recycle, and disposal rates for demolition waste, please refer to Chapter 8 - Material Assets - Waste of this EIAR.

Overall, the surface-level demolition works will have a negligible impact on the hydrogeological and hydrological environment, preserving their integrity and minimizing any potential environmental consequences. In the absence of mitigation, the effect on land, soils and geology is likely to be **short-term, not significant and negative.**

10.8.2 Construction Phase

10.8.2.1 Potential Impacts on Surface Water and Groundwater Quality

There is potential for the surface water quality to become contaminated with pollutants associated with construction activity. If a spill occurs, contaminated water and collected surface water run-off which arises from construction sites can pose a short-term risk to nearby watercourses. This potential contaminated run-off may enter directly into Carlingford Lough coastal waterbody or Dundalk ground waterbody beneath the site through lateral migration into the underlying aquifer. Mitigation and avoidance measures will be put in place to manage run-off during the construction phase. The potential of contamination is associated with the following sources:

- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates) – arising from dewatering, excavation and ground disturbance;
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or stored fuels, oils, and materials.
- Cement/concrete (increase turbidity and pH) – arising from construction materials.
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms.

In the absence of mitigation, rainfall run-off and potential dewatering during the construction and commissioning phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may in turn impact on local infiltration capacity, or downstream infrastructure or watercourses. There is also the potential risk of unintentional discharge from construction traffic or stored materials like fuels and oils which could have negative impacts on both surface waters (Carlingford Lough) and the underlying groundwater (Dundalk GWB). Moreover, construction activities often involve the use of chemicals, such as paints, adhesives, solvents, and pesticides, which can also pose a risk of contamination if not handled and disposed of properly. These chemicals can seep into the soil or be carried by rainwater or other runoff, ultimately contaminating surface water. Concreting operations carried out near surface water drainage points during construction activities could lead to discharges to a watercourse. Concrete (specifically, the cement component) is highly alkaline and any spillage to a local watercourse would be detrimental to water quality and local fauna and flora. It is necessary for the measures (set out in Section 10.9.3) to be implemented to reduce and prevent accidental discharges from occurring during construction, including the implementation of effective containment and monitoring procedures.

Accidental discharges can also occur from welfare facilities during construction activities. Wastewater can contain high levels of bacteria, chemicals and organic matter, which could contaminate nearby water sources if discharged incorrectly. The establishment and use of welfare facilities and use of sealed containment, ensures that there are no potential significant impacts; therefore, no additional mitigation is required.

During the proposed dredging works c. 45,000 cubic metres of soft silty material will be dredged and disposed of on land. The 1000m^3 of excavated rock will be reused on site.

This can increase sedimentation levels which can result in increased levels of suspended solids in the water potentially leading to reduced water clarity which may disrupt aquatic ecosystems. The dredging may also cause resuspension of contaminants such as heavy metals or hydrocarbons that are present within the dredged material. Furthermore, construction materials, fuels, and other substances used during the dredging process can potentially enter the water, introducing contaminants that can harm aquatic life and alter water chemistry. For instance, oil or chemicals may be inadvertently spilled, impacting the water quality.

In the absence of mitigation measures the potential impacts during the construction phase on surface water quality are ***negative***, ***significant*** and ***short-term***.

10.8.2.2 Potential Impacts on Human Health and Populations

A reduction in water quality via unmitigated pollutants entering into Carlingford Lough coastal waterbody and Dundalk GWB (groundwater body) has the potential to lead to negative impacts on human health and populations. Hydrocarbons and petroleum products for example have the greatest risk for human health when they are in drinking water. However, it is noted that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the environments.

Therefore, on this basis in the absence of mitigation measures the potential impacts during the construction phase on human health and populations due to changes to the hydrological environment are ***negative***, ***slight,*** and ***short-term***.

10.8.2.3 Potential Impacts on Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Assessment as Appendix 10.4 of this EIAR.

The WFD assessment indicates that, based on the current understanding of the proposed development, there is no potential for adverse or minor temporary/ long-term or localised effects on the Carlingford Lough surface waterbody. Therefore, it has been assessed that the proposed development will not cause any deterioration or change in water body status or prevent attainment, or potential to achieve, future good status or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

The WFD assessment indicates that there is no potential for adverse or minor temporary or localised effects on the Dundalk groundwater body. Therefore, it has been assessed that it is unlikely that the proposed development will cause any deterioration or change on its water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

No further assessment of WFD is recommended given that no significant deterioration or change in water body status is expected based on the current understanding of the proposed development during construction and operation.

There is a potential of accidental discharges during the construction phase. However, these are temporary short-lived events that will not impact on the water quality status of Carlingford Lough coastal waterbody and Dundalk ground waterbody in the long-term and as such will not impact on trends in water quality and overall WFD status assessment. If bedrock is encountered during excavations, only its uppermost shallow weathered strata will be exposed (i.e. the regional aquifer will not be affected). Therefore, no potential for negative impacts for human health and populations is foreseen (i.e. drinking water supplies). There is also no source pathway linkage to drinking water supplies or recreational uses. As identified in Section 10.6.3, there are no wells categorised as domestic use in the area.

10.8.3 Operational Phase

10.8.3.1 Potential Effects on Surface Water Quality

10.8.3.1.1 Surface Water Drainage

Surface water runoff from roads, car parking, and hardstanding areas, can potentially contain elevated levels of contaminants such as hydrocarbons. These pollutants such as hydrocarbons if discharged accidentally due to runoff water may result in adverse changes in water chemistry (dissolved oxygen content, biological oxygen demand etc).

The port currently has an existing stormwater drainage network in place. This serves as a drainage network for both yard surface water and roof water from buildings. The system drains via gravity to a bypass separator and discharges via one existing outfall into Carlingford Lough.

In absence of bypass separator and mitigation measures, the potential effects during the operational phase on hydrology and hydrogeology are **long-term, significant and negative.**

O&M Facility Site

There is no discharge to ground proposed as part of the surface water drainage strategy from the O&M site and the existing outfall into Carlingford Lough will be utilised. A bypass separator will be installed to intercept pollutants such as petroleum and oil before the surface water outfalls to sea.

In absence of bypass separator and mitigation measures, the potential effects during the operational phase on hydrology and hydrogeology are **long-term, significant and negative.**

Shore Road Car Park

Surface water drainage will discharge by a series of filter drains into an underground stone-filled reservoir attenuation system. This system has been designed using the results of the soakaway tests in accordance with BRE 365, 2016. These results are included in the Engineering Report by CSEA included with this application.

A bypass interceptor will be installed to capture pollutants such as petroleum and oil and prevent their entry to the public drainage system or groundwater or groundwater where an infiltration system is utilised.

Surface water will discharge to the public surface water pipe on Shore Road.

In the absence of bypass interceptor and mitigation measures, the potential effects during the operational phase on hydrology and hydrogeology are **long-term, significant and negative.**

10.8.3.1.2 Foul Wastewater Drainage

The port has an existing foul drainage network in place comprising of a foul collection tank and foul lines servicing buildings in the port. This includes an existing 150mm connection to the foul collection tank from the former Open Hydro building. A new network of foul sewers will be installed to serve the proposed development, discharging to the existing collection tank. There will be no direct or indirect foul water discharge into Carlingford Lough.

The collection tank is an Uisce Eireann asset, and they are given access to the site to allow tankers to enter and empty the chamber for off-site disposal to Dundalk Wastewater Treatment Plant (WWTP). There is no direct connection from the proposed development to Carlingford Lough. However, there is an indirect hydrological connection to the European sites (Dundalk Bay SAC and SPA's) located in Dundalk Bay at Dundalk Wastewater Treatment Plant (D0053-01).

It is worth noting that even without treatment at the Dundalk WWTP, the design Dry Weather Flow (DWF) is found to be 19.80 m3/d. This volume equates to 23.6% of the septic tank capacity (84m3) estimated for the proposed development. The peak hydraulic capacity of Dundalk WWTP is currently 56,706 m3/d according to their 2018 Annual Environmental Report. Therefore, the proposed developments maximum septic tank capacity that will be delivered to Dundalk WWTP equates to 0.0035% of Dundalk WWTP's peak hydraulic capacity.

Therefore, there would not be any measurable impact on the overall water quality within Dundalk Bay or the Natura 2000 sites located therein, and therefore would not have an impact on the current Water Body Status (as defined within the Water Framework Directive). In addition, as the proposed development will not contribute any additional stormwater drainage to the WWTP, the development will therefore have no measurable impact on the water quality in any overflow situation.

On the basis of the design characteristics of the proposed development, and feasibility of the connection with Uisce Éireann to Ringsend WWTP, the potential effects during the operational phase on surface water quality are ***neutral, imperceptible***, ***long-term*** in respect of foul water loading.

In the absence of mitigation measures the potential effects during the operational phase on hydrology and hydrogeology are **long-term, imperceptible and neutral.**

10.8.3.2 Potential Effects on Human Health and Populations

A reduction in water quality via unmitigated pollutants entering Carlingford Lough or discharging to Dundalk ground waterbody (as set out in Section 10.8.3.3.1) has the potential to lead to negative impacts on human health and populations. Hydrocarbons and petroleum products for example have the greatest risk for human health when they are in drinking water. However, it is noted that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream in the environments. Therefore, the proposed development has no potential to impact on human health, populations, and material assets through the surrounding hydrogeological and hydrological environment.

There is no potential for unmitigated off-site flooding as a result of the proposed surface water drainage strategy as the existing outfall into Carlingford Lough will be utilised, the coastal location of the proposed development and due to the low flood risk at the site (as set out in section 10.6.2.6 and the Site Specific Flood Risk Assessment prepared with regard to the proposed development (McCarthy Browne, 2024).

In the absence of mitigation measures, the potential effects during the construction phase on human health and populations due to changes to the hydrological and hydrogeological environment are ***neutral, imperceptible, long-term***.

10.8.3.3 Potential Effects on Water Framework Directive Status

There are limited indirect discharges of water during the operational phase to open waterbody/ watercourse from the proposed development. These discharges will be adequately treated via SuDS measures, hydrobrake (or equivalent) and oil/water interceptor to ensure there is no long-term negative impact to the WFD water quality status of the receiving watercourse. The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained correctly as per specifications to ensure long-term/ on-going integrity of same. Wastewater will be collected from the on-site septic tanks and adequately treated off-site at Dundalk WWTP.

In the scenario of an accidental release there is potential for a temporary impact only which would not be of a sufficient magnitude to effect a change in the current water body status.

In the absence of mitigation measures and any accidental discharge, the potential effects during the construction phase on human health and populations due to changes to the hydrological and hydrogeological environment are ***negative, imperceptible, long-term***.

10.8.4 Cumulative Effects

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. Multiple developments in the area could potentially be developed concurrently or overlap during the demolition, construction and operational phases. There will be no effects on hydrogeology and hydrology as each development will adhere to their own CEMP and mitigation plan.

10.8.5 Summary

Table 10.5 below summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 10.5 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Accidental Spills, Leaks and Discharges	Negative	Significant	Local & Regional	Likely	Long-Term	Direct
Increased Sediment Run Off during excavation works carrying Sediment and Pollutants into Carlingford Lough and Dundalk GWB	Negative	Significant	Local & Regional	Likely	Long-Term	Direct

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Groundwater Contamination through lateral migration from improper management of Construction Waste, Materials & Chemicals	Negative	Significant	Local & Regional	Unlikely	Long-Term	Direct

Table 10.6 below summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 10.6 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Accidental Spills, Leaks and Discharges	Negative	Significant	Local & Regional	Likely	Long-Term	Direct
Increased Sediment Run Off from Hardstanding Areas carrying Sediment and Pollutants into Carlingford Lough and Dundalk GWB	Negative	Significant	Local & Regional	Likely	Long-Term	Direct
Future Maintenance Works on Underground Services and Infrastructure involving Excavations exposing bedrock aquifer beneath the site introducing a pathway for contaminants to enter Dundalk GWB	Negative	Significant	Local & Regional	Likely	Short-Term	Direct

If the mitigation measures outlined in Section 10.9 below are not implemented and adhered to in full, the effect on the hydrogeological and hydrological environment is likely to be **long-term, significant and negative.**

10.9 Mitigation

10.9.1 Incorporated Design Mitigation

This section outlines the measures that will be employed in order to ensure the project has minimal adverse effects on the surrounding environment, in this case hydrogeology and hydrology. These measures include appropriate design measures such as the proper storage and containment of hazardous substances and proper drainage systems in line with best practice, standard details, policies and guidelines. For further information on design refer to Engineering Planning Report – Greenore Port OMF (CSEA, 2023)

10.9.1.1 Surface Water Quality and Drainage

The site is located adjacent to the sea (Carlingford Lough) and as there is no downstream development before out falling to the Irish Sea, it is not required to provide full attenuation for the 100-year return storm as per the requirements in Section 6.6, Volume 2, of the GDSDS. The principal issue therefore is the quality of water discharge from Greenore and not the quantity of water discharged to the sea.

The following mitigation measures are proposed in the design of the surface water network for the proposed development:

- Storing surface water during high tides to limit discharge rates at the outfall to the sea.
- Tide locking the outfall during extreme high tide events, with a closure period of up to 6 hours.
- Assuming no outfall rate during the entire 6 hours of tide lock in the worst-case scenario.
- Draining roofs, yards, internal roads, and parking areas through a sealed drainage system, collected and conveyed through stormwater pipes before discharging into an underground attenuation tank.
- Draining car parks, parking bays, and access roads through permeable paving and supplementary gully system, with surface water pipework discharging into a Stormtech Attenuation system.
- Introducing stormwater manholes at appropriate spacing distances for maintenance purposes (no greater than 90m).
- Draining the satellite car park catchment area through proposed filter drains, collecting surface water runoff from impermeable vehicular aisles and discharging into a stone-filled attenuation system.
- Using stormwater drainage network pipework with diameters ranging from 225mm to 450mm, depending on flow capacity.
- Ensuring the proposed surface water network can handle up to a 30-year critical storm event plus a 20% climate change allowance without causing flooding.

The proposed surface water drainage system designed for this development also includes a number of Sustainable Urban Drainage Systems (SuDS) measures such as permeable paving/ grasscrete, filter drains and attenuation systems. These measures will be incorporated to reduce run-off volumes and improve run-off water quality. The design of the attenuation storage system has been carried out for the 1 in 100-year event with a 20% allowance for climate change. The design of the 2 no. attenuation systems has been completed as follows:

- *Underground Arch-Type Attenuation Storage:* The attenuation storage systems shall comprise of underground Arch-type storage units, i.e., stormtech systems or similar approved. Its final discharge destination will be Irish Sea through by-pass petrol separators.
- *Underground Stone-Fill Reservoir Attenuation System:* Surface water drainage from the Satellite Car Park shall discharged into an underground stone-fill reservoir designed using the results of soakaway tests in accordance with BRE 365, 2016. Its final discharge destination will be the 100mm diameter pipe along Shore Road.

The catchment at the Shore Road carpark will be connected to the public Louth County Council surface water collection on the public road. It is proposed to limit the surface water discharge from the Shore Road carpark catchment zone of the development to the equivalent Qbar value to 2.13 l/s/ha in compliance with the Greater Dublin Strategic Drainage Study (GDSDS), Water Services Guidelines for Planning Authorities Draft (2018) and CIRIA SuDS Manual, 2015. It is proposed to use a "Hydrobrake Optimum" (downstream of each attenuation unit) vortex flow control devices to restrict the flows to the amounts calculated.

Refer to the Engineering Planning Report (CSEA, 2024) for further information on the proposed incorporated design measures to mitigate against the degradation of the surface water environment and quality.

10.9.1.2 Foul Water Drainage

A new network of foul sewers will be installed to serve the proposed development, discharging to existing connections to the existing collection tank. There will be no direct or indirect foul water discharge into Carlingford Lough.

10.9.1.3 Potential Impacts on Water Framework Directive Status

The following design mitigation measures have been incorporated in the design to mitigate potential impacts have taken account of the potential impacts of the development.

- A fuel store with a capacity of ≥200,000 litres will be provided in a dedicated area that will be maintained and managed by Greenore Port. The overall volume will be stored in 1-2 bunded tanks and located in a secure area of the site to avoid accidental impact. The tanks will be fitted with overfill prevention, bund alarm and automatic shut off valves to mitigate risk of spills.
- Surface water will be drained from this area into the proposed network with petrol interceptors included.
- The proposed stormwater drainage network design includes sustainable drainage systems (SuDS) these measures by design ensure the stormwater leaving the site is to be attenuated and treated within the new development site boundary to ensure suitable quality, before discharging to the Carlingford Lough
- It is proposed to separate the surface water and foul drainage networks, which will serve the proposed development, and provide independent connections to the local public surface water and foul sewer networks respectively.

The surface water discharges from the site are indirect, and will be adequately attenuated via SuDS measures, hydro-brake (or equivalent) and oil/water separator ensure there is no long-term negative impact to the WFD water quality status of the (Carlingford Lough) and (Dundalk GWB).

10.9.2 Demolition Phase Mitigation

To facilitate the development, demolition works are required. This will include the demolition of the former 'Open Hydro building' to, and a small portion of the port's office accommodation, an ESB substation, and an unoccupied dwelling house. The demolition works of the proposed development are limited to surface-level activities and do not involve any excavation works. As a result, the impact on hydrogeology and hydrology is minimal.

The demolition process focuses on dismantling and removing structures, buildings and infrastructure (i.e. Open Hydro building, office accommodation, ESB substation and associated switch room, unoccupied dwelling house etc.) to accommodate the new development and facilitation works, without disturbing the underlying soil or altering the landscape. This approach ensures that there are no significant effects on the underlying aquifer (Dundalk GWB) and Carlingford Lough due to increased run-off, soil compaction related to excavation works.

Refer to Chapter 8 – Material Assets – Waste – Section 8.9.2 of the EIA for further information on predicted on demolition phase mitigation in terms of off-site reuse, recycle and disposal rates for demolition waste. These measures will ensure no discharge of contaminated run-off enter the surrounding hydrogeological and hydrological environment.

Overall, no mitigation measures are required during the demolition phase in relation to hydrogeology and hydrology due to the surface level nature of the works. The surface-level demolition works will have a negligible impact on hydrogeology and hydrology, preserving their integrity and minimizing any potential environmental consequences.

10.9.3 Construction Phase Mitigation

In order to reduce impacts on the hydrogeological and hydrological environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation and export from site;
- Sources of fill and aggregates for the proposed development;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

10.9.3.1 Outline Construction Environmental Management Plan

An Outline Construction Environmental Management Plan (CEMP) is included with the application documentation.

The main purpose of a CEMP is to provide a mechanism for implementation of the various mitigation and monitoring measures which are described in the EIAR. The Outline CEMP demonstrates the applicant's commitment to implementing the proposed development in such a way as to avoid or minimise the potential environmental effects arising from construction activities. All personnel will be required to understand and implement the requirements of the plan.

Construction works and the proposed mitigation measures outlined in the Outline CEMP are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);

- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741);
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005); and
- Guidelines for the crossing of watercourses during the construction of national road schemes (National Roads Authority; 2008).

The Outline CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

The Outline CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site. All mitigation measures outlined here, and within the Outline CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to consent conditions which may be imposed.

During the project planning phase, a comprehensive emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process. This plan will include for events such as:

- Pollution incidents: These may involve spillages, the malfunction of temporary structures, embankment collapse, acts of vandalism, fires, and other related events.
- Extreme weather occurrences: Events such as heavy rainfall, flooding, are important factors to consider due to their potential impact on the construction process.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. Personnel working on the site will be suitably trained in the implementation of the procedures.

10.9.3.2 Surface Water Run-Off

As there is potential for run-off to enter/discharge into to the surrounding Natura sites located in Carlingford Lough (Carlingford Lough SPA & Carlingford Shore SAC), mitigations will be put in place to manage run-off during the construction phase as follows:

- Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.
- Should any discharge of construction water be required during the construction phase, discharge will be to the surface water network. Therefore, there will be interaction between silt laden construction water and surface water quality combined with Pre-treatment and silt reduction measures on site and hydrocarbon interceptors. All refuelling will be carried out at adequate distances away from waterbodies from doubled skinned bowsers and spill kits will be available at all times.
- Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. It is therefore proposed that the water be discharged via the existing stormwater sewer network. The use of slit traps and an oil interceptor (if required)

will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer. There shall be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry, however this is expected to be low due to the low permeability of the subsoils and the relative shallow nature for excavations. Likewise, infiltration to the underlying aquifer is not anticipated (Refer to Chapter 9 (Land, Soils, Geology and Hydrogeology) for further details).

- Run-off water containing silt will be contained on site via settlement tanks/lagoons and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds).
- The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted and / or backbucketed to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the stormwater drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Soil from works will be stored away from existing drainage features to remove any potential impact.
- Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from surface water drains will be maintained.

10.9.3.3 Fuel and Chemical Handling

The following mitigation measures will be taken at the construction stage in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:

- Designation of a bunded refuelling areas on the site
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers to carry a spill kit;
  - Operatives must have spill response training; and
  - Bowsers to be double skinned.

In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they will be secured and on spill pallets; and

- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

All contractors will be required to implement mitigation measures discussed above.

All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash-down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

10.9.3.4 Cement/ concrete works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Washouts will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer submit to agreement with Uisce Éireann.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures.

10.9.3.5 Soil Removal and Compaction

There will be soil and stones excavated to facilitate construction of new foundations and the installation of underground services. The project engineers (McCarthy Browne) have estimated that c. 7,225 m^3 of material will need to be excavated to do so. It is currently envisaged that there will be an opportunity to reuse c. 4,265 m^3 of excavated material for use in landscaping and fill. The remining 2,960 m^3 of material, will need to be removed offsite due to the limited opportunities for reuse on site. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

There will be dredging undertaken to facilitate navigable access and suitable berthing for the crew transfer vessels (CTV)s. McCarthy Browne have estimated that c. 41,000 m^3 of material will need to be dredged to do so with all but 1,000 m^3 of this material to be removed from site. This material will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

During the construction phase of the proposed development, several mitigation measures will be implemented to effectively manage and mitigate the effects of soil compaction and its associated negative consequences.

- Excavated soil and stone surplus to requirements on-site will be taken for appropriate offsite reuse, recovery, recycling and/or disposal.
- Dredge material will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

- Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any surface water drains and surface waterbodies (Carlingford Lough). Movement of material will be minimised to reduce degradation of soil structure and generation of dust.
- All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

10.9.3.6 Environmental Procedures

There will be comprehensive emergency response procedures and standard operating procedures to respond to chemical spillage all types. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures.

10.9.3.7 Human Health and Populations

It has been established (Section 10.8.2.2) that there are no recorded Recreational Waters, Bathing Waterbodies, or Drinking Water Rivers, located in the vicinity of the proposed development site associated with Carlingford Lough. On a precautionary basis, the mitigation measures set out in Section 10.9.3 will be implemented during the construction works for the protection of human health and populations.

Furthermore, as stated in Section 10.9.3.5 all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

10.9.3.8 Water Framework Directive Status

It has been established (Section 10.8.2.3) that while, there is a potential of accidental discharges during the construction phase this will not impact on trends in water quality and overall WFD status assessment. On a precautionary basis, the mitigation measures set out in Section 10.9.3 will be implemented during the construction works for the protection of surface water quality.

10.9.4 Operational Phase Mitigation

10.9.4.1 Surface Water Quality

The design has taken account of the potential effects of the development on surface water quality and measures have been incorporated in the design to mitigate these potential effects, as outlined in Section 10.9.1The proposed surface water drainage strategy is designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), Water Services Guidelines for Planning Authorities

(Draft – 2018) and The SuDS Manual (CIRIA, 2015).The proposed surface water drainage system designed for this development includes a number of Sustainable Urban Drainage Systems (SuDS) measures incorporated to reduce run-off volumes and improve run-off water quality such as permeable paving/grasscrete, filter drains, underground arch-type attenuation storage and an underground stone-fill reservoir attenuation system. The design of the attenuation storage system has been carried out for the 1 in 100-year event with a 20% allowance for climate change.

There is no discharge to ground proposed as part of the surface water drainage strategy from the O&M Facility and the existing outfall into Carlingford Lough will be utilised. Therefore, as there are no effects on the hydrogeology and hydrology at the proposed development, no mitigation is required.

There is no discharge to ground proposed as part of the surface water drainage strategy from the shore road car park. Surface water will discharge to the public surface water pipe on Shore Road. A bypass interceptor will be installed to capture pollutants such as petroleum and oil and prevent their entry to the public drainage system. Therefore, as there are no effects on the hydrogeology and hydrology at the proposed development, no mitigation is required.

10.9.4.2 Foul Water Drainage

The port has an existing foul drainage network in place comprising a foul collection tank and foul lines servicing buildings in the port. This includes an existing 150mm connection to the foul collection tank from the former Open Hydro building.

A new network of foul sewers will be installed to serve the proposed development, discharging to existing connections to the existing collection tank. Therefore, as there are no effects on the hydrogeology and hydrogeology at the proposed development, no mitigation is required.

10.9.4.3 Human Health and Populations

On a precautionary basis, the incorporate design mitigation measures for Water & Hydrology and included in the Summary of Mitigation and Monitoring Measures Tables (Chapter 19) will be implemented during the operational phase for the protection of human health and populations and material assets.

There is no discharge to ground proposed as part of the surface water drainage strategy from the O&M Facility and the existing outfall into Carlingford Lough will be utilised. There is no discharge to ground proposed as part of the surface water drainage strategy from the shore road car park. Therefore, as there are no effects on the hydrogeological and hydrological environment at the proposed development, no mitigation is required.

10.9.4.4 Potential Impacts on Water Framework Directive Status

AWN Consulting have prepared a Water Framework Directive (WFD) Screening Assessment that is included with the application documentation (Appendix 10.4 of the EIAR). The WFD Screening Report includes robust mitigation measures to protect the hydrological environment (Carlingford Lough) and underlying hydrogeological environment (Dundalk GWB).

The design mitigation measures included in section 10.9.1 have taken account of the potential impacts of the development on surface water quality; measures have been incorporated in the design to mitigate these potential impacts.

A fuel store with a capacity of ≥200,000 liters will be provided in a dedicated area that will be maintained and managed by Greenore Port. The overall volume will be stored in 1-2 bunded tanks and located in a secure area of the site to avoid accidental impact. The tanks will be fitted with overfill prevention, bund alarm and automatic shut off valves to mitigate risk of spills. Surface water will be drained from this area into the proposed network with petrol interceptors included.

The proposed development stormwater drainage network design includes sustainable drainage systems (SuDS) these measures by design ensure the stormwater leaving the site is to be attenuated and treated within the new development site boundary to ensure suitable quality, before discharging to the Carlingford Lough.

The purpose of the proposed design is to:

- Treat runoff and remove pollutants to improve quality.
- Restrict outflow and to control quantity.
- Increase amenity value.

The layout of the proposed surface water drainage network is shown on the drawing set included with this Application. It is proposed to separate the surface water and foul drainage networks, which will serve the proposed development, and provide independent connections to the local public surface water and foul sewer networks respectively.

The surface water discharges from the site are indirect, and will be adequately attenuated via SuDS measures, hydro-brake (or equivalent) and oil/water separator ensure there is no long-term negative impact to the WFD water quality status of the (Carlingford Lough) and (Dundalk GWB).

No further mitigation is required.

10.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented. The implementation of mitigation measures outlined in Section 10.9 will ensure that the potential impacts on the hydrogeological and hydrological environment do not occur during the demolition, construction and operational phases of the proposed development. Due to the inter-relationship between land, soils, geology, hydrogeology and surface water the following impacts discussed will be considered applicable to both Chapter 10 (Hydrology) and Chapter 9 (Land and Soils) of the EIAR.

10.10.1 Demolition Phase

As stated in Section 10.8.1, the potential impacts on the hydrogeological and hydrological environment surrounding the development are expected to be minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works. As a result, there will be minimal impact on the hydrogeological and hydrological environment, and no significant effects on the composition, stability, or fertility of the land are anticipated. The absence of excavation works also means that there will be no disturbance to the natural soil structure, thus preventing potential soil erosion or compaction and increased run-off rates.

Overall, the surface-level demolition works will have a negligible impact on the hydrogeological and hydrological environment, preserving their integrity and minimizing any potential environmental consequences.

The implementation of mitigation measures outlined in Section 10.9.2 will ensure the residual effect on the hydrogeological and hydrological environment during the demolition phase is likely to be **short-term, not significant and negative.**

10.10.2 Construction Phase

10.10.2.1 Surface Water Quality

The implementation of the mitigation and monitoring measures detailed in Section 10.9.3 will ensure that the potential impacts on the hydrogeological and hydrological environment during the construction phase are adequately mitigated. The residual effect on surface water quality during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

10.10.2.2 Human Health and Populations

The implementation of the mitigation and monitoring measures detailed in Section 10.9.3, will ensure that the potential impacts on human health and populations (and material assets) during the construction phase are adequately mitigated. The residual effect on human health and populations during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

10.10.2.3 Water Framework Directive Status

Even in the absence of the mitigation and monitoring measures detailed in Section 10.9.3, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There are appropriately designed mitigation measures which will be implemented during the construction phase to protect the hydrological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

The residual effect on Water Framework Directive Status during the construction phase is considered to be ***neutral, imperceptible*** and ***short-term***.

10.10.3 Operational Phase

10.10.3.1 Surface Water Quality

The implementation of the mitigation measures detailed in Section 10.9.4.1, will ensure that the potential impacts on surface water quality once the proposed development is constructed and operational are adequately mitigated. The residual effect on surface water quality during the operational phase is considered to be **neutral, imperceptible** and **long-term**.

There will be no impact to the quality of designated sites associated with Carlingford Lough (Carlingford Shore SAC/ Carlingford Lough SPA) due to the hydrological volume and dilution of Carlingford Lough and the mitigation measures cited. In addition, overall, the SuDS attenuation proposed will improve flood management and water quality exiting the site.

10.10.3.2 Human Health and Populations

The implementation of the mitigation measures detailed in Section 10.9.4.4, will ensure that the potential impacts on human health and populations (and material assets) once the proposed development is constructed and operational are adequately mitigated. The residual effect on human health and populations during the operational phase is considered to be **neutral, imperceptible** and **long-term**.

10.10.3.3 Water Framework Assessment

Even in the absence of the mitigation measures detailed in Section 10.9.4, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There are appropriately designed mitigation measures which will be implemented during the operational phase to protect the hydrogeological and hydrological environment. There is a potential of accidental discharges during the operational phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

There are no untreated discharges of wastewater during the operational phase to any open waterbody / watercourse. All surface water discharges will be adequately treated via SuDS measures, hydro-brake (or equivalent) and oil/water interceptor / separator to ensure there is no long-term negative impact to the WFD water quality status of the receiving water body. The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained correctly as per specifications to ensure long-term / on-going integrity of same.

10.10.4 Summary of Post-mitigation Effects

The implementation of mitigation measures outlined in Section 10.9 will ensure that the potential impacts on the hydrogeological and hydrological environment do not occur during the demolition, construction and operational phases of the proposed development. Due to the inter-relationship between land, soils, geology, hydrogeology and surface water the following impacts discussed will be considered applicable to both Chapter 10 (Hydrology) & Chapter 9 (Land and Soils) of the EIAR.

The following Table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 10.7 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Accidental Spills, Leaks and Discharges	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Increased Sediment Run Off carrying Sediment and Pollutants	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Surface Water and Groundwater Contamination from Construction Waste, Materials & Chemicals	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct

The following Table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 10.8 Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Accidental Spills, Leaks and Discharges	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Surface Water discharge to Surface and Ground Waterbodies carrying Potential Contaminants / Pollutants	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Direct
Future Maintenance Works on Underground Services and Infrastructure involving Excavations exposing bedrock aquifer beneath the site introducing a pathway for	Neutral	Imperceptible	Local & Regional	Unlikely	Short-Term	Neutral

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
contaminants to enter Dundalk GWB						
Discharge of Water to Ground	Negative	Significant	Local & Regional	Unlikely	Long-Term	Direct

10.10.5 Cumulative Residual Effects

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below.

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. Multiple developments in the area could potentially be developed concurrently or overlap in the construction phase.

Developments that potentially could overlap during the demolition and construction phase are as follows:

Planning Ref	Description	Application type	Decision	Date
LCC 20543	Demolition of existing structures inc. railway and engine room walls and construction of two new stores and an ESB substation.	Permission	Conditional Upheld on Appeal	15/04/2021
LCC 20268	Extension and modifications to the existing former OpenHydro warehouse. The development applied for is within Greenore Port's landholding within the curtilage also exists the watertower, lighthouse and lighthouse keeper's cottage which are all included in the Louth Record of Protected Structures Ref. LH009-01, LH009-043, LH009-044 respectively	Permission	Conditional Upheld on Appeal	18/07/2020
LCC 2360119	Retention of as constructed dwellinghouse previously granted planning permission under planning Ref. No. 97/866 and all associated site development works	Retention	Conditional	14/07/2023
LCC 23234	Retention permission for (a) a domestic store; (b) a domestic outbuilding comprising of a games room, gym and home office and (c) associated site development works	Retention	Conditional	12/01/2024
LCC 2385	Retention permission for extensions and alterations to the existing dwelling, attached	Retention	Conditional	21/07/2023

	domestic garage and associated site development works			
LCC 231	Permission for the following: (1) demolition of a single storey extension and outbuilding to the rear of the existing house; (2) alterations to the rear of the existing house; (3) construction of a one storey extension to the rear of the existing house	Permission	Conditional	24/02/2023
LCC 22614	Permission for elevational changes and alterations to existing dwelling house and all associated site works	Permission	Conditional	04/11/2022
LCC 211439	Retention permission for a single storey extension to the side and rear of the dwelling	Retention	Conditional	11/03/2022
LCC 211331	Permission for a single storey extension to the rear of the dwelling and all associated site works. The existing building is a Protected Structure in the Louth County Council Development Plan Ref. No. LHS009-036B, NIAH Ref. 13831027	Permission	Conditional	17/12/2021
LCC 211223	Retention permission for development that consists of an extension to the rear of dwelling. This building is listed as a protected structure under the Louth County Development Plan 2015-2021 Ref No LHs 009-004	Retention	Conditional	10/11/2021
LCC 19754	Permission for extension to side of existing dwelling house, upgrading of existing effluent treatment system on site and all associated site development works. *Significant Further Information submitted 01/07/20*	Permission	Conditional	28/07/2020
LCC 19727	Permission for one dwelling house, effluent treatment system and all associated site development works.*Significant Further Information submitted 17/6/20*	Permission	Conditional	14/07/2020
LCC 19202	Permission for a one storey extension to rear of the existing dwelling, a protected structure (ID: LHS009-016, NIAH No. 13831014), alterations to the existing layout and associated site works. *Significant Further Information submitted 22/05/2019*	Permission	Conditional	18/06/2019
LCC 18718	The development will consist of (1) Retention of an existing dwelling house, domestic garage and associated site development works and (2) Permission for alterations to an existing dwelling house and part conversion of roof space to habitable accommodation.	Retention	Conditional	19/01/2019
LCC 23218	Permission for extension and alterations to the ground and first floor level of an existing dwelling house, a new waste water treatment system and associated site development works **Significant further information received on 26.9.23**	Permission	Conditional	13/10/2023
LCC 21572	Permission for development that will consist of the construction of a two storey dwelling house, a single storey domestic garage, septic	Permission	Conditional	21/12/2021

	tank with percolation area, use of existing entrance onto public road and all associated site development works. *FI received on 06/12/2021*			
LCC 21732	Permission for a dwelling house, domestic garage, waste water treatment system and associated site development works *Significant Further Information submitted 04/11/21 which includes a revised house design*	Permission	Conditional	24/11/2021
LCC 2360256	Permission for extensions and modifications to existing dwelling house at 15 Euston Street, Greenore, Co. Louth. Permission to include for all associated and ancillary site development works. The existing dwelling house is a Protected Structure, Ref; LHS 009-020, and located within the Greenore Architectural Conservation Area	Permission	Conditional	15/09/2023
LCC 23254	Permission for alterations and extension to existing precision engineering workshop and all associated site works	Permission	Conditional	01/09/2023
LCC 23125	Permission for the change of use of existing building from commercial/residential use to voluntary community workshop and all associated site development works	Permission	Conditional	18/08/2023
LCC 22274	Permission for the demolition of an existing **Coast Guard Lifeboat House** and the replacement of same with a new Lifeboat House to include communication aerials, floodlighting, flag poles and all associated site development works.	Permission	Conditional Under Appeal ABP-315830-23	19/01/2023
LCC 20362	Permission for development consisting of the installation of a grid connected photovoltaic panel system fitted to the roofs of existing warehouse buildings.	Permission	Conditional	21/07/2020
LCC 2360352	Retention and completion of a partially constructed single storey extension permitted under P.A. Ref. No. 17/282 to the existing production building. The existing production building was permitted under P.A. Ref. 93/ 84 and has operated from the site for nearly 30 years. Permission is also sought to retain and complete c. 25 sq.m of additional production floorspace to the southwest of the partially constructed extension. The retention and completion of the extension and additional floor area will facilitate the internalisation of part of the production process	Retention	Conditional Under Appeal ABP-318516-23	
LCC 16852	Permission for development of a managed step down housing community with support facilities. The proposed development will consist of 30 no managed residential units, and associated ancillary facilities designed specifically for older residents. The proposed development is comprised of 9 no single storey 1-bed studio units, 3 no single storey 1-	Permission	Conditional	24/03/2017

	bed units, 11 no 1-bed apartments all with own door access over 2 storeys, 7 no 2-bed units and a 2 storey community and administration facility as well as associated site works (roads, drainage, street lighting, hard & soft landscaping, utility building & services)			
LCC 21728	EXTENSION OF DURATION OF 16/852 - Permission for development of a managed step down housing community with support facilities. The proposed development will consist of 30 no managed residential units, and associated ancillary facilities designed specifically for older residents. The proposed development is comprised of 9 no single storey 1-bed studio units, 3 no single storey 1-bed units, 11 no 1-bed apartments all with own door access over 2 storeys, 7 no 2-bed units and a 2 storey community and administration facility as well as associated site works (roads, drainage, street lighting, hard & soft landscaping, utility building & services)	Extension of Duration	Conditional	09/07/2021
LA07/2016 /1273/F	Demolition of existing dwelling and erection of 3 No. detached dwellings		Granted	16/08/2017
LA07/2022 /1234/F	Renewal of planning approval granted under LA07/2016/1273/F for the demolition of existing dwelling and erection of 3 no. detached dwellings		Granted	22/03/2023

10.10.5.1 Demolition Phase

The potential residual effects on the hydrogeological and hydrological environment surrounding the development are expected to be minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works. As a result, there will be minimal impact on the hydrogeological and hydrological environment, and no significant effects on the composition, stability, or fertility of the land are anticipated. The absence of excavation works also means that there will be no disturbance to the natural soil structure, thus preventing potential soil erosion or compaction and increased run-off rates.

Overall, the surface-level demolition works will have a negligible impact on the hydrogeological and hydrological environment, preserving their integrity and minimizing any potential environmental consequences.

The implementation of mitigation measures outlined in Section 10.9.2 will ensure the residual effect on the hydrogeological and hydrological environment during the demolition phase is likely to be **short-term, Imperceptible and negative.**

10.10.5.2 Construction Phase

In relation to the potential cumulative impact on hydrology during the construction phases, the construction works which would have potential cumulative impacts are as follows:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to receiving surface and ground waterbodies.
- Stockpiled material will be stored on away from surface water drains, and gullies will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage system.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials is possible unless project-specific measures are put in place for each development and complied with.

The works contractors for other planned or permitted developments as set out in Chapter 1 of this EIA Report will be obliged to ensure that measures are in place to protect groundwater and surface water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019).

A review of the permitted development set out in Chapter 2 – Development Description of this EIA Report has been undertaken and there are no proposed developments capable of combining with the proposed development and resulting in significant cumulative effects. The implementation of mitigation measures detailed in Section 10.9.3 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change in groundwater and surface water during the construction phase of the proposed development.

The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***short-term***.

10.10.5.3 Operational Phase

In relation to the potential cumulative impact on hydrogeology and hydrology during the operational phases, the operational activities which would have potential cumulative impacts are as follows:

- Discharge of surface water to Carlingford Lough and Dundalk groundwater body.
- Increased risk of accidental discharge of hydrocarbons from car parking areas, and along roads is possible unless diverted to surface water system with oil separator.
- Additional foul discharges to be discharge to the foul sewer system.

The port has an existing foul water drainage network in place comprising of a foul collection tank and foul lines servicing buildings in the port. The port also has an existing stormwater drainage network in place. This serves as a drainage network for both yard surface water and roof water from buildings. The system drains via gravity to a bypass separator and discharges via one existing outfall into Carlingford Lough. The proposed surface water drainage is designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), Water Services Guidelines for Planning Authorities (Draft – 2018) and The SuDS Manual (CIRIA, 2015).

The surface water and foul drainage infrastructure and water supply requirements for the proposed development have been designed to accommodate the proposed development.

Each permitted development is required by the Local Authority and IW to comply with the Local Authority and IW requirements by providing suitable attenuation on-site and ensure that there is no increase in off-site flooding as a result of the development in question.

All developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (Water Framework Directive and associated legislation) such that they would be required to manage run-off and fuel leakages.

The implementation of mitigation measures detailed in Section 10.9.4 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change in surface water during the operational phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be ***neutral, imperceptible*** and ***long-term***.

10.11 Risk of Major Accidents or Disasters

The EPA Guidelines, 2022, state that:

> *"To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other legislation e.g. a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.*
>
> *The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required."*

In general, risk of landslides in Ireland is considered to be low, as the country is not located in a region with high seismic activity or large mountain ranges. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The landslide susceptibility map (GSI spatial map viewer) identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers the location of landslides and what causes them (slope, soil type and the impact of the flow of water). Based on the GSI spatial map viewer, the proposed development site is not in an area susceptible to landslides, with a GSI Landslide Susceptibility Classification of "*Low*". This is consistent with the topography and the geology across the site.

The nearest landslide was c.16.5km to the north-west of the proposed development, referred to as the Drumad2013 (Event ID: GSI_LS13-0005) which occurred on March 22nd 2013. There have been no recorded landslide events at Greenore Port or in the vicinity.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies, has been recording seismic events in Ireland since 1978 (www.dias.ie). This network consists of several seismometers that are located throughout Ireland. Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity. However, earthquakes can still occur in Ireland, although they are typically small and have little impact. There is a very low risk of seismic activity to the proposed development site.

The most recent earthquake was in the Irish Sea (0.9 Magnitude) on the September 30th 2023 c. 130km to the south-east of the proposed development. There are no active volcanoes in Ireland so there is no risk from volcanic activity.

10.12 Worst Case Scenario

In a worst-case scenario, if the mitigation measures outlined in Section 10.9 aren't fully followed, there's a chance of contamination and pollution during the demolition, construction, and operational phases of the proposed development to occur. This could happen through accidental spills and leaks, increased run-off, sediment loading, excavation and maintenance works.

The mitigation measures set out in Section 10.9 above are in place to prevent any negative impacts on the hydrogeological and hydrological environment. This will help minimize the likelihood of these issues occurring and protect the surrounding environment.

10.13 Interactions

This section discusses interactions between this Chapter and other specialist environmental topics considered in this EIAR.

10.13.1 Land and Soils

10.13.1.1 Demolition Phase

The likelihood of significant effects on hydrogeology and hydrology at the proposed development during the demolition phase is minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works.

As a result, no significant effects on the land's composition, stability, or fertility are anticipated. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction.

As well as the mitigation measures outlined in this section, the development should adhere to the mitigation measures set out in Section 9.9.2 of the EIAR .

Full adherence to the RWMP presented in Appendix 8.1 and Chapter 8 – Material Assets Waste of the EIAR.

10.13.1.2 Construction Phase

The construction phase of the proposed development has the potential to result in increased sediment runoff which has the potential to interact on surface water quality. The proposed construction phase mitigation outlined in Section 10.9.3, means that the proposed development will not result in significant negative impact on surface water quality in the local area.

Taking into account the design and mitigation measures set out in Chapter 9 (Land and Soils) and 10 (Water and Hydrology) of this EIA Report, means that the proposed development will not result in significant negative impact on the hydrogeology and hydrology in the local area. The interaction is considered to be ***neutral***, ***Imperceptible***, and ***short term***.

10.13.1.3 Operational Phase

Taking into account the design and mitigation measures set out in Chapter 9 (Land and Soils) and 10 (Water and Hydrology) of this EIA Report there are no potentially significant interactions identified between Land, Soils and, Hydrogeology and Hydrology during the operational phase.

10.13.2 Biodiversity

10.13.2.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities on predominately existing buildings and infrastructure and do not involve any excavation works. As a result, the impact on biodiversity is minimal.

Overall, the surface-level demolition works will benefit the local biodiversity, preserving their integrity and minimizing any potential environmental consequences. The interaction is considered to be **short-term, *Imperceptible* and neutral.**

10.13.2.2 Construction Phase

Dust emissions have the potential to settle on plants causing impacts to local ecology. Mitigation measures during the construction phase of the proposed development will ensure that dust generation is minimised y.

There is potential for impacts to biodiversity associated with uncontrolled discharges to surface water (Carlingford Lough). In this instance the existing surface water system discharges into Carlingford Lough. Therefore there is a direct hydrological connection to Carlingford Lough and the Natura 200 sites located therein (Carlingford Shore SAC & Carlingford Lough SPA). However the risk is considered negligible due to the mitigation measures outlined in Section 10.9 and the hydrological volume of the surface waterbody. The foul water collection tank on site services the existing and proposed development and is a Uisce Éireann asset and is emptied with a tanker periodically and sent to Dundalk Wastewater Treatment Plant (WWTP). The use of standard construction control measures as provided in the Outline CEMP and the sustainable urban drainage systems.

Taking into account the design and mitigation measures set out in Chapter 10 (Water and Hydrology), and Chapter 11 (Biodiversity) of this EIA Report, the interaction between Water and Hydrology, and Biodiversity is considered to be ***neutral, not significant***, and ***short term***.

10.13.2.3 Operational Phase

There is potential for impacts to biodiversity associated with uncontrolled discharges to surface water (Carlingford Lough). In this instance the existing and proposed surface water system discharges into Carlingford Lough for the O&M Facility Site and is proposed to discharge to ground for the Shore Road Car Park. Therefore there is a direct hydrological connection to Carlingford Lough and the Natura 200 sites located therein (Carlingford Shore SAC & Carlingford Lough SPA). However the risk is considered negligible due to the mitigation measures outlined in Section 10.9.4 and the hydrological volume of the surface waterbody. The foul water collection tank on site services the existing and proposed development and is a Uisce Éireann asset and is emptied with a tanker periodically and sent to Dundalk Wastewater Treatment Plant (WWTP).

Taking into account the design and mitigation measures set out in Section 10.9.3 of this EIA Report, the interaction between Hydrogeology and Hydrology, and Biodiversity during the operational phase is considered to be ***long-term***, ***imperceptible*** and ***neutral.***

10.13.3 Air Quality

10.13.3.1 Demolition Phase

Demolition phase activities such as demolition of existing infrastructure and stockpiling of materials etc. have the potential for interactions between air quality and water and hydrology in the form of dust emissions that may deposit in surface waters.

Mitigation measures implemented during the demolition phase outlined in Section 10.9.2 will ensure that the deposition of dust is minimised. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and, water and hydrology. The interaction is considered to be ***negative, not significant,*** and ***short term***.

There are no interactions identified between Water and Hydrology, and Climate during the demolition phase.

10.13.3.2 Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and water and hydrology in the form of dust emissions that may deposit in surface waters.

Mitigation measures implemented during the construction phase will ensure that the deposition of dust is minimised. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and, water and hydrology. The interaction is considered to be ***negative, not significant,*** and ***short term***.

There are no potentially significant interactions identified between Water and Hydrology, and Climate during the construction phase.

10.13.3.3 Operational Phase

There are no potentially significant interactions identified between Water and Hydrology, and Air Quality during the construction phase.

10.13.4 Climate

10.13.4.1 Demolition Phase

There are no interactions identified between Water and Hydrology, and Climate during the demolition phase.

10.13.4.2 Construction Phase

There are no interactions identified between Water and Hydrology, and Climate during the construction phase.

10.13.4.3 Operational Phase

Climate change has the potential to lead to increased rainfall in future years which may result in flood impacts and interactions between Hydrogeology and Hydrology, and Land, Soils and Geology.

A Site Specific Flood Risk Assessment (SSFRA) has been carried out by McCarthy Browne and accompanies this planning application under separate cover. This SSFRA confirms the location of the proposed development is predominantly within Flood Zone C (i.e., where the probability of flooding from rivers and coastal is less than 0.1% or 1 in 1000 years – probability of fluvial flooding is low risk).

The final design for Buildings A, B and C has a finished floor level of no lower than 5.05m OD which is a safe freeboard above the water level estimated for Flood Zone C. Therefore, any flood events will not cause flooding of the proposed buildings.

The site does not act as a flood storage zone and the proposed development will not add any new hardstanding areas within the port. The Shore Road carpark area will be constructed with permeable paving. On this basis, it can be stated that the development will not affect the flood storage volume or increase flood risk elsewhere.

Therefore, it can be determined that there is no significant risk to the proposed development as a result of increased rainfall and climate. No significant interactions between Climate, Hydrology and Hydrogeology, and Land, Soils and Geology is predicted.

10.13.5 Material Assets: Built Services

10.13.5.1 Demolition Phase

There are no interactions identified between Hydrogeology, Hydrology and Material Assets during the demolition phase of the proposed development.

10.13.5.2 Construction Phase

There are no interactions identified between Hydrogeology, Hydrology and Material Assets during the construction phase of the proposed development.

10.13.5.3 Operational Phase

The use of SuDS during operations will mean that the development will result in neutral water impacts in the operational phase with regard to runoff rates and flooding risk. As a part of the SuDS features, it is anticipated that small amounts of hydrocarbon sludge waste and debris may be generated in the hydrocarbon interceptors which will treat the surface water run-off.

The foul water collection tank on site services the existing and proposed development and is a Uisce Éireann asset and is emptied with a tanker periodically and sent to Dundalk Wastewater Treatment Plant (WWTP).

This waste will be managed in accordance with the relevant legislation identified in Chapter –7 Material Assets: Built Services. The interaction is considered to be ***negative, not significant,*** and ***long-term***.

10.14 Monitoring

10.14.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no potential for increasing the groundwater vulnerability to contamination in case of accidental spills or discharges.

In addition, all waste materials will be dealt with in accordance with regional and national legislation, time and resources will be dedicated to ensuring efficient waste management practices and waste arisings will be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. Hence, eliminating the risk of contaminated runoff to surface or groundwater.

10.14.2 Construction Phase

During construction phase the following monitoring measures will be considered:

- Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all storage is located at least 20 m from surface water receptors.
- Regular inspection of surface water run-off and sediments controls will be implemented throughout the construction phase and full adherence to the Outline Construction Environmental Plan will be maintained.
- Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life.
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off; and
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc).
- Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network.

10.14.3 Operational Phase

Oil separators will be maintained and cleaned out in accordance with the manufacturer's instructions.

Maintenance of the surface water drainage system and foul sewers is recommended to minimise any accidental discharges to surface water.

10.15 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 10.9 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Accidental Spills, Leaks and Discharges	Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt fences. Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life. Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network. Full adherence to and implementation of the CEMP.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the construction phase of the proposed development.
Soil Erosion & Compaction	Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt fences. Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life. Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc).	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the construction phase of the proposed development.

Likely Significant Effect	Mitigation	Monitoring
	Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network. Full adherence to and implementation of the CEMP.	
Increased Sediment Run Off carrying Sediment and Pollutants	Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt fences. Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life. Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network. Full adherence to and implementation of the CEMP.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the construction phase of the proposed development.
Surface Water and Groundwater Contamination from Construction Waste, Materials & Chemicals	Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt fences. Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life. Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off. Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network. Full adherence to and implementation of the CEMP.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the construction phase of the proposed development.

The following Table summarises the Operational Phase mitigation and monitoring measures.

Table 10.10 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Accidental Spills, Leaks and Discharges	Implementation of a number of Sustainable Urban Drainage Systems (SuDS) measures such as permeable paving/ grasscrete, filter drains and attenuation systems. Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt fences. Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life. Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network. Full adherence to and implementation of the CEMP.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the operational phase of the proposed development.
Surface Water discharge to Surface and Ground Waterbodies carrying Potential Contaminants / Pollutants	Implementation of a number of Sustainable Urban Drainage Systems (SuDS) measures such as permeable paving/ grasscrete, filter drains and attenuation systems. Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt fences. Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life. Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network. Full adherence to and implementation of the CEMP.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the operational phase of the proposed development.
Future Maintenance Works on Underground Services and Infrastructure involving Excavations exposing bedrock aquifer beneath the site introducing a pathway for contaminants to enter Dundalk GWB	Implementation of a number of Sustainable Urban Drainage Systems (SuDS) measures such as permeable paving/ grasscrete, filter drains and attenuation systems.	Continuous implementation of the mitigation measures outlined in the EIAR in accordance with best practice guidelines throughout the course of the operational phase of the proposed development.

Likely Significant Effect	Mitigation	Monitoring
	Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt fences. Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life. Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network. Full adherence to and implementation of the CEMP.	

10.16 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the proposed development on the Hydrogeological and hydrological environment (Water & Hydrology). These effects have been considered for the demolition, construction and operational phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures set out in this chapter are adhered to in full throughout all phases, the overall predicted impact of the proposed development is **long-term, imperceptible** and **neutral**.

10.17 References and Sources

- CIRIA (2001). Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.
- CIRIA (2005). Environmental Good Practice on Site (C650).
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- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (CIRIA 532, 2001).
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

CHAPTER 11
BIODIVERSITY

VOLUME II
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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11 Biodiversity

11.1 Introduction

This chapter of the EIAR identifies, describes, and assesses the likely significant effects of the proposed Operations and Maintenance Facilities (OMF) at Greenore Port, hereafter 'the Proposed Development', on biodiversity (terrestrial, marine, and ornithology). Potential impacts during the demolition, construction, and operational phases are established.

This assessment should be read together with the Appendices contained in Volume III of this EIAR.

The proposed 4.88-hectare development site is distributed over several plots, and for ease of reference, they are described as follows:-

1. 'Terrestrial Port Area' which includes a port commodity warehouse (former Open Hydro building), hardstanding areas, a remnant wall associated with the pre-existing 'engine room', and a communications mast.
2. 'Nearshore Environment' encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
3. 'Residential Site' a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
4. 'Port Office Entrance' encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

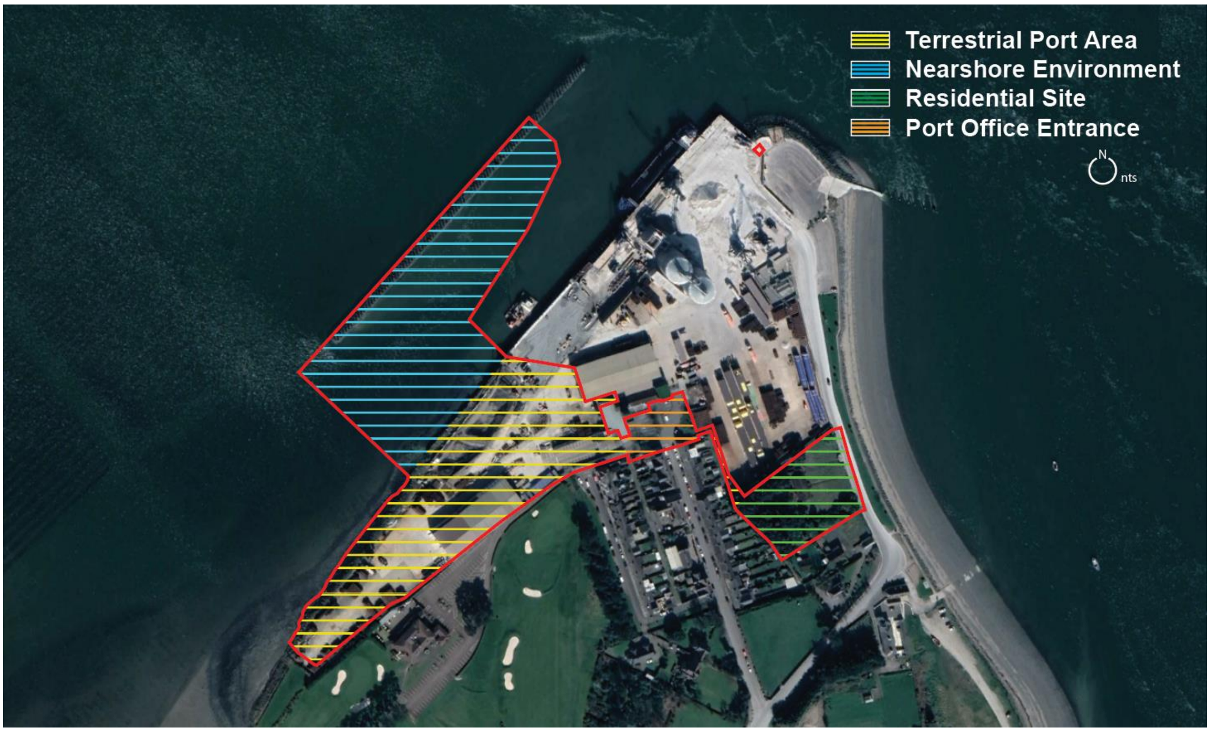

Figure 11-1 Proposed Development Area

This chapter is informed by a suite of supporting surveys and studies appended to this EIAR and presented in Volume III. The following is a list of the Appendices.

- Appendix 11.1 Terrestrial Habitat Survey: Martin B.
- Appendix 11.2 Overwintering Bird Survey 2022-2023: Martin B.
- Appendix 11.3 Overwintering Bird Survey 2023-2024: Martin B.
- Appendix 11.4 Breeding Bird Survey 2023: Martin B.
- Appendix 11.5 Terrestrial Mammal Survey: Martin B.
- Appendix 11.6 Bat Fauna Impact Assessment: Deegan B.
- Appendix 11.7 Seal Survey Carlingford Lough 2023: Martin B.
- Appendix 11.8 Visual Surveys for Marine Mammals at the Proposed Windfarm Site at Oriel: Berrow S. & O'Brien J.
- Appendix 11.9 Static Acoustic Monitoring (SAM) at the Proposed Windfarm Site at Oriel: Berrow S., O'Brien J. & Pommier M.
- Appendix 11.10 Benthic Sampling Data

11.2 Expertise & Qualifications

The ornithology & terrestrial ecology section of this chapter has been prepared by Breffni Martin of Regintel. Breffni Martin holds a BSc in Biology awarded by University College Dublin (UCD) in 1983 and has been involved in bird and wildlife conservation in County Louth for more than 20 years.

He has studied Carlingford Lough and Dundalk Bay for the last 15 years completing over 400 hours of focal observations on oystercatchers as part of an appropriate assessment of a cockle fishery in Dundalk bay (2014-17), as well as over 700 hours observations on birds in Carlingford Lough (2010-11) in a study which informed the designation of the outer part of the Lough. He also completed over 60 boat-based surveys and hundreds of hours of marine mammal observer (MMO) work in the Lough, including for the development of Berth 2 at Greenore Port.

Breffni is a board member of Birdwatch Ireland and director and acting manager of the Louth Nature Trust, an environmental NGO.

He has undertaken over 50 environmental assessments, particularly in relation to coastal and estuarine habitats and has authored many papers in this area. He has undertaken the Irish Wetland Birds Survey on the north Louth shore since 2005, as well as several specialist studies (e.g. on oystercatchers, little terns, seals) and founded and chaired the Louth branch of Birdwatch Ireland and served as a director on the board of Birdwatch Ireland 2017-2021. He also founded the Louth Nature Trust, of which he is also a trustee and manager. Breffni prepared ecological reports to accompany other proposed developments at Greenore Port in the recent past, including the redevelopment of Berth 2 and warehousing for the storage of port commodities.

The marine mammal section was prepared by Dr Simon Berrow, who has been working in the field of marine mammal research for over 25 years. He established the Irish Whale and Dolphin Group in 1991 and remains Chief Executive Officer and Consultancy Manager. Simon is also a Lecturer at the Galway-Mayo Institute of Technology contributing to the Applied Freshwater and Marine Biology Honours Degree and Masters programmes as well as supervising PhD students. He has been carrying out environmental consultancy since 1991 and has managed a number of large projects to completion, including the recently lodged application for the Oriel Offshore Windfarm. He has recently delivered a major three-year project for the Marine Institute under SeaChange and was PI on the ObSERVE-Acoustic project for the Department of Communications, Climate Action and Energy. He has in-depth knowledge of the distribution and ecology of marine mammals in Irish waters and the impacts that affect their distribution.

The benthic section of this chapter of the EIAR has been prepared by Dr Louise Scally of MERC Consultants Ltd. Louise Scally holds an M.Sc. and Ph.D. in ecology from Trinity College Dublin and is a full member of the Chartered institute of Ecology and Environmental Management (CIEEM). She has carried out benthic assessments for a range of marine developments in Ireland and been involved in the preparation of the benthic assessment of EIARs for the following projects:

- Atlantic Marine Energy Test Site (AMETS) 2010: Benthic site investigations and EIAR. Client: ESB.
- Atlantic Marine Energy Test Site (AMETS) 2023: Benthic site investigations and EIAR. Client: Sustainable Energy Authority of Ireland (SEAI).

11.3 Proposed Development

Chapter 2 of this EIAR describes the proposed development in full. The following is a summary of the proposed works.

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking, etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and an upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. If rock is encountered (estimate max of 1,000m^3) it will be reused on site.

Adjacent to the buildings, 76 parking spaces are allocated, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 operations.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the Shore Road carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to a new pedestrian route from the new Shore Road carpark and hard and soft landscaping. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine shed wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank, waste management areas, etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

11.4 Methodology

This chapter has been prepared in line with the European Union Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment and Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive).

Regard was had to the following Guidelines.

- Guidance on the preparation of the environmental impact assessment report (Directive 2011/92/EU as amended by 2014/52/EU) (European Union 2017).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR). EPA, 2022.
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater Coastal and Marine. CIEEM, 2019.
- Guidance on Marine Baseline Ecological Assessments and Monitoring Activities for Offshore Renewable Energy Projects Part 1 (DCCAE, 2018)
- Guidance on Marine Baseline Ecological Assessments and Monitoring Activities for Offshore Renewable Energy Projects Part 2 (DCCAE, 2018)
- Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR, 2008).
- Local biodiversity action plan for County Louth 2021-2026. Louth County Council, 2021.
- National Marine Planning Framework. Prepared by the Department of Housing, Local Government and Heritage gov.ie/housing.
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment', (Department of the Environment, Community and Local Government, March 2013).

11.4.1 Field Surveys

Field surveys were carried out as outlined in the following Table.

Table 11.1 Overview of Field Surveys

Survey Type	Period
Terrestrial habitat survey (inc. invasive species)	June, July, August, September 2023 April and May 2024
Winter bird surveys	October 2022 - March 2023 October 2023 – March 2024
Bat surveys	June and August 2023, May 2024
Summer breeding bird surveys	June and July 2023
Otter, Badger, Amphibian, Reptiles & Invertebrates	June and July 2023
Benthic surveys	August and September 2023
Marine Mammals in Carlingford Lough	June and August 2023

11.4.2 Assessment of Zone of Influence (ZoI)

The zone of influence (ZoI) of a project is the area over which ecological features may be affected by biophysical changes caused by the proposed project. Within the ZoI, those receptors sensitive to change must be identified and considered.

To define a project's ZoI, the potential for project-related effects on sensitive receptors must first be established. For this purpose, a Source-Path-Receptor (SPR) model was applied. The SPR model is a well-established model frequently used to analyse project-related impacts on ecosystems, and we have applied it to the assessment of the proposed project.

Using this approach, all elements of the proposed project were reviewed to assess potential pathways and receptors that might be affected to establish a tailored ZoI. This process involved the following steps:

- The identification of sources of potential impacts and their pathways from the proposed development site to sensitive receptors.
- Consideration of sensitive receptors and their dependent ecosystems.
- Identifying and characterising project related impacts and their likely effects, direct, indirect and cumulative on the identified sensitive receptors.

Once the ZoI was established, the following steps were taken to assess the potential for likely significant effects on sensitive receptors:

1. The scale and scope of the project was examined.

2. A desk review of the available literature describing the habitats and species known to occur at the proposed development site and surrounding area was undertaken.
3. Any project related activities likely to affect migratory or highly mobile species was considered.
4. Any use of the proposed development site by mobile species that make regular movements to, from, or across the site was assessed.
5. An assessment was carried out of the key ecological processes and species activity periods, including seasonal variations in distribution, abundance, and activity.

11.4.3 Biodiversity Surveys

11.4.3.1 Terrestrial Habitat

The terrestrial section of the proposed development area was surveyed during daylight hours in June, July, August, and September 2023 and April and May 2024.

Habitat Survey & Protected Flora

A literature survey was undertaken, reviewing OSI maps, other plans, and any published information regarding the port's development.

The surveys consisted of several walkovers of the onshore proposed development site and adjoining lands during daylight hours. During the walkovers all flora species were recorded along with their abundance and setting. Identifications were confirmed using Webbs Flora (Webb, 1969) where required. The substrate was also assessed and classified using Fossitt's Guide (Fossitt, 1995).

Invasive Species

Searches of the NBDC[1] for invasive species was carried out for any documented records of non-native plants listed in the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015).
The proposed development site was surveyed for invasive species concurrent with the habitat surveys.

Terrestrial Mammals

Bat Survey

Two bat assessments (emergent survey and building inspection) were undertaken across the proposed development site, one on the 3rd of August 2023, and the other on the 22nd of May 2024 within the active bat period (March – October).

As outlined in Marnell et al. 2022 'The presence of a large maternity roost can normally be determined on a single visit at any time of year, provided that the entire structure is accessible and that any signs of bats have not been removed by others. However, most roosts are less obvious. A visit during the summer or autumn has the advantage that bats may be seen or heard. Buildings (which, for this definition, exclude cellars and other underground structures) are rarely used for hibernation alone, so droppings deposited by active bats provide the best clues. Roosts of species which habitually enter roof voids are probably the easiest to detect as the droppings will normally be readily visible. Roosts

[1] https://maps.biodiversityireland.ie/Map

of crevice-dwelling species may require careful searching and, in some situations, the opening up of otherwise inaccessible areas. If this is not possible, best judgement might have to be used and a precautionary approach adopted. Roosts used by a small number of bats, as opposed to large maternity sites, can be particularly difficult to detect and may require extensive searching backed up by bat detector surveys (including static detectors) or emergence counts.' In relation to the factors influencing survey results the guidelines outlines the following 'During the winter, bats will move around to find sites that present the optimum environmental conditions for their age, sex and bodyweight and some species will only be found in underground sites when the weather is particularly cold. During the summer, bats may be reluctant to leave their roost during heavy rain or when the temperature is unseasonably low, so exit counts should record the conditions under which they were made. Similarly, there may be times when females with young do not emerge at all or emerge only briefly and return while other bats are still emerging thus confusing the count. Within roosts, bats will move around according to the temperature and may or may not be visible on any particular visit. Bats also react to disturbance, so a survey the day after a disturbance event, may give a misleading picture of roost usage.

The survey involved the methodologies outlined in Collins (2016), which included the roost inspection methodologies, i.e., the external methodology outlined in section 5.2.4.1 and the internal survey outlined in section 5.2.4.2 of the guidelines. In addition, the methodologies for presence-absence surveys (Section 7) were carried out for dusk emergent surveys.

As outlined in Collins (2016) 'The bat active period is generally considered to be between April and October inclusive (although the season is likely to be shorter in northern latitudes). However, because bats wake up during mild conditions, bat activity can also be recorded during winter.

Otter & Badger Surveys

Several otter (*Lutra lutra*) and badger *(Meles meles)* surveys were undertaken in June and July 2023.

The otter survey followed the methodology outlined in the National Otter Survey of Ireland (Reid, 2013), which involved covering all the coastline within 1km of the proposed development site and following all the riparian corridors into the hinterland to the same distance. All evidence of otter presence was recorded including prey remains, spraints, footprints, slides, paths, couches, and footprints. Any evidence of holts was also noted. The overall favourability of the sites was also assessed in terms of disturbance, threats (e.g. from crossing roads, loose dogs) and habitat features.

The badger survey recorded any signs of badger activity, including the presence of setts, foraging evidence, access runs, tracks and prints. The surveys adhered to the guidance as set out in *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Roads Schemes* (NRA 2009) and *Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes* (NRA 2006).

A detailed literature survey was also undertaken.

Other Protected Mammals

Concurrent with the habitat survey and otter and badger surveys, the proposed development site and immediately adjacent areas were surveyed for evidence of field signs (prints, hairs, etc) and suitable habitats for other protected terrestrial mammal species including hedgehog, pygmy shrew, pine marten, Irish Stoat, red squirrel, Irish hare and red deer.

Amphibians, Reptiles, and Invertebrates

Based on the existing condition of the site, a largely working port area, and Martin's knowledge of the proposed development site, amphibians, reptiles and terrestrial invertebrates were scoped out from requiring surveying as no significant habitats are present within the development site that would support significant populations.

11.4.3.2 Marine Mammal Assessment

Seal Survey

A preliminary survey (Wilson, 2012) was undertaken by Tara Seal Research over the years 2008 to 2011 assessing abundance of harbour and grey seals, and harbour seal productivity. Prior to the 2008-2011 survey, surveys were undertaken by both NPWS (south of a notional border separating the north and south of the Lough) and NIEA (north of that border). Follow-up surveys on foot of a Car Ferry development were made in 2015 and 2017 (Martin, 2015 - 17). A thermal imaging survey was also carried out in 2018 (Morris, 2018).

A dedicated marine mammal survey was carried out between June 2019 and May 2020 in the site of a planned offshore windfarm, 'Oriel'[2], immediately to the south of the entrance to Carlingford Lough. Boat-based visual surveys (over 12 days) were carried out over seven months, when sea conditions were suitable, according to a standardised design. The report, *Visual Surveys for Marine Mammals at the Proposed Windfarm Site at Oriel*, prepared by IWDG Consulting, is included as an Appendix.

11.4.3.3 Avifauna Assessment

Wintering Bird Survey

The Irish Wetland Bird Survey (I-WeBS) is the primary method of collecting data for wintering waterbird populations at Irish wetland sites. These data, largely collected by volunteer field surveyors since the winter season of 1994/95, have underpinned the designation of Special Protection Areas (SPAs), and have enabled the production of waterbird population estimates and trends at national and at site level (e.g. Crowe & Holt, 2013; Burke et al., 2019; Lewis et al., 2019). I-WeBS surveys are undertaken primarily on a rising or high tide, when birds are pushed closer to shore or are gathering at roost sites and are therefore easier to count than when widely distributed across exposed tidal flats.

However, I-WeBS surveys are designed to obtain the most accurate peak counts of waterbirds at a site. However, they cannot provide information about waterbird abundance or distribution during the low tide period, when many waterbirds are feeding. This gap in knowledge was addressed somewhat in 2009/10, when the National Parks and Wildlife Service (NPWS) initiated a programme of low tide surveys which took place over the three winter seasons of 2009/10, 2010/11 and 2011/12 at 32 coastal SPAs (The NPWS Waterbird Survey Programme). Due to the cross-border nature of Carlingford Lough SPA, it was not surveyed as part of the NPWS Waterbird Survey Programme. However, comparable counts were undertaken in 2010-11 (by Martin (2011), described in NPWS (2013).

[2] Oriel application was lodged with An Bord Pleanála on the 24th of May 2024.

European Designated Sites supporting information was accessed from the NPWS website.

Field Surveys were undertaken by Martin from October 2022 to March 2023 and October 2023 – March 2024 in an area of 200 metres around the proposed development site over four hours on high and low tides, covering both spring and neap, so that all tidal states were covered.

The 200-metre boundary is based on Cutts methodology for assessing bird disturbance (Cutts, 2013). The area was divided into two zones, Zone 1 being inside Carlingford Lough SPA and Zone 2 outside of it, see Figure 11-2.

Before the start of the bird survey, the 200-metre area was surveyed by walking over. Subsequently, all birds within this area were counted, and approximate distribution was mapped. Birds using the existing breakwater (part of Zone 2) were separately counted. The total number of species recorded during the surveys was subsequently compared to the Irish Wetland Bird Survey's (IWeBS) most recent maximum counts.

During the 2023to 24 season, several additional surveys were undertaken, specifically:

- Two-night surveys.
- Targeted visits surveying extreme tidal or weather events.
- A focal behavioural study recording the behaviour of waterbirds using the ZoI (100 observations)

Figure 11-2 Bird Survey Zones

Breeding Bird Survey

A breeding bird survey of terrestrial birds and waterbirds was carried out in June and July 2023 following the *Countryside Bird Survey (CBS): Status and trends of Common and Widespread Breeding Birds 1998-2016* to assess likely breeding behaviour.

The CBS is based on a random approach stratified by region coordinated by Birdwatch Ireland. The field methodology closely follows that of *Risely et al*., 2010. This involved following transects over the development site early in the morning and recording all species and their behaviour, specifically singing, display, gathering nesting material, provisioning of nests and the presence of juveniles.

The survey covered the port area of the subject site as well as likely habitats immediately adjacent to the port. Habitats in the wider environment such as the Greenore Golf Course, Green Island (Island in Carlingford Lough) and the Breakwater were also documented.

11.4.3.4 Benthic Ecology Sensitivity Assessment

To assess the potential for impacts on benthic habitats and species the MarESA sensitivity assessment was employed. This system involves a systematic process to examine the biology or ecology of a feature, compile the evidence of the effect of a given pressure on the feature (species or habitat) in question, assess the likely sensitivity of the feature to the pressure against standard scales, and to document the evidence used and justify assessments made (Tyler-Walters *et al*, 2018).

Using this system, sensitivity is determined by the capacity of the feature to remain unchanged under the influence of the pressure (its resistance), see Table 11-2, and if changed, the amount of time needed for a full recovery once the activity has stopped (its resilience), Table 11-3.

A feature that is easily damaged has low resistance and if it takes a long time to recover, also has low resilience. If a feature is not sensitive to the pressures associated with an activity, that activity is not incompatible with the conservation of that feature. If, however, there is a high degree of sensitivity of a feature to an activity in an area designated for it, management measures are needed to prevent damage by that activity to that feature. An overall sensitivity assessment matrix Table 11-4 can then be complied.

Table 11.2 Resistance assessment scale to a defined intensity of pressure (Tyler-Walters *et al.* 2018)

Resistance	Description
None	Key functional, structural, characterising species severely decline and/or the physiochemical parameters are also affected e.g. removal of habitats causing a change in habitat type. A severe decline/reduction relates to the loss of 75% of the extent, density or abundance of the selected species or habitat component e.g. loss of 75% substratum (Where this can be sensibly applied).
Low	Significant mortality of key and characterising species with some effects on the physical or chemical character of the habitat. Significant decline/reduction relates to the loss of 25-75% of the extent, density, or abundance of the selected species or habitat component e.g. loss of 25-75% of the substratum
Medium	Some mortality of the species without change to habitats. This loss relates to <25% of the species or habitat component
High	No significant effects on the physical or chemical character of the habitat and no effect on population viability of key/characterising species but may affect feeding, respiration and/or reproduction rates

Table 11.3 Resilience assessment scale of a feature (Tyler-Walters *et al.* 2018)

Resilience	Description
Very low	Negligible or prolonged recovery possible; at least 25 years to recover structure and function
Low	Full recovery within 10-25 years
Medium	Full recovery within 2-10 years
High	Full recovery within 2 years

Table 11.4 Overall sensitivity assessment matrix (Tyler-Walters *et al.* 2018)

	Resistance			
Resilience	None	Low	Medium	High
Very low	High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Low	High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Medium	Medium sensitivity	Medium sensitivity	Medium sensitivity	Low sensitivity
High	Medium sensitivity	Low sensitivity	Low sensitivity	Not Sensitive

Magnitude assessment method

Definitions used for the magnitude of potential Impacts on benthic (Subtidal and intertidal) ecology are shown in Table 11-5 and the effect of significance matrix used is given in Table 11-6.

Table 11.5 Magnitude assessment matrix

Magnitude	Definition
High	Complete change and/or loss of the baseline biotope with the potential to negatively impact the conservation status of the local ecosystem and with very low chance of recovery
Moderate	Change in the structure and function of the baseline biotope but which would be unlikely to negatively impact the conservation status of the local ecosystem.
Low	Minor or temporary change in the structure and function of the baseline biotope in a localised area
Negligible	No perceptible change to the characterising species of the baseline biotope or to its structure and function

Table 11.6 Effect of significance matrix used for benthic (subtidal and intertidal) ecology

Value/Sensitivity	Magnitude			
	High	Moderate	Low	Negligible
High	Major significant impact	Major significant impact	Moderate significant impact	Insignificant impact
Moderate	Major significant impact	Moderate significant impact	Minor significant impact	Insignificant impact
Low	Moderate significant impact	Minor significant impact	Insignificant impact	Insignificant impact
Negligible	Insignificant impact	Insignificant impact	Insignificant impact	Insignificant impact

Desk Study

To fully understand the receiving environment, relative to project related effects on benthic ecology, the literature consulted included:

- National Parks and Wildlife Service data sources for all European Sites within the ZoI of the proposed project. This included the individual site synopsis for each designated area, conservation objectives and their supporting documents and GIS layers (marine habitats, species and community mapping).
- The Northern Ireland Sublittoral Survey (1986)
- Sublittoral Survey of Northern Ireland (2008)
- Northern Ireland Broadscale Habitat Mapping (2004)
- Available benthic data (NPWS, Marine Institute and INFOMAR)
- Aquaculture licence areas (GIS mapping published by Department of Agriculture, Food and the Marine)

Subtidal Surveys

Seven (7) Subtidal sediments were collected within the area in August/September 2023 between the breakwater and the existing quay wall (the development footprint). Samples were collected using a 0.1m^2 Day grab. Following the removal of a sub-sample for particle size distribution and organic content analysis, the remaining sediment was sieved at 1mm mesh size and preserved for macrofaunal identification. Ancillary *in situ* environmental data including station positions, observations and associated imagery were gathered at each sampling location.

Intertidal Surveys

A walkover survey of the intertidal area east and west of the proposed development site at Greenore was undertaken on two separate occasions during August 2023. The second, main survey, was undertaken to coincide with a predicted tidal height of 0.4 meters so the entire shoreline could be covered.

Records were made of the characterising species present and their relative distribution across the site so that the primary biotopes present could be ascertained. Any impacts and activities at the site were also noted and recorded. GIS mapping of the *Zostera noltei* beds present within the area to the west of Greenore point were obtained courtesy of the EPA.

11.4.4 Consultation

Consultation with National Parks and Wildlife Service, 09.01.2024

A consultation meeting with the National Parks and Wildlife Service (NPWS) was held on 9th January 2024 to scope the view of NPWS with regard to the proposed infrastructure being located partially within a European Designated Site (Carlingford Shore SAC (Site code: 002306) and Carlingford Lough SPA (Site code: 004078)) and ensure the project team provides the most robust information from the outset.

NPWS were presented with an overview of the proposed development, including the proposed construction methodologies, details of the methodology being employed by the team of project ecologists and preliminary findings from baseline surveys completed to date. It was established that the existing habitat at Greenore Port is not Annex I habitat and that the proposed development will not result in permanent habitat loss. Generally, the level of information gathered was considered comprehensive to allow for the production of a satisfactory suite of documentation to support the application.

The NPWS representatives advised integrating enhancement features for swifts and guillemots. It was also advised that the ecology team review the construction methodology and include exclusion periods where necessary as a mitigation measure. This advice was given due consideration; the three buildings include swift boxes, and the mitigation section of this report includes exclusion periods.

Consultation with Louth County Council, 10th and 20th May 2024

The first meeting concentrated primarily on the design and engineering aspects of the proposed development. The biodiversity representative highlighted that the Greenore area has a large Swift population and requested that enhancement measures be included in the design. This measure is implemented with each of the three buildings hosting swift boxes. Confirmation was sought that faunal surveys and bat surveys were completed.

It was advised that the landscaping plan should be appropriate to the environment and incorporate native species, together with plants identified in the All-Ireland Pollinator Plan. The proposed landscaping plan was developed in consultation with the project's ecology team and is an appropriate response to the existing environment.

The meeting on 20th May focused on environmental issues, including biodiversity. Representatives from Louth County Council queried whether designated sites in Northern Ireland were considered in the assessments.

The project team outlined that since 1 January 2021, nature conservation areas in the UK (including Northern Ireland) have no longer been part of the Natura 2000 network (Office of the Planning Regulator, 2021), and so they have not been considered in the Supporting Information for Screening for Appropriate Assessment included under separate cover.

It was confirmed by the project ecology team that possible transboundary and RAMSAR conventions were considered as part of the EIAR. The projects and plans examined to inform the cumulative assessment of this EIAR included those deemed relevant in Northern Ireland.

A discussion took place on the extent of rock breaking required. It was outlined that the dredge is predominantly soft, and rock breaking is not anticipated. Berth 3 is not as deep a quay wall as Berth 2, and the vessels will be shallower. If rock is encountered and breaking is required, the volume of approximately 1,000 cubic meters is not comparable to the scale of rock breaking that occurred during the development of Berth 2. The dredge depth proposed is -4m compared with -7.5m for Berth 2.

The dredge plume was discussed. It was outlined that the Marine Mammal Observer (MMO) did not observe a significant dredge plume in the last campaign for Berth 2. The material this time is finer, as evidenced by the particle size analysis, and the proposed marine development area is a scour channel that doesn't allow sediment accumulation. The current at this location provides for fast and wide dispersion to occur. The assessment prepared by RPS, see Chapter 12 of this EIAR, Coastal Processes, confirms the self-scouring nature of the port.

The planning authority queried whether mitigation included restricting the timing of works and, if so, whether this would impact the project's timely implementation. The team confirmed that restrictions would be linked to the pile-driving element of the pontoon and Berth 3 and the rock-breaking element of the dredging. It was confirmed that the construction programme has considered exclusion periods.

The planning authority queried the habits of Brent Geese locally, and the ecology team set out that they are found in the areas of *Zostera beds*, approximately 2 km from the proposed development site, and where there is algae bloom occurring from freshwater inputs as well as algae growing on trestles. It was confirmed that they are not found anywhere close to the port/proposed development area.

11.5 Difficulties Encountered

No difficulties were encountered during the preparation of the biodiversity chapter. All survey dates were within the optimal survey period for each survey, and full site access was achievable on all surveys.

Regarding the offshore wind arrays that this development will support, only the Oriel project had been lodged at the time of lodging this application, and at the time of submission, the application was not publicly available on the An Bord Pleanála website. Other applications for offshore wind arrays were not lodged with An Bord Pleanála at the time of writing, and the details were, therefore, not available to the project team.

The certainty or predictability of this assessment was not affected by any difficulties encountered.

11.6 Baseline Environment

11.6.1 Terrestrial Habitats and Flora

This section should be read together with Appendix 11.1, Terrestrial Habitat Survey.

Terrestrial habitats encountered were classified according to Fossitt (2000) and are illustrated in the following Figure.

Figure 11-3 Existing Habitats - Fossitt (2000)

11.6.1.1CC1 Sea walls, piers and jetties

The development zone encompasses a narrow coastal strip categorised as *Sea walls, piers, and jetties* (CC1). This area spans approximately 150 meters by 5 meters. It features a recently constructed quay wall, several older concrete caissons (each roughly 1 cubic meter in volume), and a pitched sea wall composed of cut limestone cobbles. The sea wall has been reinforced with concrete slabs derived from the dismantling and renovation of the old quay wall. Over time, windblown topsoil and decayed coastal vegetation have accumulated, especially within the crevices of the track and stone bank. The caissons have also been partially filled with clean stone.

Various plant species have been observed in small clusters or as individual specimens within and along the periphery of the caisson area, particularly where decomposing nitrogenous vegetation settles in cracks and crevices. These species include *Plantago maritima, Beta vulgaris, Aster tripolium, Malva sylvestris, Matricaria discoidea, Cochlearia officinalis, Tripleurospermum maritimum, Senecio squalidus, Erysimum sp, and Geranium robertianum,* along with a solitary example of *Reseda luteola*. However, *Crambe maritima, Suaeda maritima*, and *Honkenya peploides* were notably absent.

According to Fossitt, the Groyne/Breakwater at Greenore Port, which marks the northern edge of the development area, is also to be classified CC1. The structure is positioned approximately 100 meters from the berthing face of Greenore Port and was constructed as a rubble mound rock structure, with wooden piles running along its length. The breakwater is used by waterbirds for roosting and loafing, primarily large gulls and cormorants.

11.6.1.2BL3 Buildings and Artificial Surfaces

Buildings and artificial surfaces (BL3) represent a highly modified habitat type characterised by the dominance of artificial materials with negligible ecological value. These recorded areas in the application area consist of concrete hardstanding and man-made structures and are deprived of vegetation.

The terrestrial development area's southwestern section primarily constitutes a functional port area, featuring hardstanding remnants of a wall associated with the pre-existing railway (the engine room wall), a port warehouse (formerly occupied by Open Hydro), a portion of the Greenore Port office, a hardstanding car park, and segments of public/private realm. Consequently, this area falls under Buildings and artificial surfaces (BL3) classification.

Additionally, the existing residential dwelling and driveway are also categorised within this classification due to their predominantly artificial composition.

11.6.1.3 GA2 Amenity Grassland

Amenity grassland (GA2) is a modified grassland habitat that is subject to regular maintenance. The result is a short sward and low biodiversity, which is therefore considered lower local importance. The habitat is present at the residential site within the proposed development site.

11.6.1.4 BC4 Flower beds and borders

Ornamental flower beds, Rowan/Mountain Ash, Cabbage Tree, Sweet Cherry, Whitebeam and Sycamore are present at the existing port office entrance.

11.6.1.5 BL1 Stone walls and other stonework

The subject site contains a section of a wall associated with the former Engine Shed of the Greenore railway station. This now free-standing brick and limestone wall can be categorised as Stone walls and other stonework (BL1) according to Fossitt.

11.6.2 Terrestrial Mammals

This section should be read together with Appendix 11.5 Terrestrial Mammal Survey and Appendix 11.6, Bat Fauna Impact Assessment.

11.6.2.1 Bats

No bats were noted emerging from structures. Two common pipistrelle bats were observed in 2023 at the residential site and an individual Soprano Pipistrelle was recorded foraging within a large metal storage building to the north of the site outline within the port area in 2024. In 2023 & 2024 no bats were noted transiting through or foraging within the port area inside the proposed site outline. The site is of relatively low importance to the local bat population. The site is currently well-lit from the existing floodlights within the subject site, and from light spill of the adjacent residential area street lighting.

11.6.2.2 Otters & Badgers

Otter spraints were not recorded in the proposed development site or within the wider port landholding.

Otter spraints were recorded along the sea wall of the adjacent golf course, with several clustered around the sluice between the bay and Greenore golf course ponds. Similar numbers were found at Hammils Quay (a slip adjacent to the old railway line) and in other places along the shore. Spraints were also found within the golf course, where the watercourse flows into the golf course under a culvert. Spraints were also noted along the channel leading from the wetlands of Greenore pNHA into the golf course. Several otter tracks and a possible slide were found on an island in one of the ponds on the Greenore Golf Course, indicating a possible couche. No spraints were seen along the east side of the port.

Overall, the intertidal bay between Carlingford and Greenore provides quality otter foraging habitats with an abundance of crabs, crayfish, and fish available. The widespread otter spraints suggest extensive use of the golf course streams and ponds, the shore, and the intertidal area by otters. Wetlands in the hinterland may serve as holt habitats.

Signs of badger were also looked for during the otter survey, but none were seen. Generally, the area around the port and the golf course are unsuitable for badger due to the high-water table.

Figure 11-4 Recorded Otter Spraints

11.6.2.3 Other Fauna

Signs of other fauna, including red fox, badger, and pine martin, were also surveyed but no trace was found. No amphibians or reptiles were noted on site, and smooth newts and viviparous lizards are considered highly unlikely in the area, having regard to the nature of the proposed development area.

11.6.3 Marine Mammals

This section should be read together with Appendix 11.7, 11.8 and 11.9.

Carlingford Lough and adjacent waters are important for marine mammals. Seals, especially harbour (common) seals, occur in good numbers throughout the year and grey seals in much smaller numbers. Harbour porpoises are frequent in the north Irish Sea to the east of Carlingford Lough, and common and bottlenose dolphins also occur occasionally, as do minke whales seasonally.

11.6.3.1 Pinnipeds (seals)

11.6.3.1.1 Harbour (Common) seal *Phoca vitulina*

As part of this project, Martin (2023) carried out land-based counts at haul-out sites around the Lough in June and August 2023. Historical data were also presented, which suggests an apparent decrease in common seal abundance; however, previous counts were based on multiple repeat counts and thus may explain the higher numbers compared to 2023. A total of 119, including 9 pups, were counted in June, and 213, including 7 pups, in August 2023 (Martin 2023).

Harbour seals primarily occupied the inner part of the Lough, “Seal Rock”, Carrigenean, Mill Bay and Green Island. During August/September 2023, they had a pronounced preference for the north part of Green Island. An exception to this was that, on occasions, harbour seals would gather at Carrickbrada in the Greenore count area.

Table 11.7 Estimates of harbour seals in Carlingford Lough from 2008-2023 at haul-out sites (from Martin 2023)

Date	Adult	Pup
July 2008	178	54
Aug/Sept 2008	350	NC
July 2011	187	43
Aug/Sept 2011	376	NC
July 2015	222	29
Aug/Sept 2015	359	NC
July 2017	344	23
Aug/Sept 2017	297	NC
June 2023	110	9
August 2023	206	7

NC – no count

During an aerial survey of common seals carried out during August and September 2012, Duck and Morris (2013) counted 40 on 31 August 2012 in Carlingford Lough making it the single most important site for this species on the east coast of Ireland and 90 in total between Carlingford and north Dublin.

A repeat survey in August 2017 and 2018 recorded very few common seals in Carlingford Lough with most of the 61 counted in the area on the northern side of Dundalk Bay (Morris and Duck 2019). These counts report a 14-31% decline in common seals since 2003.

Common seals are not as mobile as grey seals, typically foraging within 10km of their haul-out site (Thompson et al. 1998).

11.6.3.2 Grey seal (Halichoerus grypus)

Table 11.8 Grey seal counts (from Martin 2023)

Year	July					Aug/Sept				
2008	nc*	nc	nc	nc	nc	21	34	38	18	15
2009	12	10	16	20	30	nc	nc	nc	nc	nc
2011	8	8	47	39	nc	40	44	32	28	15
2015	23	17	52	40	60	64	48	35	73	57
2017	53	53	17	88	64	74	58	56	39	65
2023	24	nc	nc	nc	nc	40	nc	nc	nc	nc

*nc = no count

Martin (2023) also presented counts of grey seals and estimated 24 were present in July 2023 and 40 in August 2023, but suggested the method used was not applicable to estimates of absolute abundance in Carlingford Lough and should be treated with caution due to the fact that grey seals are far more wide ranging than common seals and a large proportion of the resident population may be in the water during any given survey (grey seals are more reliably assessed at their breeding sites). However, given the relatively small numbers, a comparison with data from previous surveys is presented. Grey seals primarily occupied the outer more exposed parts of the outer Lough at Blockhouse Island and reefs and the Cooley Long Rock.

During an aerial survey of common seals carried out during August and September 2012, Duck and Morris (2013) counted 48 grey seals between Carlingford and Dunany Point and 172 from Lambay Island to Dublin Bay. A repeat survey in August 2017 and 2018 recorded very few grey seals in Carlingford Lough with most of the 83 counted in the area on the northern side of Dundalk Bay (Morris and Duck 2019).

11.6.3.3 Cetaceans

11.6.3.3.1 Irish Whale and Dolphin Group database (2014-2023)

Cetacean records from the area of interest were accessed on 31 January 2023. There were 107 records of cetacean species (and downgrades if species identification could not be determined). These included harbour porpoise (*Phocoena phocoena*), two dolphin species (bottlenose *Tursiops truncatus* and common dolphin *Delphinus delphis*) and three baleen whale species (minke *Balaneoptera acutorostrata*, humpback *Megaptera novaengliae* and bowhead whale (*Balaena mysticetus*).

Table 11.9 Cetacean sighting records from the IWDG from 2014 to 2023

	No. of sightings	No. of individuals	Mean Group size
harbour porpoise	31	89	2.9
bottlenose dolphin	50	79	1.6
common dolphin	10	13	1.3
dolphin species	2	12	6.0
dolphin species possibly harbour porpoise	6	23	3.8
minke whale	4	5	1.3
bowhead whale	1	1	1.0
humpback whale	1	1	1.0
cetacean species	2	9	4.5
Total	**107**	**232**	

Of the bottlenose dolphin sightings, 46 were of the solitary individual known as "Fin", who was observed regularly from July 2020 to November 2022 in the strong tidal current off Greenore. Interestingly, 9 of the 10 common dolphins were also of a single dolphin seen regularly from July 2022 to November 2023 and is still thought to be present. Of the harbour porpoise sightings, all were outside Carlingford Lough in the approaches.

The only record of a bowhead whale in Ireland was reported on 29 May 2016 near the Helly Hunter Rocks at the mouth of Carlingford Lough by Carlingford Lough Pilots Ltd. (Whooley and Berrow 2019). Also, a rare record was of a humpback whale off Kilkeel to the north of the Lough on 6 July 2019. The four records of minke whale were in June, July and October and occurred offshore of Carlingford Lough.

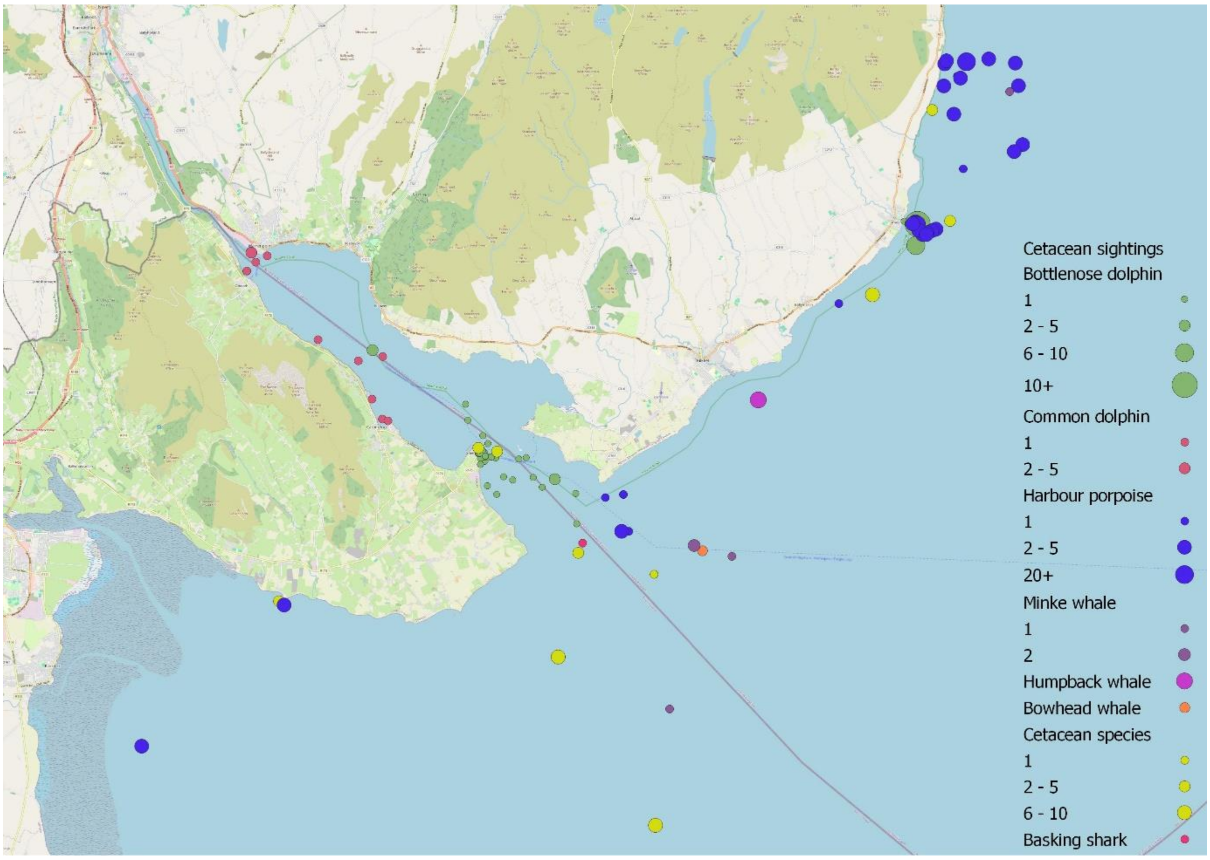

Figure 11-5 Cetacean Sightings in the Area of Interest (2014-2023) Source: IWDG Cetacean Sighting scheme

11.6.3.3.2 Dedicated surveys for offshore windfarm

A dedicated marine mammal survey was carried out between June 2019 and May 2020 at the site of a proposed offshore wind farm immediately to the south of the entrance to Carlingford Lough, see Appendix 11.2. Boat-based visual surveys (12) were carried out over seven months when sea conditions were suitable, according to a standardised design.

A total of 140 on-effort sightings were recorded of at least five marine mammal species (see Table 11-10). Most sightings (67.6%) were of harbour porpoises, which were recorded during every survey. The next most frequently recorded species was grey seal (16.2%) recorded on five of the seven surveys and minke whale (13.2%), recorded on three of the seven surveys. Common seals were recorded on three surveys and accounted for only 2.2% of all sightings (Table 11-10).

Table 11.10 Number of sightings (individuals) of marine mammals during surveys off Oriel from June 2019 to May 2020 (from Berrow and O'Brien 2020)

Date	HP	CD	MW	GS	CS	Others
19-20 June 2019	11(12)	-	-	3(3)	-	
17-18 July 2019	3(3)	-	1(1)	-	1(1)	
1-2 August 2019	15(19)	-	14(14)	4(4)	-	1 basking shark, 1 cetacean sp.
2 October 2019	8(9)	-	3(3)	2(2)	-	
1-2 December 2020	11(15)	1(3)	-	-	1(1)	1 seal sp.
20-21 January 2020	34(70)	-	-	6(6)	1(1)	
19 May 2020	10(21)	-	-	7(7)	-	

HP = Harbour porpoise, CD – Common dolphin, MW = Minke whale, GS = Grey seal, CS = Common seal

Harbour porpoise occurred throughout the survey area with most sightings of single individuals, but larger group sizes were recorded in January and May 2020. Calves were recorded on two occasions, with an adult to calf ratio of 1.4% and juveniles 4.3%. Harbour porpoise calves are born during summer and typically wean over the winter and the presence of calves during spring and juveniles over winter is consistent with this pattern.

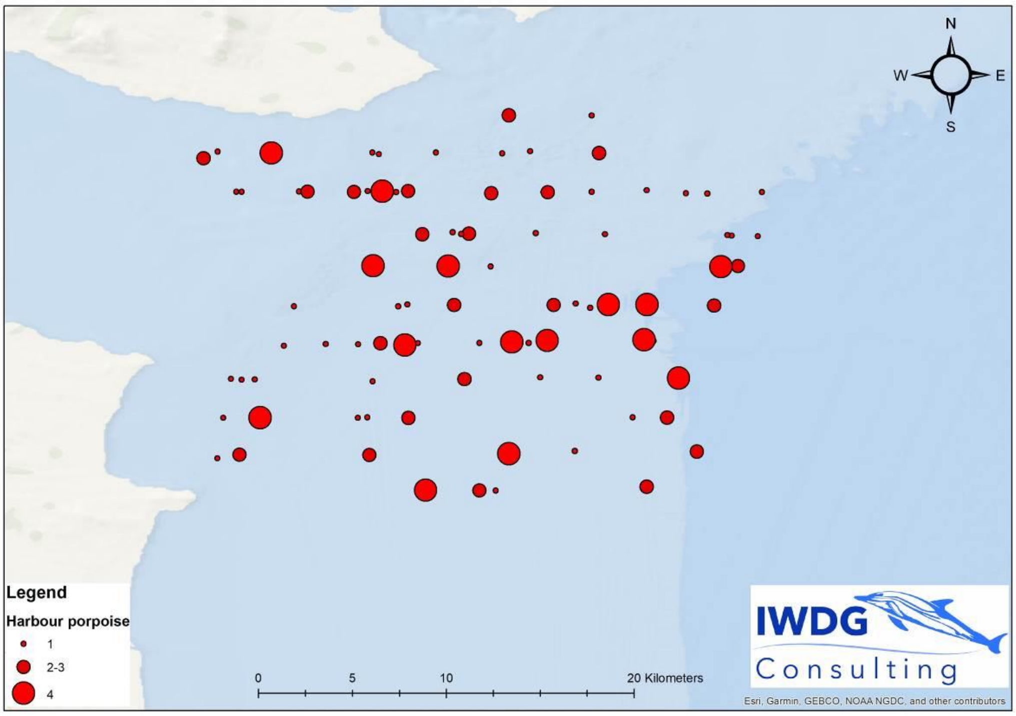

Figure 11-6 Distribution and group size of harbour porpoise sightings off Oriel from June 2019 to May 2020 (from Berrow and O'Brien 2020).

Harbour porpoise density estimates for five of the surveys ranged from 0.14 per sq. km to 0.64 per sq. km and were 0.22 overall. The estimate from January 2020 (0.65 porpoise per sq. km) resulted in an abundance of 205±35, which reflects the peak in abundance, which may be associated with a traditional herring spawning ground within the site (Dickey-Collas et al. 2001).

Individual minke whales were recorded on 18 occasions, 14 of which were in August 2019. They were also recorded on the July and October surveys. They occurred throughout the survey area, tending to be a little offshore.

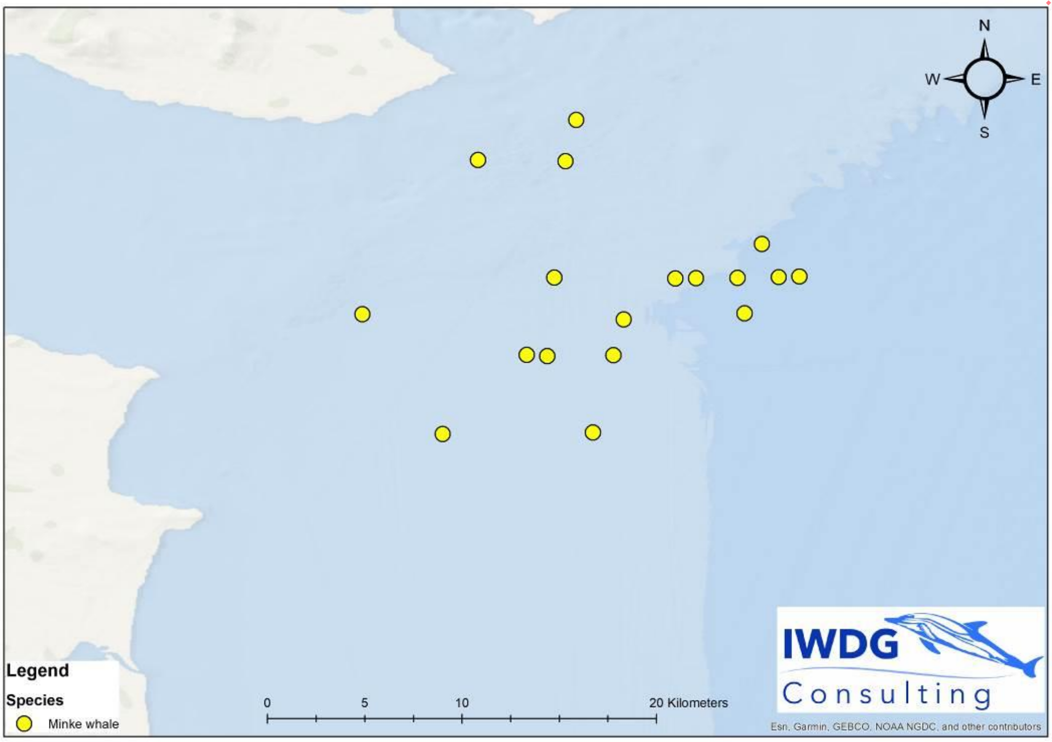

Figure 11-7 Distribution of minke whale sightings off Oriel from June 2019 to May 2020 (from Berrow and O'Brien 2020).

A density estimate was calculated for minke whales in August 2019, providing a density of 0.01±0.02 minke whales per sq.km, which equates to an abundance estimate of 3±0.6 (95% CI 2-5 individuals).

11.6.3.3.3 Grey (Halichoerus grypus) and Common Seal (Phoca vitulina)

Grey seals were the second most frequently recorded species, accounting for 16.2% of sightings and 11.3% of individuals recorded. They were recorded on five of the seven surveys and in all seasons sampled and in consistent numbers per survey. All sightings were of individual animals. Only three sightings of common or harbour seals were recorded, one each in July, December and January, all of single individuals (Table 11-10) and one in November, again of single individuals. Seals were distributed throughout the study area with a tendency to be more inshore. Common seals were recorded in the northern half of the study area.

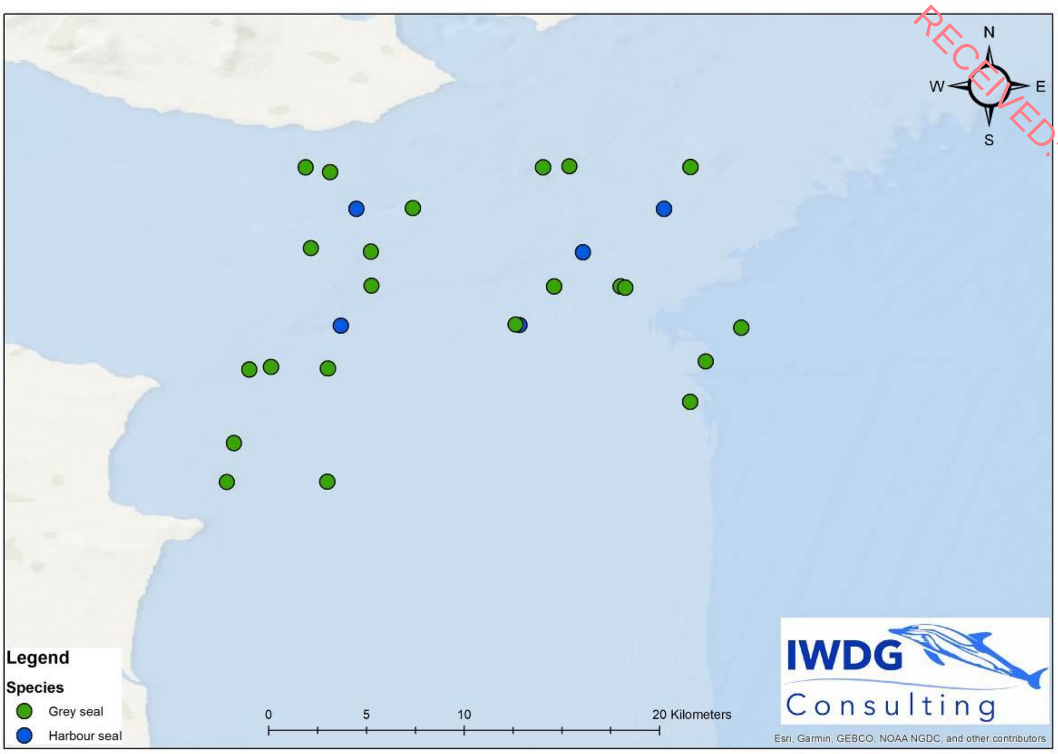

Figure 11-8 Distribution of grey and common (harbour) seal sightings off Oriel from June 2019 to May 2020 (from Berrow and O'Brien 2020).

11.6.3.3.4 Static Acoustic Monitoring at a proposed offshore windfarm

Static Acoustic Monitoring (SAM) was carried out between 2019 and 2020 to complement boat-based visual surveys and describe the long-term presence of harbour porpoise off Co. Louth within the site of a proposed offshore windfarm, Oriel. Between November 2019 and November 2020, a total of 685 days of SAM data were collected across the site. SAM using self-contained click detectors (C-PODs) was conducted at four sites. SAM datasets were then used to explore the temporal presence of harbour porpoises within their detection range. Generalised linear mixed-effect models were used to associate porpoise presence with factors such as season, diel, tidal cycles and phases. Results showed porpoises to be present on average 99% of days monitored. Harbour porpoises were the most frequently detected species with dolphins rarely detected.

Season appeared to influence porpoise presence differently across sites, with winter and summer overall important periods for porpoise presence. The effect of the diel cycle also varied across locations, although night, morning and/or evening phases often yielded more detections than day phases. The tidal cycle and tidal phase only affected the detection rate at some locations, where slack low water coincided with increased detections.

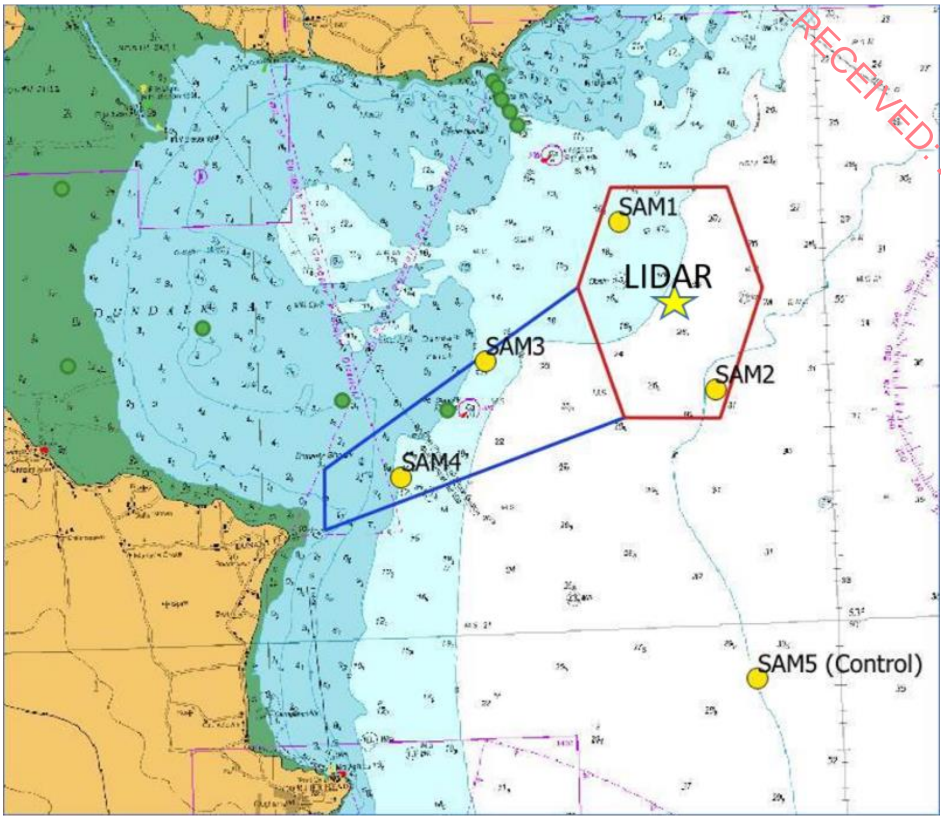

Figure 11-9 Location of all SAM moorings

11.6.3.3.5 Other Endangered, Threatened and Protected Species

Basking sharks *Cetorhinus maximus* were recently provided legal protection in Ireland under the Wildlife Act (2022). Under the Wildlife Act (amended 2022), wilfully disturb basking sharks or destroy their breeding and resting places is now an offence. A single sighting of a basking shark was recorded on 29 May 2023 in the Hoskyn Channel at the mouth of Carlingford Lough. A single sighting of a basking shark was also recorded to the south of Carlingford lough on 1 August by Berrow and O'Brien (2020).

11.6.4 Avifauna

11.6.4.1 Over Wintering Birds

This section should be read together with Appendix 11.2 and 11.3. The below represents a summary of those appendices.

An overwintering bird survey was carried out from October 2022 to March 2023 and again from October 2023 to March 2024. The surveys included the intertidal habitat in the relevant count area. In addition, several targeted and behavioural surveys were undertaken during the 2023-2024 period.

The total number of species recorded within a 200-metre bird disturbance "zone of influence" around the proposed development site was 25 in the 2022-2023 period and 27 in the 2023-2024 period.

Notably, Brent geese were not seen in the vicinity of the ZoI during the 2023-2024 count season. The main cohort was concentrated in the Zosteria area about 2km distant. During bad weather, they sometimes used the golf course for feeding and shelter. In the latter part of the year, they focused on the two outflows along the Carlingford shore road.

The general port area hosts a highly variable number of waterbirds consisting primarily of two cohorts, regularly occurring birds using the breakwater for roosting, and a more variable cohort consisting primarily of gulls who are attracted to the area when animal feed cargos are being discharged. The latter cohort consists almost exclusively of large gulls such as great black backed gulls and herring gulls, with a smaller number of common and black-headed gulls.

Peaks in numbers on the 6th of January and 13th February 2023 correspond to discharges of animal feed on the quay wall. When animal feed is discharged from ships holds, it is typically lifted by way of a large grab, and dumped into a hopper which funnels it into a truck. The truck is then covered but inevitably there is spoil, particularly on windy days. Typically, gulls will compete for this on the quay wall, along the road out of the port, and in the water fronting the quay wall where they often surface feed. They typically avoid the most active parts of the port, particularly when the Liebherr cranes are operating, but particularly herring gulls will aggressively compete for food items right next to human activity.

At other times, when cargos not attractive to birds are being discharged the numbers drop off considerably, particularly gulls, so that on some occasions there are no birds using the breakwater at all, particularly during eastern or northerly winds when it is very exposed. At other times the breakwater is over washed by spring tides.

Recorded species have variable responses to disturbance, be it visual or from noise, with waders and wildfowl being the most susceptible.

Waterbirds frequenting the zone of influence are clearly habituated to the regular activities of the port and are highly tolerant of it. Birds are undisturbed on the breakwater and clearly tolerate even very heavy port activities when there. Given the 100-metre distance from the active port area to the breakwater it can be inferred that a distance of 100 metres is more generally tolerable. Similarly, foraging birds are undisturbed using zone 1 of the ZoI during port operations; zone 2 intertidal is generally not used for foraging but is used by divers and auks at high tide.

Cormorants, Red Shanks, large Gulls and Turnstones have been shown to tolerate disturbance from port activities at distances down to 10m.

The main behaviour observed is loafing and roosting on the breakwater. Foraging is mainly a function of the cargo/spoil stemming from port operations. This area is only available on some spring tides (0.5 metres or less), and these only occur on about 18 days in a given year the area is only available for a few hours on either side of low water, making it available for about 36 hours over a given overwintering period. Taking this as running from September to March, it covers a period of 212 days or 5,088 hours. This means the area is available for less than 1% of the over wintering period. Furthermore, it was noted that foraging in this area on spring tides does not meet with great success, and birds were observed to prefer other softer areas for foraging.

The targeted visits demonstrated that the breakwater, though an important roosting and loafing area, is not critical. In times of bad weather or extreme tides, other areas are preferred (the golf course, Green Island).

They also demonstrated the very high level of tolerance birds using the breakwater have to the existing port operations. This high degree of habituation means that birds will readily habituate to the activities stemming from the proposed development.

11.6.4.2 Breeding Birds

This section should be read together with Appendix 11.4.

Within the terrestrial port area, a pair of wagtails and a pair of rock pipi,ts are regular along the quay wall and nesting was confirmed in both cases (provisioning of nests). A single pair of jackdaws bred in a cavity in an old wall. No evidence of gulls breeding in the port area was found. A significant reduction in gull numbers was seen during the summer of 2023, mainly sub-adult birds frequenting the port. No evidence of shelduck nesting was seen in the vicinity of the port.

Within the residential plot, a pair of blackbirds, two pairs of collared doves and a pair of woodpigeons were recorded as breeding in the garden area.

There was no sign of breeding birds was found in the office structures, such as house sparrows and starlings, who may nest in the eaves of such structures.

Swifts and house martins were noted flying up and down the main street in Greenore village.

On the breakwater, black guillemots were confirmed breeding during the summer of 2023, with two pairs using the nesting boxes on the breakwater and a further pair in cavities on the quay wall; the latter are unlikely to be successful due to the presence of rats who may predate eggs and young.

Overall, the terrestrial breeding bird population is typical for the existing port related habitat. No rare or especially protected passerines were found.

11.6.5 Benthic Ecology

This section should be read together with Appendix 11.10.

11.6.5.1 Subtidal benthic ecology within the receiving environment

The benthic habitat of Carlingford Lough is known from extensive surveys carried out during the Northern Ireland Sublittoral Survey (NISS) of 1982-1985 (Erwin *et al*, 1986). The data from this survey is included in the BioMar survey of Ireland database as it covers the entire marine area of Carlingford Lough, including that within Irish jurisdiction. The data from these surveys describes a range of habitats and species recorded during 48 separate dives at various locations throughout the lough. A subset of these sites was resurveyed as part of the Sublittoral Survey of Northern Ireland in 2008 (Goodwin *et al*, 2008). The results of the 2008 survey indicated no significant change since the original NISS baseline survey.

Carlingford Lough Marine Conservation Zone (MCZ) lies north of the navigable channel in the inner part of the lough. MCZs are a term used by the UK to define areas that protect a range of nationally important, rare or threatened habitats and species. The Northern Ireland Department of the Environment carried out additional surveys of this MCZ using dropdown cameras and grab sampling in 2015 (DOE, 2015) which have also confirmed that the original baseline, within the MCZ, has remained largely unaltered.

Table 11-11 provides a summary of the habitats recorded during the NISS and Figure 11-10 shows the locations of all dive sites. This survey did not assign biotopes to the habitats surveyed as they predated the Marine Nature Conservation Review (MNCR) classification of biotopes (Connor *et al*, 2004). However, further work has been undertaken to develop the Northern Ireland Broadscale habitat map (Figure 11-10) has classified the habitats within Carlingford Lough according to the European Nature Information System (EUNIS) classification. This system can be directly correlated to the MNCR scale.

The broadscale mapping indicates that the inner reaches of Carlingford Lough, which includes Carlingford Lough MCZ, is dominated by the biotope SS.SMu.IFiMu.PhiVir: *Philine aperta* and *Virgularia mirabilis* in soft stable infralittoral mud (EUNIS code: A5.343). This area is bisected by a narrow section of the central scour channel characterised by the habitat complex SS.SSa Sublittoral sands and muddy sands (EUNIS code: A5.2). SS.SSa is also found throughout the shallower areas of the lough.

The remainder of the lough is characterised by a mosaic of the following biotopes

- CR.MCR.EcCr Echinoderms and crustose communities (EUNIS code: A4.21)
- SS.SMx.IMx Infralittoral mixed sediment (EUNIS code: A5.43)
- SS.SCS.CCS Circalittoral Coarse sediment (EUNIS code: A5.14)

It is important to note that the NISS records extensive areas of maërl approximately 550 meters northwest of Greenore Point. This area is not classified as maërl in the broadscale mapping. However, based on the available records, it is considered to be present at this location in mosaic with the other biotopes listed above.

Table 11.11 Summary Results of the NISS (1982-1985)

ID	Location	Description	Depth (m)	Easting	Northing
1	S of Killowen Bank, Carlingford Lough.	Firm sand with isolated clumps of large mussels.	28-32	718825.782	814009.04
2	S of Killowen Bank, Carlingford Lough.	Fairly firm plain of fine sand with Mya and occasional clump of *Ascidiella aspersa.*	19-23	718825.783	814109.019
3	S of Killowen Bank, Carlingford Lough.	Sandy mud plain with abundant Ensis sp. and occasional *Arctica islandica*.	12 to 16	718925.761	814009.042
4	S of Killowen Bank, Carlingford Lough.	Sandy mud plain with abundant small *Virgularia* sp. & Burrowing brittle stars.	3 to 7	718925.762	814109.019
5	S of Killowen Bank, Carlingford Lough.	Fairly firm plain of fine sand with small ripples - *Virgularia* very common.	0 to 2	718925.763	814208.998
6	W of Vidal Rock, Carlingford Lough.	Plain of cobbles on gravel.	20-24	724524.555	810309.811
7	E of Green Is, Carlingford Lough.	Lower limit of pure sand 16m then cobbles and sand; much richer in species. Some boulders.	11 to 15	724524.559	810709.726
8	E of Green Is, Carlingford Lough.	Plain of firm fine muddy sand. Sparse algae. Many *Echinocardium*.	2 to 6	724624.539	810809.704
9	E of Green Is, Carlingford Lough.	Areas of boulders on sand plain.	0 to 2	724624.539	810809.704
10	Blockhouse Is, Carlingford Lough.	Boulders and cobbles with hydroids and sponges-strong tidal stream.	11 to 15	725724.302	810009.87
11	Blockhouse Is, Carlingford Lough.	Slope of fairly big boulders with cobble slope at 25m with ridge of boulders beyond this. Rich sponge communities.	20 to 24	725624.323	810009.871
12	N of Greenore Pt, Carlingford Lough.	Sand and cobbles with algal community	1 to 5	722125.071	811809.5
13	S of Carrigaroan, Carlingford Lough.	Sand and cobbles with algal community	0 to 3	721125.29	812909.267
14	SE Killowen Bank, Carlingford Lough.	Area of barren fine rippled sand - smooth firm sand with Ensis sp. Outcrop of bedrock-low lying & sand covered with *Polymastia mammilaris* & *Ciocalypta*.	3 to 7	719825.567	813409.167

15	SE Killowen Bank, Carlingford Lough.	Sand plain of *Echinocardium* with *Ophiura albida* common. Little else. Extensive areas of *Zostera* also poor in other life.	0	719725.59	813709.102
16	W of Killowen Bank, Carlingford Lough.	Sandy mud plain with abundant Ensis sp. and occasional *Arctica islandica*.	8 to 12	718125.933	814508.936
17	W of Killowen Bank, Carlingford Lough.	Sandy mud plain with abundant small *Virgularia* sp. & Burrowing brittle stars.	1 to 5	717825.997	814608.917
18	W of Killowen Bank, Carlingford Lough.	Fairly firm plain of fine sand with Mya and occasional clump of *Ascidiella aspersa.*	11 to 15	718425.866	814109.021
19	NW of Killowen Bank, Carlingford Lough.	Fairly firm plain of fine sand with small ripples - *Virgularia* very common.	0 to 4	717826.001	815008.831
20	SE of Vidal Rock, Carlingford Lough.	Pebble/cobble bottom with hydroids. Dogfish very abundant. Also *Pholis* sp.	20 to 24	725024.45	810209.831
21	S of Vidal Rock, Carlingford Lough.	Plain with cobbles sparsely embedded in sand. Much dead and drift weed. Poor.	6 to 10	724824.489	809909.896
22	S of Vidal Rock, Carlingford Lough.	Pebble. Gravel bed with large plants of *L. saccharina* & *L. hyperborea*. A lot of red crusts and few animals.	0 to 4	724724.508	809709.939
23	S of Vidal Rock, Carlingford Lough.	Site similar to 6m one. Gravel / pebble bed with *Laminaria saccharina* & *L. hyperborea*, red algae & few animals.	0 to 1	724824.486	809609.96
24	N of Greenore Point, Carlingford Lough.	Extensive areas of maërl in muddy gravel and patchy kelp.	0 to 3	722125.069	811609.543
25	W of Buoy No 11a, Carlingford Lough.	Extensive low lying outcrop of bedrock in area of muddy gravel. *Ascidiella aspersa* & *Antedon* very common.	5 to 9	721425.222	812309.395
26	NW Carlingford Lough.	Flat mud plain with abundant *Virgularia* & *Philine* & little else.	0 to 1	715126.579	816308.563
27	NW Carlingford Lough.	Mud plain with *Virgularia* and *Philine*.	0 to 1	716326.317	815208.795
28	Rosstrevor Bay, Carlingford Lough.	Mud plains with *Virgularia* & *Philine* dominating.	0 to 3	716626.262	816108.6
29	Rosstrevor Bay, Carlingford Lough.	Mud plains with Philine. Occasional mucous egg sacs covered with *Stiliger*.	0 to 2	717526.076	816408.532
30	S of Green Island, Carlingford Lough.	Area of soft mud with 6" deep rotting seaweed-area of muddy sand in small mounds. Very poor.	18 to 22	723824.698	809909.899

31	E of Greenore Point, Carlingford Lough.	Pebble & cobble plain with much shell debris. Many dead Ostrea shells. Bivalves & sediment abundant. Abundant *Hydrallmania* & *Alcyonidium*.	11 to 15	722724.935	810709.733
32	S Green Island, Carlingford Lough.	Flat bedrock covered with a layer of muddy silt. Huge patches of *Polymastia mammilaris.*	15-19	723724.723	810309.815
33	S Green Island, Carlingford Lough.	Flat bedrock covered with a layer of muddy silt. Huge patches of *Polymastia mammilaris.*	10 to 14	723724.724	810409.792
34	S Green Island, Carlingford Lough.	Areas of shallow sloping bedrock and flat cobbles with a little sediment.	1 to 5	723824.705	810709.728
35	S Green Island, Carlingford Lough.	Small boulders with dense cover of L. saccharina. Few animals but number of red and brown algae. Very silty.	0	723824.706	810809.706
36	E of Stalka Rock, Carlingford Lough.	Low lying outcrops uneven & fissured with firm sand.	0 to 4	722624.97	812209.412
37	W of Watson Rocks, Carlingford Lough.	Shell gravel plain with abundant shell debris and pebbles. Many infaunal bivalves: no samples. *Ascidiella aspersa* very abundant.	0 to 4	721225.259	811809.503
38	NW Buoy No 11a, Carlingford Lough.	Dunned loose gravel with sand in troughs. Small patches of *Ascidiella aspersa*.	6 to 10	720425.434	812609.335
39	NW Buoy No 11a, Carlingford Lough.	Flat sand with patches of hydroids.	3 to 7	720925.331	812809.29
40	NW Buoy No 11a, Carlingford Lough.	Sand and gravel with *Ascidiella aspersa*.	0 to 2	721225.271	813109.224
41	E of Greenore Point, Carlingford Lough.	Steep slope of small cobbles with pebble / gravel base.	3 to 7	722505.97	810831.85
42	E of Greenore Point, Carlingford Lough.	Steep slope cobbles with quite a few algae on them. Pebble gravel base.	0 to 2	722505.97	810831.85
43	W of Green Island, Carlingford Lough.	Gravel plains with *Ophiothrix* super abundant. Very occasional boulder where *Alcyonium* occasionally got a footing.	3 to 7	723324.811	810809.708
44	SW of Stalka Rock, Carlingford Lough.	Mixed bottom. Some maerl at start amongst bedrock and boulder ridges. Sandy mud patches with Artica.	1 to 5	722025.094	812009.457
45	S of Watson Rocks, Carlingford Lough.	Plain of shelly gravel on mud with occasional cobble. Large outcrop of rock with very steep sides and fissures.	2 to 6	721625.175	811709.523
46	W of Killowen Point, Carlingford Lough.	Mud plain with *Virgularia* and *Philine*.	0 to 2	717526.069	815608.703

47	S of New England Rock, Carlingford Lough.	Boulders and cobbles with hydroids and sponges-strong tidal stream.	19 to 23	725524.344	810009.871
48	N of Green Island, Carlingford Lough.	Pinhead squirt-channel between two rocks-bottom muddy gravel with much drift weed; then sand; then bedrock	3 to 7	724124.647	811209.62

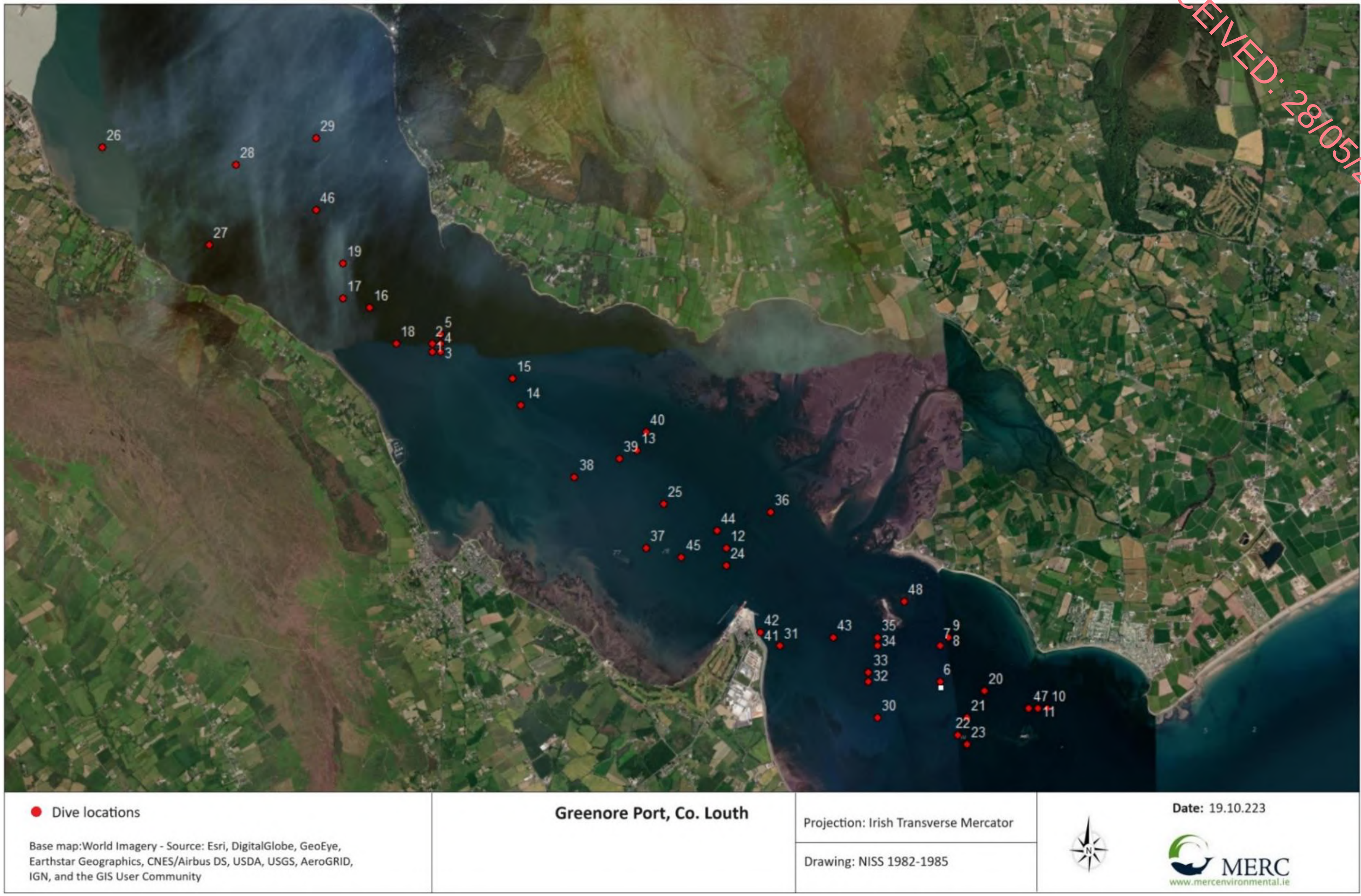

Figure 11-10 Locations of Dive Stations conducted during the NISS (1982-1985). Source: BioMar database.

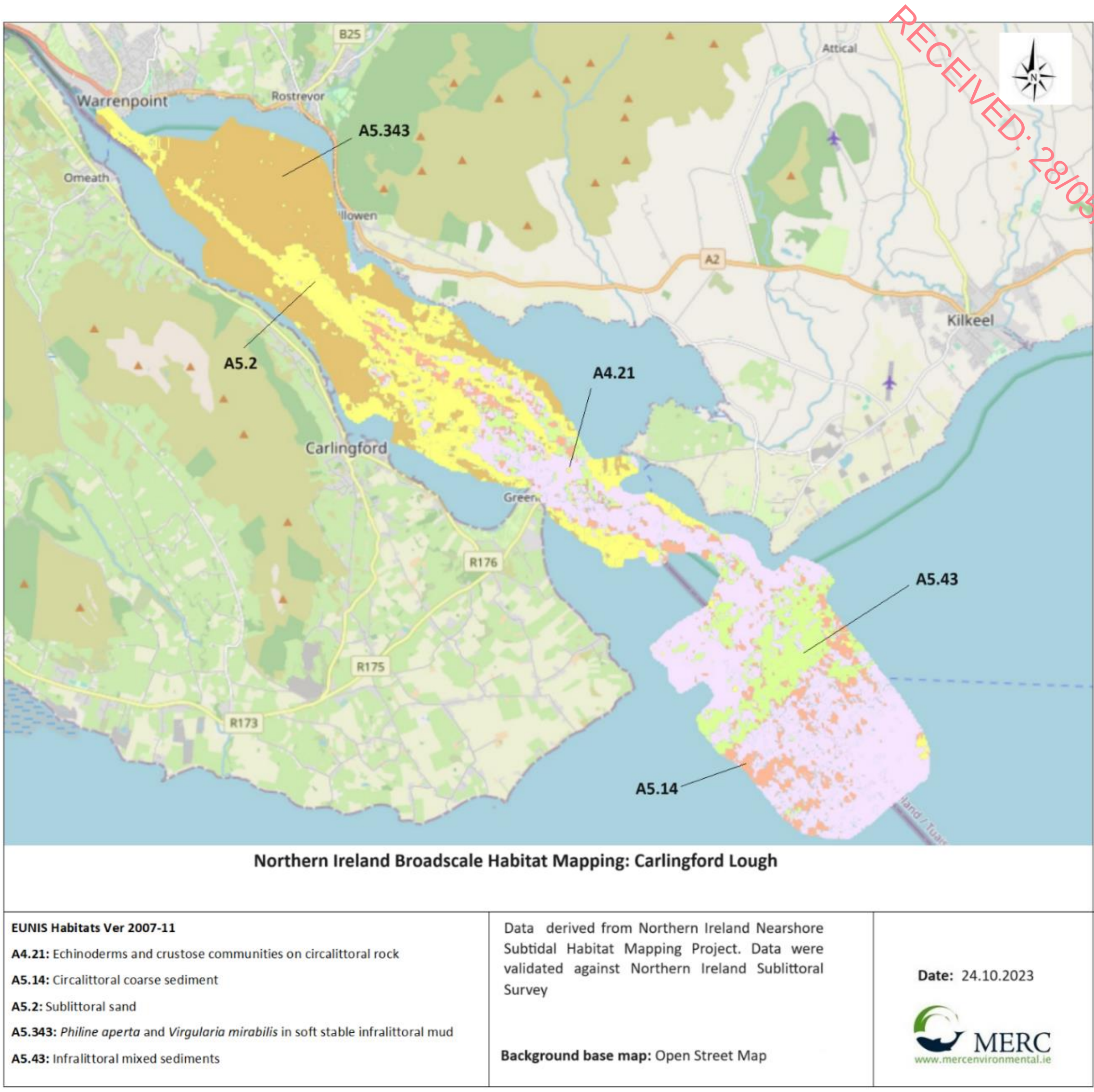

Figure 11-11 Northern Ireland Broadscale Habitat mapping of Carlingford Lough. Subtidal benthic ecology at the proposed development site

The data for the macrofaunal, particle size and organic carbon analysis of grab samples taken within the area of the development site is given in appendix 1 and described below.

A total of seven benthic grab samples were taken throughout the area between the breakwater and the existing quay, **Figure 11.12**.

A number of attempts to obtain samples failed due to the nature of the seabed. Generally, where failed attempts occurred, the ground was characterised by cobble or rock, also shown in Figure 11.12.

The seabed within the area between the breakwater and the quay is very uneven and appears to be comprised of pockets of deeper accumulations of mud in mosaic with areas of cobble and rock, while coarser sands appear to have accumulated in a pocket towards the southeastern end of the breakwater.

Figure 11-12 Location of all benthic grab stations.

Sediments at stations 1 & 2 were defined as sandy gravel, with high percentages of gravel (>40% of particles over 2mm), coarse sands and a low amount of fine sands and silt/clays. Total organic carbon was correspondingly low. The faunal assemblages at these stations were very diverse, with a high number of taxa (>50 per 0.1m2) and high abundance of animals. The communities partially matched two EUNIS level 5 biotopes- SS.SMx.IMx.VcorAsquAps *Venerupis corrugata*, *Amphipholis squamata* and *Apseudes latreilli* in infralittoral mixed sediment and SS.SMx.IMx.MedCirr *Mediomastus fragilis* and cirratulids in infralittoral mixed sediment. The numerical dominance of the oligochaete *Tubificoides benedii* at station 2 showed the estuarine influence and higher organic carbon content at this station.

Stations 3-7 were less gravelly and contained finer sediments than those sampled at station 1 & 2. Fine, very fine sands and silt/clay comprised the majority of the sediments at these stations. Total organic carbon was, as expected, higher at these stations and a maximum of 8.41% was recorded at station 3. Communities were noticeably less diverse- stations 4 & 6 only contained one animal each and a maximum of 21 taxa was recorded at station 5. With so little data it is difficult to assign biotopes. These communities all have indications of an estuarine influence with the presence of estuarine taxa such as *Tubificoides* spp and *Tharyx robustus*. A lower EUNIS level based on the particle size analysis can be used to attempt to define biotopes for these stations. Stations 3, 4 and 7 could be defined as

SS.SMu.SMuVS Sublittoral mud in variable salinity (estuaries) and stations 5 & 6 as SS.SMx.SMxVS Sublittoral mixed sediment in variable salinity (estuaries)- both EUNIS level 4

No unusual or rare taxa were recorded during this survey.

11.6.5.2 Intertidal habitats

The intertidal habitats described below were recorded during site walkovers carried out on the 16th and 31st of August, 2023.

Large expanses of intertidal mudflats and sandflats are present along the northern and southern shores of Carlingford Lough. The majority of the intertidal area along the southern shore is licenced for aquaculture production with active use of these licenced areas. A section of the northern shore, between Greencastle and Killowen, is also in active oyster production.

To the west of the development area, the intertidal area is characterised by a relatively flat sand shore. Above the strandline, coarse sediments characterised by gravel, pebbles and broken shell dominate. Below the strandline, the sediment is characterised by sand with abundant worm casts in mosaic with areas of coarser mixed sediments, boulders and cobble in an undulating pattern. Extensive areas of *Zostera noltei* are present throughout this area Figure 11.12. Patches of Common cord grass (*Spartina angelica*), an Invasive Alien Species (AIS) are present throughout the intertidal area. Areas of intertidal reef dominated by fucoids and *Ascophyllum nodosum* also occur throughout this area.

The main characterising biotopes recorded in the intertidal area are:

- LS.LMp.LSgr.Znol: *Zostera noltei* beds in littoral muddy sand
- LS.LSa.MuSa: Polychaete / bivalve dominated muddy sand shores
- LR.LLR.F.Asc.FS: *Ascophyllum nodosum* on full salinity mid eulittoral rock

Tracks made to access the oyster trestles cross the intertidal flats and frequent littering associated with the aquaculture operation is obvious throughout the area.

Immediately east of Greenore point the intertidal is dominated by a narrow intertidal zone characterised by the biotope LS.LCS.Sh Shingle (pebble) and gravel shores. Further, south along the eastern side of the peninsula, the intertidal area widens out, again forming large sandflat areas dominated by aquaculture (oysters and clams).

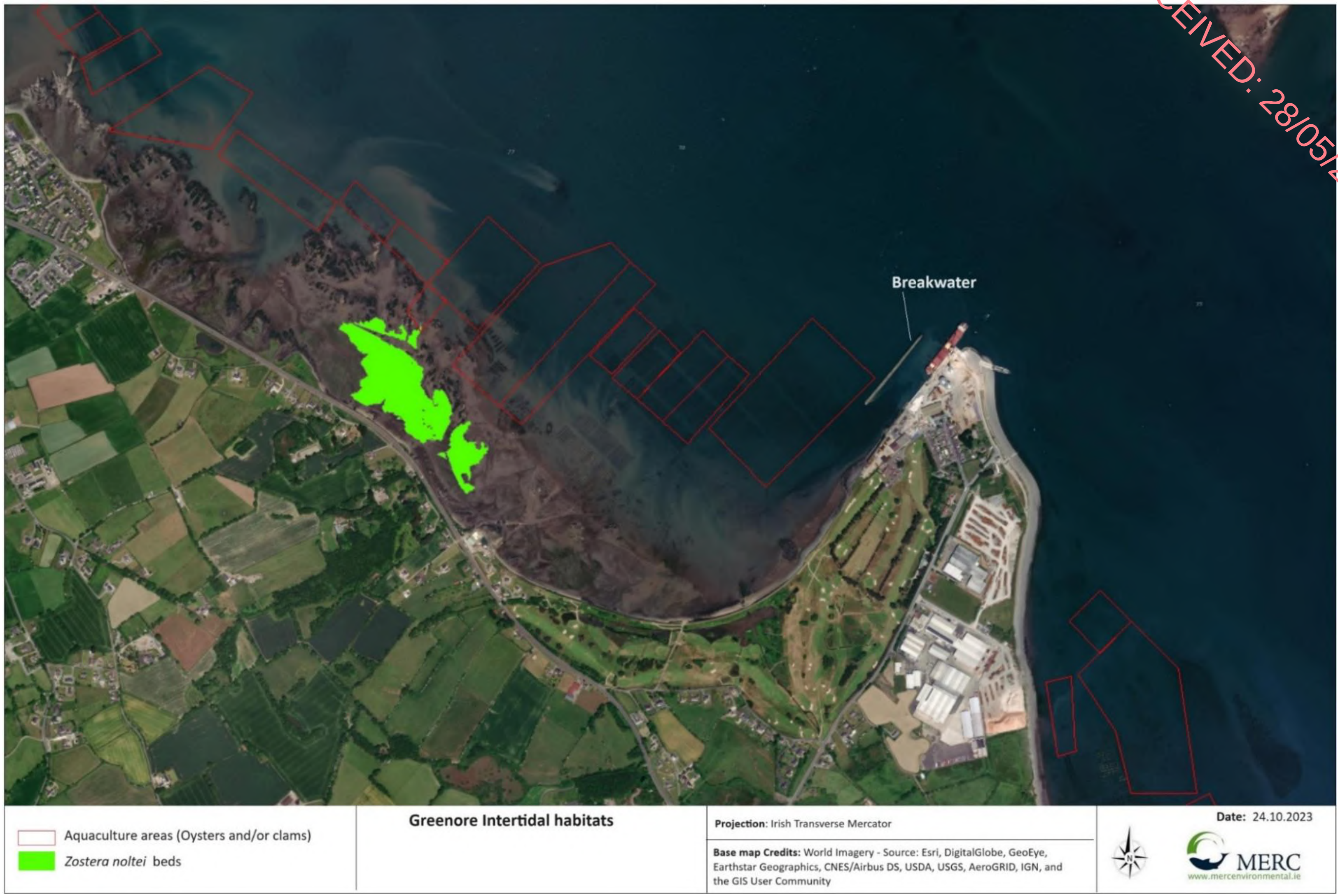

Figure 11-13 Intertidal habitats adjacent to Greenore Port.

11.6.6 Designated Sites

The following Figure is extracted from the Carlingford Lough MPA Management Plan (November 2022) and identifies all the designated sites within Carlingford Lough.

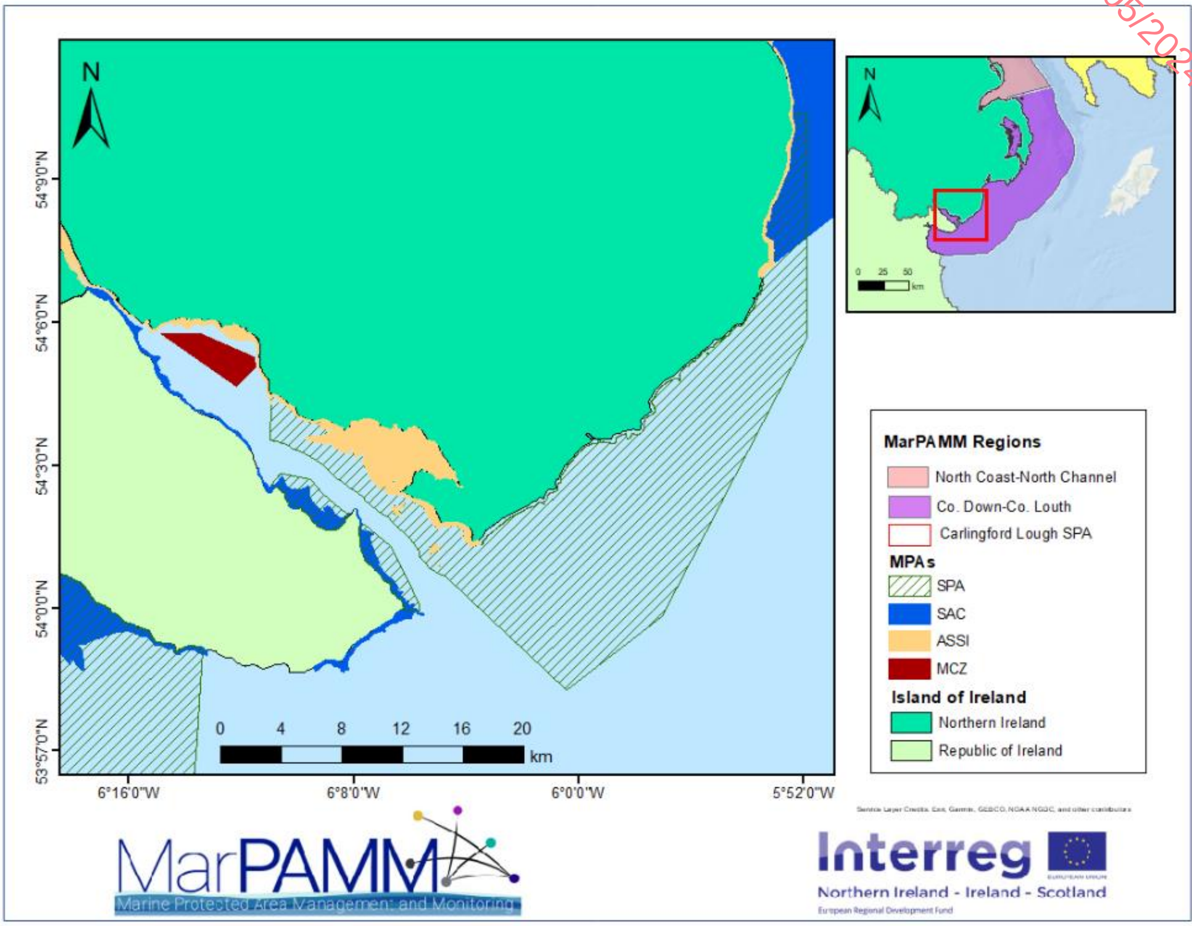

Figure 11-14 Carlingford Lough Designations

11.6.6.1 Relevant European Sites

The proposed development site is partially within Carlingford Shore SAC (Site code: 002306) and Carlingford Lough SPA (Site code: 004078). For reference purposes, and to put the project in the context of other European Sites, SACs and SPAs along the east coast of Ireland, within 50km of the proposed development site are shown in **Figure 11-14** and given in Table 11-12. It is acknowledged that the foraging range for waterbirds and marine mammals may cover a far greater range and are discussed in the Supporting Information for Screening for Appropriate Assessment (SISAA) prepared for this project.

Figure 11-15 European sites within a 50Km radius

Site name	Site code	Distance from proposed development site (km)
Carlingford Shore SAC	002306	Partially within development site
Dundalk Bay SAC	000455	13 (hydrologically)
Carlingford Mountain SAC	000453	4 (as the crow flies)
Clogher Head SAC	001459	28 (hydrologically)
Boyne Coast and Estuary SAC	001957	33 (hydrologically)
River Boyne And River Blackwater SAC	002299	41 (hydrologically)
Rockabill to Dalkey Island SAC	003000	48 (hydrologically)
Carlingford Lough SPA	004078	Partially within development site
Dundalk Bay SPA	004026	8 (as the crow flies)
North-West Irish Sea SPA	004236	20 (as the crow flies)
Boyne Estuary SPA	004080	33 (as the crow flies)
River Nanny Estuary and Shore SPA	004158	39 (as the crow flies)
Rockabill SPA	004014	45 (as the crow flies)
Skerries Islands SPA	004122	49 (as the crow flies)

Table 11.12 European sites within a 50km radius

An SISAA and Natura Impact Statement (NIS) have been submitted with the planning application. The NIS concludes as follows,

"This assessment is based on complete, precise and definitive findings in the light of the best scientific knowledge. It objectively concludes that, provided the mitigation measures described in this document are fully implemented, ***no adverse effect will occur on the integrity*** *of any European site."*

11.6.6.2 Natural Heritage Areas

The basic designation for wildlife is the Natural Heritage Area (NHA).

Proposed NHAs (pNHAs) were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. These sites are significant for wildlife and habitats.

Prior to statutory designation, pNHAs are subject to limited protection, including recognition of their ecological value by Planning and Licensing Authorities.

Within a 15km radius of the proposed development site, the following pNHAs occur:

- Carlingford Lough pNHA (Site Code 000452)
- Carlingford Mountain pNHA (Site Code 000453)
- Dundalk Bay pNHA (Site Code 000455)

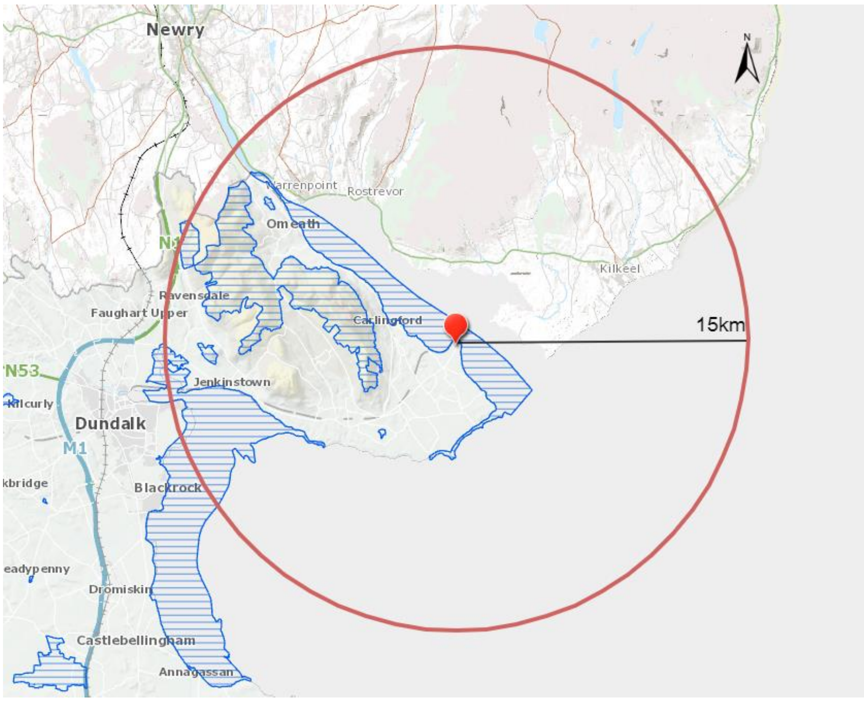

Figure 11-16 Proposed Natural Heritage Areas

11.6.6.3 Other Designated Conservation Areas

Ramsar Sites

Dundalk Bay Ramsar Site (Site code: 834) encompasses 4,768 hectares and lies to the south of the proposed development site. It is coincident with the boundary of Dundalk Bay SPA.

According to the Ramsar Information Sheet for Dundalk Bay,

"The boundary of Dundalk Bay Ramsar site was delineated as the same boundary as the original Special Protection Area in 1994 (but the latter was subsequently enlarged). The Ramsar site occupies the small estuarine inlet at Ballymascanlan and the extensive intertidal habitats of the wider Dundalk Bay. The boundary of the SAC includes all of the Ramsar site but also includes the estuarine waters of Dundalk Harbour and the subtidal waters (dredged channel) connecting Dundalk Harbour to the open waters of the Bay. Both the Ramsar site and the SAC lie within the larger area of Dundalk Bay SPA. The SPA

also includes some additional saltmarsh habitat and an extensive area of open water habitat extending from Riverstown in the North (just east of Giles Quay) to Dunany Point in the South.

The site is of international importance as the extensive intertidal habitats within the site support significant populations of over wintering waterbirds. The site is one of the most important sites for wintering waterbirds in Ireland. The site provides good quality habitat for the feeding and roosting requirements of the various bird species which winter here making it a significant wetland for maintaining the biological diversity of the Atlantic biogeographic region. The site also supports significant stands of Eel grass (Zostera noltii), a species known to be declining internationally, which is important to maintain the biological diversity within the Atlantic biogeographic region. The diversity of interconnected wetland habitats (intertidal mud and sand flats, estuarine waters, intertidal marshes and sand, shingle shores) within the site make it a significant site for the maintenance of regional biodiversity.

WeBS data (from the period 2006/07 to 2015/16) lists internationally important populations of Light-bellied Brent Goose (Branta bernicla hrota), Knot (Calidris canutus), Black-tailed Godwit (Limosa limosa) and Bar-tailed Godwit (Limosa lapponica), The Light-bellied Brent Goose is Vulnerable as several important European populations have declined (Birdwatch Ireland). Knot is Near Threatened on a global scale (IUCN) as subpopulations have experienced population declines; the European population is Least Concern. The Black-tailed Godwit is Vulnerable within Europe and Near Threatened globally; it has undergone rapid declines in Europe and in parts of its global range owing to changes in agricultural practices. The Bar-tailed Godwit's European population is stable but declining globally and is Near threatened. I-WeBS data (same period) also lists nationally important populations of Greylag Goose (Anser anser), Shelduck (Tadorna tadorna), Teal (Anas crecca), Mallard (Anas platyrhynchos), Pintail (Anas acuta), Common Scoter (Melanitta nigra), Little Egret (Egretta garzetta), Oystercatcher (Haematopus ostralegus), Ringed Plover (Charadrius hiaticula), Golden Plover (Pluvialis apricaria), Dunlin (Calidris alpina), Northern Lapwing (Vanellus vanellus), Curlew (Numenius arquata), Redshank (Tringa totanus), Cormorant (Phalacrocorax carbo) and Turnstone (Arenaria interpres). The EU population status for the Pintail is Threatened (EUNIS). Red breasted Merganser has undergone moderately rapid declines in Europe and is Near threatened (IUCN). The Oystercatcher, is undergoing rapid population declines across the European part of its global range and its overall global population trend is decreasing, it listed as Vulnerable in Europe and as Near Threatened globally (IUCN).

Figure 11-17 Dundalk Bay Ramsar Site

Carlingford Lough Marine Conservation Zone (MCZ)

The OSPAR convention considers Marine Protection Areas (MPAs) as sites for which conservation measures have been created, making use of protective, restorative, and precautionary governance to protect and conserve species, habitats, ecosystems, or ecological processes in the marine environment (OSPAR, 1998). The OSPAR commission provides a mechanism through collaborative governance with EU and non-EU members to protect the marine environment of the North-East Atlantic, encompassing a wide array of marine issues from work on pollution and dumping at sea to the conservation of marine biodiversity (OSPAR, 2016).

Northern Ireland's commitment to the objectives of the OSPAR commission is through marine conservation work undertaken by DAERA within SACs and Marine Conservation Zones (MCZs) (DAERA, 2021). NI has committed to developing and maintaining a network of well managed MPAs through the application of management plans to help steer activity use approaches within the area.

The Carlingford Lough MCZ lies north of the navigable channel in the inner part of the lough and within Northern Ireland.

According to the Dept of Agriculture, Environment and Rural Affairs (DAERA).

> *"The MCZ has been designated as it supports the habitat Philine quadripartita (white lobe shell) and Virgularia mirabilis (sea-pen) in soft stable infralittoral mud. This habitat is only present in*

Carlingford Lough; individual records of P. quadripartita and V. mirabilis occur throughout Northern Ireland. P. quadripartita and V. mirabilis occur in high densities within the MCZ and this habitat is thought to be a temporal variant of other sublittoral cohesive mud and sandy mud communities."

The protected features and conservation objectives are as follows:

Protected Features	Conservation Objectives
Habitats: • Subtidal (sublittoral) mud: ➢ *Philine aperta* and *Virgularia mirabilis* in soft stable infralittoral mud	**Maintain in Favourable Condition**

"Favourable condition", in relation to marine habitats or geological features, means that the habitat's or geological features' extent is stable or increasing and its structures, functions, quality and the composition of its characteristic biological communities (including diversity and abundance) are such that it remains in a healthy condition, which is not deteriorating.

"Favourable condition", in relation to marine species, means that the quality and quantity of the species, habitat, and the composition of its population in terms of number, age, and sex ratio ensures that the population is maintained in numbers that enable it to thrive. For the purposes of determining whether a protected feature is in favourable condition, any temporary deterioration in condition or reduction in numbers shall be disregarded if the habitat or population is sufficiently healthy, thriving and resilient to enable its recovery.

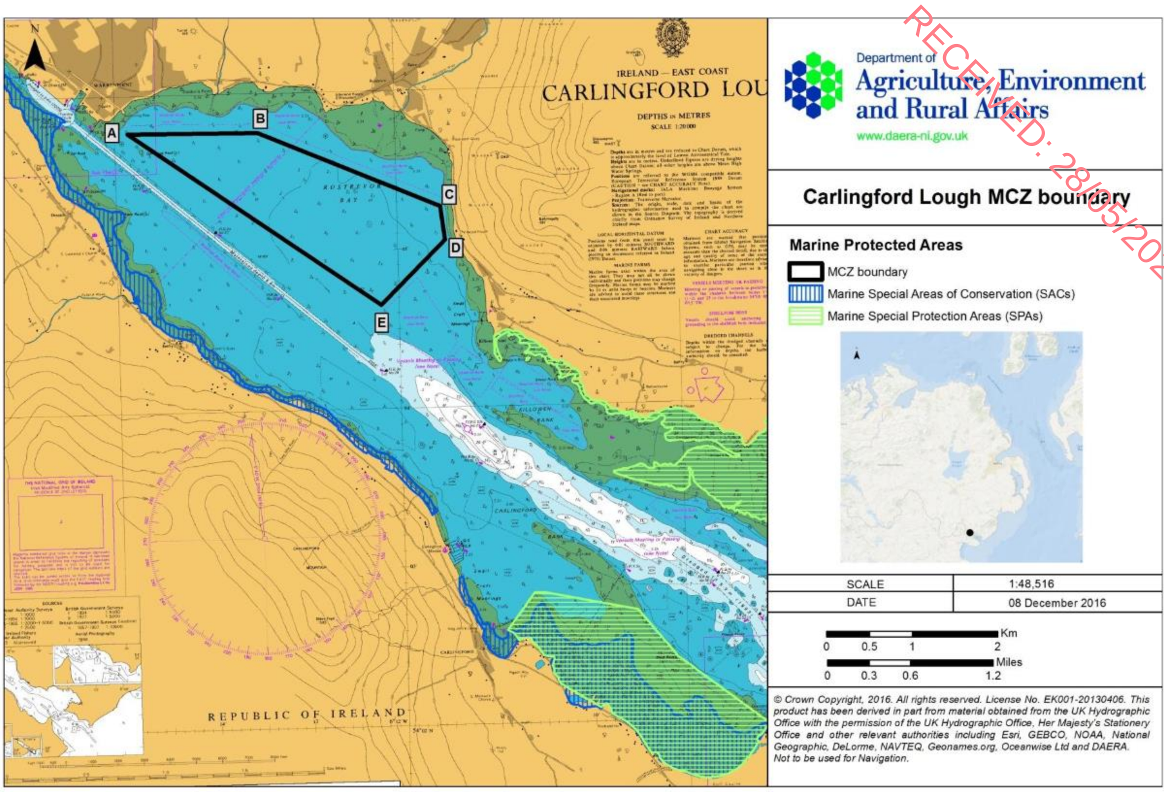

Figure 11-18 Carlingford Lough MCZ

The Carlingford Lough MPA management plan has been designed to be used as a tool that both statutory and local authorities can use to ensure requirements established through the UK Marine Strategy, Marine Strategy Frameworks Directive and OSPAR agreements are fulfilled in future development decisions.

The management plan uses an approach based on an ecosystem management system by Sardá et al., (2017) defined "*As the conservation of the species, habitat or ecosystem structure and functioning to maintain long-term and resilient ecosystem services.*"

The Plan sets out Strategic Guidance, and No. 5 relates to Marine Infrastructure, Ports and Harbours. It states,

"Within Carlingford lough there are two important port assets with Warrenpoint and Greenore, these ports tend to manage their activities in such a way that they contribute positively to the environment status of marine areas. This requirement was derived from the Marine Strategy Framework's Directive and is currently applicable to the RoI to 1 nautical mile for water quality but also includes issues such as litter and noise. Through the UK's withdrawal from the EU, this is covered in NI through the UK Marine Strategy. The purpose of this approach is to achieve good ecological status. This legislation provides the basis for development, managing waste and water pollution.

It continues to state,

"Infrastructure, ports, and harbour developments should operate within appropriate departmental guidance which states that no significant adverse effects, directly or cumulatively on the seabed,

designated features, species, wider biodiversity interests or environmental carrying capacity must occur."

Strategic Guidance 6 relates to Dredging and the Plan states,

"Although navigational dredging occurs, there is no overlap between the channel dredging and the MCZ. However, the proximity of Warrenpoint harbour may pose a risk if dredging activity occurs within or adjacent to the MCZ boundary. This risk has the potential to impact the northwest area of the MCZ through "re-suspension and smothering", caused by direct habitat/species destruction through habitat removal or by the disposal of dredged materials (smothering/siltation) onto vulnerable habitat features/species (DAERA, 2016). This risk is currently perceived as low, but the opening of new dredged disposal sites may change this."

Notably, Greenore Port does not engage in capital dredging as it is a self-scouring port; this combined with the distance to the MCZ means that the one-off dredge proposed to facilitate the installation of the proposed Berth 3 and the pontoon means there is no likely impact on the Carlingford Lough MCZ.

11.7 The 'Do Nothing' Scenario

There are two extant planning permissions at Greenore Port for the extension and modification of an existing warehouse (LCC Planning Ref 20268/ABP Ref 307862) and the construction of new warehouses (LCC Planning Ref 20543/ABP Ref 310184). As these are valid permissions, the respective developments represent the most likely evolution of the site under the 'Do Nothing' Scenario.

During the processing of the applications, An Bord Pleanála screened both developments for Appropriate Assessment, the conclusions are set out hereunder.

PL15.307862: Extension and modifications to the existing former Open Hydro warehouse.
The Board determined that,

Having regard to the limited scale of the proposed development and its conformity with the established use of the port lands at Greenore, and to the provisions of the Louth County Development Plan 2021-2027 including policy objective EE 27 to facilitate the operation of ports including Greenore, it is considered that, subject to compliance with the conditions set out below, the proposed development would not seriously injure the amenities of property in the vicinity of the site or the natural or built heritage of the area and would be acceptable in terms of the traffic safety and convenience. The proposed development would, therefore, be in accordance with the proper planning and sustainable development of the area.

RECEIVED: 28/05/2024

Appropriate Assessment Screening

The Board considered that the proposed development would not have the potential to have any significant direct effect on any Natura 2000 site, nor would it be likely to have any significant indirect effect on the Carlingford Shore Special Area of Conservation (Site code: 002306) or Carlingford Lough Special Protection Area (Site code: 004078) through interference with ex situ habitats, disturbance to species within the Natura 2000 site, the release of dust or pollutants to air, downstream impact on water quality, or any other pathway. This conclusion is consistent with the conclusions of the Appropriate Assessment screening report submitted by the applicant. No scientific evidence was submitted by any party in the course of the application or appeal that would support an alternative conclusion as to the likelihood of significant effects on the Natura 2000 sites. There is no potential effect that the proposed development could have on the Natura 2000 sites that could be rendered a likely significant effect by a cumulation of an impact from another plan or project, including the concurrent proposal which is before the Board under An Bord Pleanála reference number ABP-310184-21.

The Board, therefore, concluded, on the basis of the submissions made in connection with the application and appeals which are considered adequate to allow a screening exercise to be completed, that the proposed development, by virtue of its nature, limited scale and location within the existing area of Greenore Port, would not be likely to have a significant effect on the Carllingford Shore Special Area of Conservation (Site code: 002306) or Carlingford Lough Special Protection Area (Site code: 004078) or any other Natura 2000 site, either by itself or in combination with any other plan or project, and that a Stage 2 Appropriate Assessment (and submission of a Natura impact statement) is not, therefore, required.

PL15.310184: Demolition of existing structures and construction of two new stores and an ESB substation

In making their decision to Grant Permission, the Board concluded that, Having regard to the limited scale of the proposed development and its conformity with the established use of the port lands at Greenore, and to the provisions of the Louth County Development Plan 2021-2027 including policy objectives EE 26 and EE 27 to facilitate the operation of ports including Greenore, it is considered that, subject to compliance with the conditions set out below, the proposed development would not seriously injure the amenities of property in the vicinity of the site or the natural or built heritage of the area and would be acceptable in terms of the safety and convenience of road users. The proposed development would, therefore, be in accordance with the proper planning and sustainable development of the area.

The Inspector's Report includes screening for AA and concludes,

"Having regard to the F.I submitted and the nature and scale of the proposed development and considering that the warehouses are for dry storage cargo goods, within the existing port site, the Planning Authority concluded that no AA issues arise in this case. Therefore, they considered that the proposed development either individually or in combination with other plans or projects would not result in significant effects on the identified designated sites. ABP-310184-21 Inspector's Report Page 65 of 70 7.12.11. It is therefore concluded on the basis on the information submitted in connection with the application and appeals, which is adequate to allow a screening exercise to be completed, that the proposed development, by virtue of its nature, limited scale and location within the existing area of Greenore Port, would not be likely to have a significant effect on the Special Protection Area 004708, the Special Area of Conservation 002306 or any other Natura 2000 site, either in itself or in combination with any other plan or project and so a Stage 2 appropriate assessment and the submission of the Natura Impact Statement is not required."

11.7.1 Short-term (up to Dec 2025)

Each of the extant permissions has a 5-year life-term that expire December 2026 and January 2027 respectively. The programme for modifications and new build is approx. 12 months.

In the absence of development up to 2025, the following is anticipated.

The **'Terrestrial Port Area'** includes a port commodity warehouse (former Open Hydro building), hardstanding areas, a remnant wall associated with the pre-existing 'engine room', and a communications mast. Given the predominantly hardstanding nature of this area and the limited opportunity for flora to establish, no change to the existing baseline is predicted. Fauna would likely remain as described in the baseline.

The **'Nearshore Environment'** encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.

The baseline data indicates the natural benthic environment surrounding Greenore Port, has been largely altered over the years as a result of the construction of the port itself and the development of an intensive aquaculture industry in the surrounding area. It is considered that, even without the proposed development, the benthic baseline would be highly unlikely to change or improve as the current infrastructure and licensed activities will remain active in the short and medium to long term.

Marine mammals in the area, especially seals are accommodated to current levels of activity at the port and so there would be no change anticipated.

The **'Residential Site'** a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road. The garden surrounding the vacant house may change from amenity grassland to recolonising bare ground (ED3) category whereby the area may be invaded by herbaceous plants, typical colonisers are ruderals or weed plants. In urban areas, recolonising bare ground can be important for wildlife and may support a diverse flora. However, the importance would be negligible in this environment where there is an abundance of high-quality habitat in the wider area.

The **'Port Office Entrance'** encompasses a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space that front Euston Street. The biodiversity value of this location would likely remain consistent with the baseline.

11.7.2 Medium Term (Post 2027)

Following the implementation of the extant permission, the following is anticipated to occur within each of the four-character areas.

The **'Terrestrial Port Area'** the existing hardstanding and built environment will be replaced with a similar built environment and it is not anticipated that the redevelopment would result in an appreciable change to the existing flora and fauna baseline.

The **'Nearshore Environment'** implementation of the extant permissions would not change the ecological environment as development is not proposed at this location. Therefore, it is likely that the biodiversity of this area would remain as per the existing baseline. The development of the additional warehousing would not increase the port's throughput, and so there would be no change to disturbance levels above those already in existence and to which marine mammals in the area, especially seals, are habituated. Over time, the breakwater is likely to degrade and, without remediation, partially collapse, negatively impacting the area's roosting and nesting bird population.

The **'Residential Site'** 's biodiversity value is not anticipated to change over and above that described in the short-term scenario as the extant permissions do not relate to this portion of the proposed development site.

The **'Port Office Entrance'**. This location's biodiversity value would likely remain consistent with the baseline as the extant permissions do not relate to this portion of the proposed development site.

11.7.3 Designated European Sites

As set out under Section 11.7, An Bord Pleanála in determining the two extant permissions, concluded that the proposed developments by virtue of their nature, limited scale and location within an existing port area, would not be likely to have a significant effect on the Carlingford Shore SAC or Carlingford Lough SPA or any other Natura 2000 site, either alone or in combination with other plans or projects.

11.8 Potential Significant Effects (Demolition and Construction Phases)

It is noted that a decommissioning phase is not anticipated for the proposed development. The infrastructure is being developed to service offshore wind farms. When those wind farms near the end of their design life (anticipated at least approx. 25 years), they may be 'repowered', i.e. subject to a further grant of planning permission, turbines and associated technology will be replaced (partially or totally) with more powerful and efficient models using the latest technology. The proposed O&M facility will, therefore, continue to be required. In the unlikely event that all relevant offshore wind farms are fully decommissioned, the O&M infrastructure (pontoons and warehouses) can be used as part of the existing port operations, subject to obtaining any necessary further consents. Potential significant effects from decommissioning will, therefore, not occur, and this assessment excludes consideration of decommissioning.

11.8.1 Terrestrial Habitat

The ecological condition of the proposed development area, which will be impacted by the demolition works, is of negligible biodiversity value. Therefore, the proposed demolitions would not have the potential to impact terrestrial habitats.

The terrestrial development area has been subject to significant human modifications over the last 150 years. Therefore, and due to the site's already limited biodiversity value, it is considered highly unlikely that further modifications would impact terrestrial habitats.

Refer to Appendix 11.1.

11.8.2 Terrestrial Mammals

The proposed development site's habitats are of limited value for fauna as evidenced by the baseline surveys.

No signs of otter were identified within the proposed works' footprint. Holts and couches may become established prior to the commencement of construction. Should this occur, then loss of holts and associated injuries to otter therein may occur. As such, the potential for impact is assessed on a precautionary basis.

No signs of badger were identified within the footprint of the proposed works. Setts may become established prior to the commencement of construction. Should this occur, then loss of setts, and associated injuries to badger therein may occur. As such, the potential for impact is assessed on a precautionary basis.

The principal construction impact on terrestrial mammals is the loss of habitat at the Residential Site, which provides limited foraging for common species. These species normally move away from disturbance, and mortality during construction is not expected or will not be substantial.

Refer to Appendix 11.5.

11.8.3 Bats

Having regard to the survey findings, neither the demolition or construction phases are likely to impact bats and therefore there is no likely significant effect. Refer to Appendix 11.6.

11.8.4 Marine Mammals

Following a review of the proposed project and associated scope of work, a range of potential project-related pressures with the potential to act on marine mammals were identified at the demolition, and construction phases of the project, these are detailed in Table 11-13. The ZoI over which the pressures identified above might impact the receiving environment was examined to determine the range over which each impact might exert a pressure. These ranges are also provided in Table 11-13.

The ZoI is not restricted to the immediate proposed development site but includes an extended area in line with the National Parks and Wildlife Service (NPWS) publication *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* (2014).

Construction activities will involve underwater noise/vibration disturbance during the construction period. Marine mammals are vulnerable to impacts from increased noise levels, and their sensitivity to different frequencies depends on the species. Seals are the marine mammals most likely to be exposed to construction activities, as cetaceans only rarely occur within Carlingford Lough.

Direct impacts on marine mammals may occur during piling (Berth 3 and Pontoon) and dredging. Potential direct impacts from piling may arise if seals are very close to the quay and pontoon during start-up. Potential direct impacts from dredging may arise if seals are very close to the dredging site during start-up or (and to a lesser extent porpoise or dolphins).

Noise exposure levels during piling and dredging were quantified in Dublin Port during the ABR project. While this is a different area, using larger piles and where attenuation by the bedrock and overlying sediments will be different to that at Greenore, it provides some guidance. Noise measurements took place while H-section piles with a cross-sectional area of 333 cm^2 were being driven to depths of 35m. Peak sound energy occurred at below 1 kHz but there was substantial energy up to 10 kHz, with high frequencies rapidly attenuated (RPS 2016). The hearing range of harbour and grey seals extends over wide frequencies, including the ultrasonic spectrum. The area of best hearing is between 8 and 25 kHz, with acute hearing also at lower frequencies (Terhune and Turnbull 1995), which is above the peak sound energy generated, which was below 1 kHz. Todd *et al*. (2015) reviewed the impacts of dredging on marine mammals and suggested a back-calculated source level of 163 dB re 1 mPa at 1 metre (bandwidth ¼ 20 Hz–100 kHz) for a backhoe dredging operation off the Shetlands of 179 dB re 1 mPa at 1 metre (bandwidth ¼ 3 Hz – 20 kHz). Despite these elevated levels, they are mainly low frequency and below the peak frequency for echolocation and would attenuate quickly.

The study concluded that noise levels attenuated rapidly so that at 500m, they were at background noise levels. Noise levels generated during dredging and disposal operations in Dublin Port (RPS 2016) showed that at ranges of 213m and 268m, noise levels were below the disturbance threshold for seals at 160 dB re 1 µPa (from Southall *et al.* 2021).

Table 11.13 Potential Demolition and Construction Phase Impacts on Marine Mammals

Activity	Potential impact	ZoI
Construction phase		
Dredging	Disturbance	Short-term disturbance of normal activities at dredging site.
	Displacement	Short-term displacement from dredging site.
	Increased foraging opportunities	Possible increase in foraging opportunities at dredging site.
Installation of Berth 3	Permanent threshold shift	Direct impact extending to a max. 1000m from the piling area[3].
	Temporary threshold shift	Direct impact extending to a max. 1000m from the piling area[4].
	Displacement	Direct impact extending to 250m.[5]
	Disturbance	Direct impact extending to 250m[6]
Installation of new pontoon and associated infrastructure	Permanent threshold shift	Direct impact extending 1000m from piling area[7]
	Temporary threshold shift	Direct impact extending to 1000m[8]
	Displacement	Direct impact extending to 250m.[9]
	Disturbance	Direct impact extending to 250m[10]
Landside development of new port facilities	Pollution: Accidental spillage of hydrocarbons or cementitious material (land side)	Area of impact out to 5km.

[3] Mitigation zone established by the NPWS (2014) Guidelines, but in reality, the PTS zone is significantly less (10s of metres - author's professional opinion based on experience)

[4] Mitigation zone established by the NPWS (2014) Guidelines but in reality, the TTS zone is significantly less (<100 metres author's professional opinion based on experience)

[5] Mitigation zone established by the NPWS S (2014) Guidelines , but in reality, the TTS zone is significantly less < than 250 metres. The author's professional opinion is based on experience.

[6] Mitigation zone established by the NPWS S (2014) Guidelines , but in reality, the TTS zone is significantly less < than 250 metres. The author's professional opinion is based on experience.

[7] Mitigation zone established by the NPWS S (2014) Guidelines, but in reality, the PTS zone is significantly less (10s of metres author's professional opinion based on experience.

[8] Mitigation zone established by the NPWS S (2014) Guidelines but in reality, TTS zone is significantly less <100 metres author's professional opinion based on experience.

[9] Mitigation zone established by the NPWS S (2014) Guidelines but in reality, TTS zone is much, much smaller <250 metres author's professional opinion based on experience.

[10] Mitigation zone established by the NPWS S (2014) Guidelines but in reality, TTS zone is much, much smaller <250 metres author's professional opinion based on experience.

11.8.5 Avifauna

The proposed development will take place over two phases as set out in the development description and each is assessed separately below without mitigation Appendix 1 details the assessment criteria and Appendix 2 for the conservation status of each relevant species.

11.8.5.1Demolition of former 'Open Hydro' Building

The demolition of the building will cause visual and noise/vibration disturbance. It is possible that this may cause some disturbance to birds on the breakwater and in the intertidal area, but given the tolerance of roosting birds 100-metre distance from noisy operations in the port area when discharging vessels, this is considered unlikely. Birds roosting in the caisson area (grey heron) would likely move to the breakwater when disturbed and this is reasonably not considered to be a likely significant effect on the SPA.

The demolition works will generate dust, which may be blown over the designated sites, Carlingford Shore SAC and Carlingford Lough SPA, particularly on windy days. The Air Quality assessment prepared for the proposed development and included in the EIAR identifies the risk as follows and proposes mitigation to reduce this to no likely significant residual effect.

Table 11.14 Dust Emmission Risk

Potential Impact	Dust Emission Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling Risk	Low Risk	Medium Risk	High Risk	Low Risk
Human Health Risk	Negligible	Low Risk	Low Risk	Negligible
Ecological Risk	Low Risk	Medium Risk	Medium Risk	Low Risk

Water contaminated with demolition dust could enter the designated sites, for example where it is used for damping dust, or in the case of a significant deluge. This material may enter the SPA where it may be ingested by birds as grit or adventitiously when consuming vegetation (eg Zostera sp) producing a potential knock-on effect. The Water Chapter of the EIAR proposes mitigation in this regard.

11.8.5.2 Construction of New Buildings

Construction activities will similarly involve visual and noise/vibration disturbance during the works. As with the demolition works, this disturbance is considered unlikely to affect birds on the breakwater or foraging in the intertidal area given their tolerance for other similar port activities. However, construction may also generate dust and contaminate water with the potential to enter the designated sites, for example, on windy days, during damping operations, or during rainfall.

11.8.5.3 Dredging Intertidal Area

There are two potential impacts, the first from the dredging activity itself, and the second from the extirpation of an area of intertidal mixed sediment flats. The dredging activity and the permanent extirpation of a section of intertidal foraging area, 3000 sq.m/0.05% oof the whole intertidal area at the sub-site, will make it unavailable to waders, and to a lesser extent, gulls for foraging, given that gulls mainly use it for surface feeding of spoil from the port. In relation to waders the main affected species are redshank, turnstone, curlew, grey heron and little egret. Given that the sub-site is likely well below carrying capacity for these species, and that the breakwater will remain available at the eastern end, the impact is likely to be small displacement and slight deprivation of a small foraging area, which is unlikely to have any long-term effect.

The dredging activity will also lead to significant disturbance close to the breakwater and will create a plume of silt in the water which may increase turbidity, affecting the ability of divers and auks to fish. The plume may produce a knock-on effect on birds by settling on intertidal vegetation such as Zostera sp beds on an incoming tide. However, given the character of the substrate, generally coarse with fines being absent this is unlikely to be significant, see Benthic Section of the Biodiversity Chapter for full details. The level of turbidity is likely to be low given the coarseness of the substrate and the lack of silt in the substrate.

11.8.5.4 Piling for New Pontoons

The piling driving element of the piling works involves the production of noise, which has a startle effect, though some bird species may become quickly habituated if the noise is regular (e.g., gulls). This can be effectively mitigated through monitoring and a slow start-up to habituate the birds.

11.8.5.5 Construction of New Quay Platform and Floating Pontoons

Construction of the quay platform and pontoons may result in temporary displacement of waders, and this is unlikely to have any significant effect on waterbird condition or productivity.

Table 11.15 Summary of Potential Significant Effects from the Demolition & Construction Phases

Activity	Quality	Significance	Duration	AA Screening Test
Demolition of former open-hydro building	Negative	Slight	Temporary	Likely Significant Effect
Construction of O&M Buildings	Negative	Slight	Medium term	Likely Significant Effect
Dredging and piling intertidal area	Negative	Moderate	Temporary	Likely Significant Effect
Quay wall and pontoon construction	Negative	Not significant	Long-term	No Likely Significant Effect

Table 11.16 Summary of Potential Significant Effects from the Demolition & Construction Phases on Various Receptors

Receptor	Value/abundance	Potential Impact Construction	Potential Impact Operation
Carlingford Lough SPA intertidal area	International	Complete conversion of 3000m sq / 0.05% of sub-site intertidal to subtidal	Nil
Light-bellied Brent Goose	12	Small displacement* if present	Nil
Shelduck	2	Nil	Nil
Wigeon	10	Nil	Nil
Teal	8	Nil	Nil
Great Crested Grebe	2	Nil	Nil
Great Northern Diver	2	Nil	Nil
Red-throated Diver	1	Nil	Nil
Cormorant	89	Small displacement	Nil
Shag	4	Nil	Nil
Little Egret	3	Neutral	Nil
Grey Heron	5	Neutral	Nil
Oystercatcher	17	Small displacement	Small displacement
Grey Plover	1	Nil	Nil
Dunlin	15	Small displacement	Nil
Black-tailed Godwit	3	Nil	Nil
Curlew	5	Small displacement	Small displacement
Redshank	12	Small displacement	Small displacement
Turnstone	10	Small displacement	Small displacement
Black-headed Gull	166	Small displacement	Nil
Common Gull	27	Small displacement	Nil
Lesser Black backed Gull	13	Small displacement	Nil
Herring Gull	1291	Nil	Nil
Great Black-backed Gull	67	Nil	Nil
Guillemot	2	Neutral	Nil
Razorbill	2	Neutral	Nil

*Small displacement means displacement between 10-100m

11.8.6 Benthic Environment

Following a review of the proposed project and associated scope of work, a range of potential project-related pressures with the potential to act on benthic habitats were identified at the construction phases of the project. These are detailed in the following Table. To determine the ZoI over which the pressures identified above might impact the receiving environment, the range over which each impact might exert a pressure was examined, and these ranges are also provided in Table 11-15.

Notably, the review did not identify evidence that the demolition elements of the project would potentially impact the benthic habitats within the proposed project's ZoI.

Table 11.17 Potential construction stage project-related pressures on the benthic environment

Activity	Potential impact	ZoI
Construction phase		
Dredging	Smothering of benthic species	Direct impact within the development footprint extending out to 250 meters distance to allow for dispersion.
	Damage to benthic species	Direct impact within the development footprint.
	Introduction of Invasive Alien Species	It is not possible to predict an exact area for the spread of IAS following any introduction.
Installation of Berth 3	Damage to benthic species	Direct impact within the development footprint.
	Smothering of benthic species	Direct impact extending to 250m from the development footprint.
	Habitat loss (area of new quay extension)	Direct area of new quay wall. Calculated to be 198.9 Square meters of benthic habitat.
Installation of new pontoon and associated infrastructure	Smothering of benthic species	Direct impact extending to 250m
	Habitat loss (Footprint of piles)	Direct area of piles. Calculated to be <1 square meter
	Introduction of Invasive Alien Species	It is not possible to predict an exact area for the spread of IAS following any introduction.
Land side development of new port facilities	Pollution: Accidental spillage of hydrocarbons or cementitious material (land side)	Area of impact out to 5km.

In order to assess the potential for impact of each of the aforementioned pressures on the benthic habitats within the ZoI of the proposed project, the Marine Evidence based Sensitivity Assessment (MarESA), Tyler-Walters *et al.* (2018), was applied. A description of this methodology is provided in section 11.4 and the results of the sensitivity assessment are set out below.

Table 11.18 Overall sensitivity assessment matrix (Tyler-Walters et al. 2018)

	Resistance	Resilience	Sensitivity
Smothering			
SS.SMu.IFiMu.PhiVir	High	High	Not sensitive
SS.SCS.CCS	High	High	Not sensitive
SS.SMx.IMx	High	High	Not sensitive
CR.MCR.EcCr	High	High	Not sensitive
SS.SMx.IMx.VcorAsquAps	N/A	N/A	N/A
SS.SMx.IMx.MedCirr	High	High	Not sensitive
SS.SMu.SMuVS	High	High	Not sensitive
SS.SMx.SMxVS	High	High	Not sensitive
LS.LMp.LSgr.Znol	None	Very low	High
LS.LSa.MuSa	High	High	Not sensitive
LS.LCS.Sh	High	High	Not sensitive
LR.LLR.F.Asc.FS	Low	Low	High
Pollution (Hydrocarbons)			
SS.SMu.IFiMu.PhiVir	N/A	N/A	N/A
SS.SCS.CCS	Low	High	Low
SS.SMx.IMx	Low	High	Low
CR.MCR.EcCr	Low	High	Low
SS.SMx.IMx.VcorAsquAps	N/A	N/A	N/A
SS.SMx.IMx.MedCirr	Low	High	Low
SS.SMu.SMuVS	Low	High	Low
SS.SMx.SMxVS	Low	High	Low
LS.LMp.LSgr.Znol	Low	Medium	Medium
LS.LSa.MuSa	Low	High	Low
LS.LCS.Sh	Low	High	Low
LR.LLR.F.Asc.FS	N/A	N/A	N/A
***Pollution* (cementitious)**			
SS.SMu.IFiMu.PhiVir	N/A	N/A	N/A
SS.SCS.CCS	Low	High	Low
SS.SMx.IMx	Low	High	Low
CR.MCR.EcCr	Low	High	Low
SS.SMx.IMx.VcorAsquAps	N/A	N/A	N/A
SS.SMx.IMx.MedCirr	Low	High	Low
SS.SMu.SMuVS	Low	High	Low
SS.SMx.SMxVS	Low	High	Low
LS.LMp.LSgr.Znol	None	Very low	High
LS.LSa.MuSa	Low	High	Low
LS.LCS.Sh	Low	High	Low
LR.LLR.F.Asc.FS	N/A	N/A	N/A
***Pollution* (Waste/ Sewage)**			

	Resistance	Resilience	Sensitivity
SS.SMu.IFiMu.PhiVir	NR	NR	Not sensitive
SS.SCS.CCS	Low	High	Low
SS.SMx.IMx	Low	High	Low
CR.MCR.EcCr	Low	High	Low
SS.SMx.IMx.VcorAsquAps	High	High	Not sensitive
SS.SMx.IMx.MedCirr	NEv	NR	NEv
SS.SMu.SMuVS	Low	High	Low
SS.SMx.SMxVS	Low	High	Low
LS.LMp.LSgr.Znol	Medium	Medium	Medium
LS.LSa.MuSa	Low	High	Low
LS.LCS.Sh	Low	High	Low
LR.LLR.F.Asc.FS	NR	NR	Not sensitive
Abrasion/Damage			
SS.SMu.IFiMu.PhiVir	Medium	Medium	Medium
SS.SCS.CCS	Low	High	Low
SS.SMx.IMx	Low	High	Low
CR.MCR.EcCr	Low	High	Low
SS.SMx.IMx.VcorAsquAps	Medium	High	Low
SS.SMx.IMx.MedCirr	Medium	High	Low
SS.SMu.SMuVS	Low	High	Low
SS.SMx.SMxVS	Low	High	Low
LS.LMp.LSgr.Znol	Low	Medium	Medium
LS.LSa.MuSa	Low	High	Low
LS.LCS.Sh	Low	High	Low
LR.LLR.F.Asc.FS	Low	Low	High
Introduction of IAS			
SS.SMu.IFiMu.PhiVir	Medium	Very Low	Medium
SS.SCS.CCS	Medium	Very Low	Medium
SS.SMx.IMx	Medium	Very Low	Medium
CR.MCR.EcCr	Low	Very Low	High
SS.SMx.IMx.VcorAsquAps	Low	Very Low	High
SS.SMx.IMx.MedCirr	Low	Very Low	High
SS.SMu.SMuVS	Low	Very Low	High
SS.SMx.SMxVS	Low	Very Low	High
LS.LMp.LSgr.Znol	Low	Low	High
LS.LSa.MuSa	Medium	Very Low	Medium
LS.LCS.Sh	Medium	Very Low	Medium
LR.LLR.F.Asc.FS	Low	Low	High
Shading			
SS.SMu.IFiMu.PhiVir	High	High	Not sensitive
SS.SCS.CCS	NR	NR	NR
SS.SMx.IMx	NR	NR	NR

	Resistance	Resilience	Sensitivity
CR.MCR.EcCr	NR	NR	NR
SS.SMx.IMx.VcorAsquAps	NR	NR	NR
SS.SMx.IMx.MedCirr	NR	NR	NR
SS.SMu.SMuVS	NR	NR	NR
SS.SMx.SMxVS	NR	NR	NR
LS.LMp.LSgr.Znol	Low	Medium	Medium
LS.LSa.MuSa	NR	NR	NR
LS.LCS.Sh	NR	NR	NR
LR.LLR.F.Asc.FS	NEv	NR	NEv
Habitat Loss			
SS.SMu.IFiMu.PhiVir	None	Low	High
SS.SCS.CCS	None	Low	High
SS.SMx.IMx	None	Low	High
CR.MCR.EcCr	None	Low	High
SS.SMx.IMx.VcorAsquAps	None	Very low	High
SS.SMx.IMx.MedCirr	None	Low	High
SS.SMu.SMuVS	None	Low	High
SS.SMx.SMxVS	None	Low	High
LS.LMp.LSgr.Znol	None	Very low	High
LS.LSa.MuSa	None	Very low	High
LS.LCS.Sh	None	Low	High
LR.LLR.F.Asc.FS	None	Very low	High

NR: Not relevant, NEv: No Evidence
Biotopes codes in bold: Assessment derived from Marlin sensitivity assessments.
All other Biotope complexes: based on expert judgement with regard to range of characterising species present.

11.8.6.1 Smothering of benthic biotopes and habitats

Sediment mobilisation in subtidal and intertidal benthic habitats has the potential to lead to effects on a range of benthic habitats and species. The extent to which sediments will mobilise is dependent on the nature of the sediment (coarse sediments settle out rapidly following disturbance), the exposure of the site (sediments in exposed sites will frequently be subject to natural disturbance due to wave action), the tidal regime of the area (tide swept sediments are generally devoid of “fines”). The impact of sediment mobilisation on benthic habitats and their constituent species is dependent on the sensitivity of those species to burial and smothering resulting from sediment mobilisation and transport. The species found in exposed sediments are generally robust specialists capable of withstanding disturbance and smothering. The impacts of physical disturbance on the species associated with exposed coarse sediments are generally low and greatest in areas of low natural disturbance where the species present are less well adapted to withstand physical stress.

The sediment habitat within the proposed dredge and construction area is comprised of relatively coarse materials and previous dredge campaigns in this area did not result in a significant sediment plume, due to the nature of the material and the strong tide between the breakwater and the quay wall.

Furthermore, local circulation around the port area on an ebb tide is easterly and southerly on a spring tide. It is therefore anticipated that any sediment mobilised will be rapidly dispersed in the local area.

The biotopes SS.SMx.IMx, CR.MCR.EcCr and LS.LMp.LSgr.Znol are all assessed as sensitive to smothering pressures. However, the extent of the ZoI is considered to be too small and localised to impact these biotopes. Therefore, no significant impacts associated with either the dredging or quay wall and pontoon construction phases on any sensitive habitats within the ZoI is anticipated.

11.8.6.2 Pollution (Hydrocarbons)

Inshore working vessels (not covered by international regulation) and equipment associated with the construction phase of the project have the potential to lead to localised impacts on marine and coastal species resulting from accidental spillage of hydrocarbons.

However, due to the size of these vessels their use of hydrocarbons is relatively low. The extent of dispersal of hydrocarbons in marine waters is governed by several factors including spreading, drifting, evaporation, dissolution, photolysis, biodegradation and formation of both oil-in-water and water-in-oil emulsions.

Diesel and petrol are light, refined petroleum products with a relatively narrow boiling range, meaning that, when spilled on water, most of the oil will evaporate or naturally disperse within a few days or less. Wave or swell action may lead to some of the oil dispersing into the water column. Oil dispersed in the water column can adhere to fine-grained suspended sediments which then settle out and get deposited on the seafloor. This process is more likely to occur in estuaries and near river mouths where fine-grained sediment is present. It is less likely to occur in open marine settings such as Carlingford Lough. Diesel oil is readily and completely degraded by naturally occurring microbes, under time frames of one to two months. In terms of toxicity to water-column organisms, diesel is considered to be one of the most acutely toxic oil types. Fish, invertebrates and seaweed that come in direct contact with a diesel spill may be killed. The area of impact of accidental fuel spills will be depended on the volume spilled and weather, dispersion conditions. The volume of such fuel likely to be carried by the small vessels using the area during the construction phase of the project is likely to be quite low. For this reason, the ZoI, relative to potential pollution events, is considered to extend out from the source to a distance of 5km. This is a highly conservative approach and takes account of the tidal dynamics within Carlingford Lough and the adjacent open waters of the Irish Sea.

It is considered that, without mitigation, there is a potential for impact on the sensitive biotopes within the ZoI, listed as having high or medium sensitivity, in Table 11-16 during the construction phase of the project.

11.8.6.3 Abrasion and Disturbance

The physical zone of impact is confined to the development footprint adjacent to the existing quay wall, the proposed new pontoon, and the dredge area during construction. Within this area, the sublittoral biotopes present are:

- SS.SMu.SMuVS Sublittoral mud in variable salinity
- SS.SMx.SMxVS Sublittoral mixed sediment in variable salinity

These two biotopes are common in areas with low salinity around the Irish coast. The benthic analysis did not indicate the presence of any rare or unusual species within this area.

The intertidal habitat in this area is characteristic of LR.LLR.F.Asc.FS in mosaic with LS.LSa.MuSa. These two biotopes are very common in both Carlingford Lough and around the Irish coast. The LR.LLR.F.Asc.FS biotope in this area is partially formed on boulder debris resulting from defence works along the embankment adjacent to the existing quay.

While these biotopes will be impacted during the construction phase of the project, it is considered that they will re-establish within the short term (<5 years[11]) following dredging. Therefore, no significant impact on these two biotopes is anticipated.

11.8.6.4 Habitat Loss

The installation of the quay wall (Berth 3) will lead to the loss of 198.9 square meters of benthic habitat. This area of habitat is comprised largely of LS.LSa.MuSa with pockets of LR.LLR.F.Asc.FS which has formed on the aforementioned boulder debris. As such, no Annex I habitats are represented within this area of loss. Similarly, the minimal loss of habitat attributed to the insertion of two piles associated with the pontoon within the SAC area in an area represented by SS.SMx.SMxVS Sublittoral mixed sediment in variable salinity which does not in itself constitute an Annex I habitat. These biotopes have likely formed in this area as a result of the original port development itself. Therefore, no significant impact on these three biotopes is anticipated.

The installation of the extension to the quay wall will result in the loss of 153.7 sq. m (0.015 hectares), or 0.00252%, of the Wetlands and Waterbird habitat within Carlingford Lough SPA.

The dredge area where the habitat will change from intertidal to sub-tidal represents 3,000 sq. m. This area will be lost as intertidal foraging over mixed substrate and become a subtidal habitat. The importance of the intertidal foraging area is minor due to its hard character, and limited availability.

11.8.6.5 Introduction and Spread of Invasive Alien Species (IAS)

While the known occurrence of marine IAS in Carlingford Lough is likely as a result of increased anthropogenic activity (leisure craft and aquaculture) over the years the proposed development is unlikely to contribute further introductions of IAS as most shipping is governed by MARPOL regulations.

Small vessels and plant working in intertidal areas can potentially lead to the introduction of marine IAS if not correctly antifouled and/or cleaned before entering an area. While the risk of IAS introduction is considered very low it may contribute to the spread of IAS in the northeast of Ireland and other SACs in this area if not adequately mitigated for during the construction phase.

[11] Short-term as defined by Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022)

11.8.7 Designated European Sites

The SISAA, determined that there was potential for the project, alone and in combination with other projects and plans, to have adverse effects on the integrity of the following European sites:

- Carlingford Shore SAC
- Carlingford Lough SPA
- Rockabill to Dalkey Island SAC

Table 11.19 European Designated Sites: Likely significant effect of the proposed development

Carlingford Shore SAC	Potential for Likely	
Annual vegetation of drift lines	Potential for LSE	An impact to this habitat within Carlingford Shore SAC has been identified from the potential for accidental spillage of hydrocarbons associated with small vessels, jack-up barges and associated plant which may be required to operate in the
Perennial vegetation of stoney banks	Potential for LSE	An impact to this habitat within Carlingford Shore SAC has been identified from the potential for accidental spillage of hydrocarbons associated with small vessels, jack-up barges and associated plant which will be required to operate in the
Carlingford Lough SPA		
Brent Goose (*Branta bernicla hrota*)	Potential for LSE	An impact to the habitat (Zostera noltei beds) which is the primary food source for this species has been identified from the potential for accidental spillage of hydrocarbons associated with small vessels, jack-up barges and associated plant which may be required to operate in the proposed project area adjacent to this habitat. Based on the distribution of Brent geese around the lough, it is unlikely that they will be temporarily displaced due to noise and visual disturbance impacts. However, applying the precautionary approach an impact could occur from the startle
Wetlands and waterbirds	Potential for LSE	An impact to the habitat (*Zostera noltei beds*) which is the primary food source for this species has been identified from the potential for accidental spillage of hydrocarbons associated with small vessels, jack-up barges and associated plant which may be required to operate in the proposed project area adjacent to this habitat. Similarly, accidental spillage of hydrocarbons and cementitious material also has the potential to impact the benthic habitats and their associated invertebrate community upon which other wildfowl associated with this SPA feed. The installation of the extension to the quay wall will lead to the loss of 153.7 Square meters (0.015 hectares) or
		It is unlikely that waterbirds will be displaced due to noise and visual disturbance impacts. However, applying the precautionary approach an impact could occur from the startle effect caused by the pile-driving element of the marine piling works. The accidental spillage of hydrocarbons from small vessels, jack-up barges and plant operating in the area may have the potential to lead to temporary impacts on benthic sediments in the event of any accidental spillage or leakage of hydrocarbons or cementitious material. It is considered that
Rockabill to Dalkey		

Carlingford Shore SAC	Potential for Likely	
Harbour porpoise (*Phocoena Phocoena*)	Potential for LSE	Harbour porpoise (*Phocoena phocoena*) which occur regularly and are associated with a European site (Rockabill to Dalkey Island SAC). Increased disturbance may occur, especially during the operation phase, and collision risk to a much lesser extent. Any impact on the feeding resource for these species (i.e. from the accidental spillage of hydrocarbons or run-off of cementitious material) has the potential to impact this species. Underwater noise, on start-up of plant and machinery working in subtidal areas, has the potential to impact Harbour porpoise with the potential to lead to effects at this European sites. Increased traffic associated with this development could lead to increased disturbance and even displacement in the wider offshore area on routes to and from Greenore which has the

Wintering waterbirds and seabirds (*ex-situ* effects) – Possibility of Potential Effect

<u>The Breakwater</u>

Although outside of Carlingford Lough SPA, Greenore port breakwater is a regular high tide roost used by small numbers of waders and divers, particularly cormorants, and larger numbers of gulls.

While no loss of the breakwater will occur because of the proposed development, disturbance related to the construction works on waterbirds is considered likely to trigger a small temporary displacement for the gull species and possibly a more permanent displacement for a small number of waders. However, they may become habituated to the new arrangement as they are to the current activities associated with a busy shipping port.

A small risk of displacement of these species is associated with noise due to marine piling, specifically pile driving.

The operation of the facility is highly unlikely to impact the conservation objectives of European sites for which they form an SCI. Therefore, while a short-term displacement may impact the COs of European sites, no long-term impact is considered likely.

<u>Greenore Golf Course</u>

Up to 280 black-headed gulls and smaller numbers of herring gulls use the golf course. When the ground is wet, a small number of oystercatchers also use the golf course foraging for earthworms. A population of 65 mallards seems to be permanent residents of the golf course, rarely venturing onto the SPA intertidal area. It was also observed that during bad weather events, birds often use the golf course for roosting (golfers typically also being absent at these times,

Therefore, no significant impact on waterbirds utilising the golf course is considered likely. For this reason, likely significant effects on SPAs designated for waterbirds within the development site's foraging range are not considered likely.

<u>Other SPAs</u>

A cohort of Brent geese are known to commute between Dundalk Bay SPA (roosting) and Carlingford Lough (feeding). However, other than a possible small displacement when drifting on the water awaiting tidal changes, they are unlikely to be impacted by the development. Specialist waders such as curlews, black-tailed godwits and oystercatchers may also move between the two SPAs. However, they are unlikely to be impacted, except for a possible small displacement.

Redshank and turnstones are more likely to be site faithful. Gulls, in particular herring gulls (O'Hanlon, 2022), are likely to range very widely in the winter months in search of feeding opportunities and these may involve visits from Dundalk Bay SPA and the North-West Irish Sea SPA and further afield. Equally, gulls frequenting these SPAs may, in turn, visit Carlingford Lough SPA, particularly when there are animal feed feeding opportunities at the port. The proposed development will result in a small temporary displacement of gulls and is unlikely to impact the conservation objectives of these distant SPAs. A small number of turnstones and redshanks use the breakwater for roosting when weather conditions are suitable (they avoid it in strong north or easterly winds). These species tend to be more site faithful, particularly turnstones, and so are unlikely to visit other SPAs.

Rockabill SPA, lies approximately 50km from the development site and is designated for Purple Sandpiper (*Calidris maritima*), Roseate Tern (*Sterna dougallii*), Common Tern (*Sterna hirundo*), and Arctic Tern (*Sterna paradisaea*). The latter three tern species breed on the island. However, studies into their foraging pattern have shown that they do not venture as far as Carlingford Lough. According to the NPWS site synopsis "*Surveys of the foraging behaviour of the Roseate Tern population on Rockabill have recorded up to 73% of Roseate Terns foraging within 3.5 km of the islands. The seas surrounding the islands, to a distance of 3.5 km, are therefore included within the SPA to protect the foraging resource of this internationally important Roseate Tern population.*"

Other SPAs designated for breeding seabirds, Irelands Eye Spa and Lambay Island SPA are even further away, well beyond the foraging range of any breeding seabird. Irelands Eye QI include (Cormorant (*Phalacrocorax carbo*), Herring Gull (*Larus argentatus*), Kittiwake (*Rissa tridactyla*), Guillemot (*Uria aalge*), Razorbill (*Alca torda*) while Lambay Island SPA QIs are Fulmar (*Fulmarus glacialis*), Cormorant (*Phalacrocorax carbo*), Shag (*Phalacrocorax aristotelis*), Greylag Goose (*Anser anser*), Lesser Black-backed Gull (*Larus fuscus*), Herring Gull (*Larus argentatus*), Kittiwake (*Rissa tridactyla*) [A188], Guillemot (*Uria aalge*), Razorbill (*Alca torda*) and Puffin (*Fratercula arctica*).

Boyne Estuary SPA lies approximately 30 km from the development site, QIs for this site are overwintering Shelduck (*Tadorna tadorna*), Oystercatcher (*Haematopus ostralegus*), Golden Plover (*Pluvialis apricaria*), Grey Plover (*Pluvialis squatarola*), Lapwing (*Vanellus vanellus*), Knot (*Calidris canutus*) , Sanderling (*Calidris alba*), Black-tailed Godwit (*Limosa limosa*), Redshank (*Tringa totanus*), and Turnstone (*Arenaria interpres*). In an overwintering context these species are all likely to be site faithful and unlikely to visit the ZoI of the development site, or indeed Carlingford Lough at all. It is also designated for breeding Little Tern (*Sterna albifrons*), where a colony of up to 100 pairs regularly breeds during the summer. This species is notable for its short foraging range, typically less than 2km, and so are unlikely to visit the development site; indeed, little terns have never been recorded in Carlingford Lough.

11.9 Potential Significant Effects (Operational Phase)

11.9.1 Terrestrial Habitat

As described under section 11.8.1 above for the demolition and construction phase, the terrestrial development area has been subject to significant human modifications over the last 150 years. Therefore, and due to the site's already limited biodiversity value, it is considered highly unlikely that further modifications would impact terrestrial habitats.

The landscape design integrates habitat enhancement measures through the selection of native planting and species listed in the All-Ireland Pollinator Plan. The effect of these measures is likely moderately positive, at the local level with a permanent duration.

11.9.2 Terrestrial Mammals

As described under section 11.6, the proposed development site's habitats are of very limited value for fauna, having regard to the largely built nature of the existing environment. The proposed operational phase will have no perceptible impact on terrestrial mammals.

11.9.3 Bats

The Bat Report states,

"The potential for collision risk and impact on flight paths in relation to bats is considered is considered low due to the low level of bat activity on site and the buildings would be deemed to be clearly visible to bats. The site is currently well-lit from the existing floodlights within the subject site, and from light spill of the adjacent residential area street lighting. There are no predicted significant negative impacts on bat species from the proposed development."

11.9.4 Marine Mammals

Following a review of the proposed project and associated scope of work, a range of potential project-related pressures with the potential to act on marine mammals were identified at the operational phase of the project, these are detailed in Table 11-18. The ZoI over which the pressures identified above might impact the receiving environment was examined to determine the range over which each impact might exert a pressure.

The ZoI is not restricted to the immediate proposed development site but includes an extended area in line with the National Parks and Wildlife Service (NPWS) publication *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* (2014).

Table 11.20 Potential Operational Phase Impacts on Marine Mammals

Activity	Potential impact	ZoI
Operational phase		
Presence of a new pontoon	Displacement	Long-term displacement of normal activities along access route by vessels using pontoon.
	Disturbance	Medium-term displacement of normal activities along access route by vessels using pontoon.
	Pollution (waste, sewage and accidental spillage of hydrocarbons from visiting vessels)	Area of impact out to 5km.
Day-to-day use of port and associated facilities	Pollution (waste, sewage and accidental spillage of hydrocarbons)	Medium-term displacement of normal activities along access route by vessels using pontoon. Area of impact out to 5km.

Both seals and cetaceans are likely to be exposed to potential disturbance during the operational phase. Seals are more likely to be exposed within Carlingford Lough, while cetaceans are more likely to be exposed in the approaches to and at the mouth of the Lough.

Low-frequency continuous sound such as that generated by shipping has been reported as the dominant source of anthropogenic sound in a broad-band range from 5 to 300 Hz. Characteristics of shipping noise, including frequency and source level, are roughly related to vessel size and speed (Richardson *et al*. 2013). Smaller vessels such as a CTV produce higher frequencies of noise, typically up to 10 kHz (which attenuate at shorter distances) but at a lower source level (for example, see Sims et al. 2012).

The hearing range of harbour and grey seals extends over wide frequencies, including the ultrasonic spectrum. The area of best hearing is between 8 and 25 kHz, with acute hearing also at lower frequencies (Terhune and Turnbull 1995), which overlaps in part with the peak sound energy generated up to 10 kHz.

The waters surrounding haul-out sites are critical habitats for feeding and/or for navigation to more offshore foraging areas. This may lead to chronic exposure to man-made noise, however, in areas with repeated exposure to human activity, marine mammals may become habituated with a decline in avoidance responses and thus become less sensitive to noise and disturbance (Richardson *et al.* 2013).

The fast nature of CTV also presents a collision risk to marine mammals at the surface. CTV routes to ORE sites will tend to be fixed, reducing the effect of disturbance and collision risk as marine mammals learn to avoid the area after repeated use. Clearly, it is important that these routes do not pass through (or close to) important habitats.

11.9.5 Avifauna

Only the control rooms will operate 24/7. The deployment of technicians and equipment on the pontoons, the entry-exit from the port area and the berthing of Crew Transfer Vessels (CTVs) will take place over an approx. 18-hour period, running from 6 am to 9 pm.

The potential impacts on avifauna during the operational stage of the proposed development are (i) disturbance arising from increased human activity, noise, and lighting caused by the movement between the OMFs and the pontoons and the movement of CTVs as they travel out from the port to the offshore wind arrays.

Based on a demonstrated tolerance distance of between 10 and 100 metres and the observed habituation of birds using the breakwater for roosting, no long-term significant effect on these birds is considered likely.

A reduction in the number of divers and auks using the port area for fishing may result, though anecdotally, floating pontoons may attract fish, which may have the effect of offsetting the displacement effect when the pontoons are not in use. Similarly, grey herons and little egrets may also use the pontoons as a platform for fishing.

It is unlikely that the operational stage will have a significant adverse effect on the local avifauna population.

11.9.6 Benthic Environment

Following a review of the proposed project and associated scope of work, a range of potential project-related pressures with the potential to act on benthic habitats were identified at the operational phase of the project. These are detailed in the following Table. To determine the ZoI over which the pressures identified above might impact the receiving environment, the range over which each impact might exert a pressure was examined, and these ranges are also provided in Table 11-19.

Table 11.21 Potential operational stage project-related pressures on the benthic environment

Activity	Potential impact	ZoI
Operational phase		
Presence of new pontoon	Shading effect of new pontoon	Direct area below pontoon extending to 25m buffer.
	Introduction of Invasive Alien Species from visiting vessels	It is not possible to predict an exact area for the spread of IAS following any introduction.
	Pollution (waste, sewage and accidental spillage of hydrocarbons from visiting vessels)	Area of impact out to 5km.
Day-to-day use of port and associated facilities	Pollution (waste, sewage and accidental spillage of hydrocarbons)	Area of impact out to 5km.

11.9.6.1 Pollution (Hydrocarbons)

Vessels accessing and moored on the proposed new pontoon (not covered by international regulation) and equipment have the potential to lead to localised impacts on marine and coastal species resulting from the accidental spillage of hydrocarbons.

The area of impact of accidental fuel spills will depend on the volume spilled and weather and dispersion conditions. The volume of such fuel likely to be carried by the small vessels using the area during the operational phases of the project is likely to be quite low. For this reason, the ZoI, relative to potential pollution events, is considered to extend out from the source to a distance of 5km. This is a considered a highly conservative approach and takes account of the tidal dynamics within Carlingford Lough and the adjacent open waters of the Irish Sea.

It is considered that, without mitigation, there is a potential for impact on the sensitive biotopes within the ZoI, listed as having high or medium sensitivity, in Table 11-16 during the operational phase of the project.

11.9.6.2 Introduction of IAS

Vessels (not governed by MARPOL regulations) visiting the pontoon area can lead to the introduction of IAS. While the risk of IAS introduction is considered very low, it may contribute to the spread of IAS in the northeast of Ireland if not adequately mitigated.

11.9.6.3 Shading/fouling

The area directly under the proposed new pontoon and access gangway will be subject to shading effects. The sublittoral biotopes present in this area are not sensitive to shading. Therefore, no shading impact is foreseen.

Fouling of the wetted surface of structures e.g. by mussels frequently leads to an alternation of the benthic habitat directly below and radiating out for a number of meters from the structure due to the establishment of mussels and their associated pseudofeces. However, the tide across this area is likely to prevent the formation of significant residues of pseudofeces. Furthermore, the biotopes at this location would not be sensitive to the effects of pseudofeces deposition.

11.9.7 Designated European Sites

There is a direct spatial overlap between the proposed project and Carlingford Shore SAC and Carlingford Lough SPA. There is a small potential for increased disturbance to Harbour porpoise from the Rockabill to Dalkey Island SAC from increased boat traffic accessing the proposed project site.

An impact to the habitat within Carlingford Shore SAC has been identified from the potential for accidental spillage of hydrocarbons associated with CTVs which will be required to operate in the proposed project area adjacent to this habitat.

11.9.7.1 Coastal Habitats

Perennial vegetation of stony banks

An impact to this habitat within Carlingford Shore SAC has been identified from the potential for accidental spillage of hydrocarbons associated with small vessels i.e. CTVs.

Annual vegetation of drift lines

An impact to this habitat within Carlingford Shore SAC has been identified from the potential for accidental spillage of hydrocarbons associated with small vessels i.e. CTVs

11.9.7.2 Avifauna

Brent Goose and other water birds

An impact to the habitat (*Zostera noltei* beds) which is the primary food source for this species has been identified from the potential for accidental spillage of hydrocarbons associated with small vessels i.e. CTVs.

Based on the distribution of Brent geese around the lough, it is unlikely that they will be temporarily displaced due to noise and visual disturbance impacts. However, applying the precautionary principle, a Likely Significant Effect is assigned.

Wetlands for Waterbirds

As above for Brent Geese, an impact to the habitat (*Zostera noltei* beds) which is the primary food source for this species has been identified from the potential for accidental spillage of hydrocarbons associated with small vessels i.e. CTVs.

Similarly, accidental hydrocarbon spillage has the potential to impact the benthic habitats and the associated invertebrate community upon which other wildfowl feed.

Similar to the Brent Geese displacement due to noise and visual disturbance impacts is considered unlikely. However, applying the precautionary principle, a Likely Significant Effect is assigned.

11.9.7.3 Benthic habitats

The accidental spillage of hydrocarbons from small vessels i.e. CTVs operating in the area may have the potential to lead to temporary impacts on benthic sediments in the event of any accidental spillage or leakage of hydrocarbons. It is considered that this may have the potential to result in negative impacts on benthic habitats associated with the wetland habitat for waterbirds within Carlingford Lough SPA.

11.9.7.4 Wintering waterbirds and seabirds (*ex-situ effects*)

The Breakwater

Disturbance related to the operational phase on waterbirds is considered likely to trigger a small temporary displacement for the gull species and possibly a more permanent displacement for a small number of waders. However, it is likely that they would become habituated to the new arrangement as they are to the current activities associated with a busy shipping port.

11.9.7.5 Marine Mammals associated with SACs (ex-situ effects)

Harbour porpoise (*Phocoena phocoena*) which occur regularly and are associated with a European site (Rockabill to Dalkey Island SAC). Increased disturbance may occur especially during the operation phase, and to a much lesser extent, collision risk. Any impact on the feeding resource for these species (i.e. from the accidental spillage of hydrocarbons from CTVs) has the potential to impact this species associated with other European sites.

Increased traffic associated with this development could lead to increased disturbance and even displacement in the wider offshore area on routes to and from Greenore which has the potential to impact Harbour porpoise associated with other European sites. While the risk is considered to be extremely low, the potential for negative effects, without mitigation, is considered possible.

11.9.8 Cumulative Effects

The cumulative assessment takes account of the impacts associated with the proposed development together with other projects and plans.

A fundamental requirement of assessing cumulative/in-combination effects is to identify those projects, plans or activities with which the proposed development may interact and create a cumulative impact. These interactions can arise during the construction, operation, and decommissioning phases.

A decommissioning phase is not anticipated for the proposed development. The infrastructure is being developed to service offshore wind farms. When those wind farms near the end of their design life (anticipated at least approx. 25 years), they may be 'repowered' i.e. subject to a further grant of planning permission turbines and associated technology will be replaced (partially or totally) with more powerful and efficient models using the latest technology. The proposed O&M facility will, therefore, continue to be required.

In the unlikely event that full decommissioning of all relevant offshore wind farms occurs, the O&M infrastructure (pontoon and warehouses) will be capable of being utilised as part of the existing port operations, subject to obtaining any necessary further consents.

To inform this part of the report a 'long list' of projects, plans and activities was compiled, and it is presented in Appendix 1.1 (Volume III) and includes,

- Planning permissions – Last 5 years
- Planning applications
- Projects holding a Maritime Area Consent (MAC)
- Foreshore Licenses
- Aquaculture Licences in Carlingford Lough
- Wastewater discharge Licences

We are not aware of any other proposed projects at this time for which applications have not yet been submitted.

Table 11.22 Potential for Cumulative Impacts

Potential impact	Identified projects with potential for cumulative impact	Assessment of potential for cumulative impact
Carlingford Shore SAC		
Annual vegetation of drift lines [1210]		
Projects with a hydrological connection to the Carlingford Shore SAC that, during their individual construction phase(s), may generate an accidental spillage of hydrocarbons that would reach the SAC during high spring tides or high swell.	No projects identified.	No potential for impact
Perennial vegetation of stony banks [1220]		
Projects with a hydrological connection to the Carlingford Shore SAC that, during their individual construction phase(s), may generate an accidental spillage of hydrocarbons that would reach the SAC during high spring tides or high swell.	No projects identified	No potential for impact
Carlingford Lough SPA		
Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]		
Projects, plans or activities that would directly impact the identified foraging areas for brent geese and waterbirds. In particular, any planned oyster beds, and any plans or projects associated with the golf course.	Existing and additional aquaculture operations in the vicinity of the port have the potential to displace brent geese and waterbirds from their preferred foraging habitat. Carlingford Oyster Company LCC2360352. Existing aquaculture operations within Carlingford Lough.	Potential for cumulative impact, without mitigation during the construction phase of the proposed development.
Projects, plans or activities that would lead to displacement of birds roosting area	None identified	No potential for cumulative impacts.
Noise and vibration from piling, rock-breaking, blasting and other intensive construction activities cause disturbance	Temporary displacement	No potential for cumulative impacts.
Occupation of the site will generate foul sewage for disposal at Dundalk Wastewater Treatment Plant	In relation to residential developments granted permission in the last 5 years, the review demonstrates that the permissions predominantly relate to extensions or modifications to existing dwellings, with three permissions relating to new	No potential for cumulative impacts.

	dwellings. None of the applications included an Appropriate Assessment Screening or a Natura Impact Statement. The granting of permission demonstrates that the planning authority was satisfied that for each development, they would not, alone or in combination with other plans or projects, adversely affect the integrity of any European sites. Therefore, any potential for cumulative impact with the proposed development is considered to be unlikely or insignificant.	
	A permission under appeal relates to Carlingford Oyster Company Limited retention and completion of a partially constructed single story extension at a production building. The report on file references inter alia: A submission from the Loughs Agency may be relevant to the drainage with regard to surface water mitigation measures.	Potential for cumulative impact, without mitigation during the construction phase of the proposed development.
Wetland and Waterbirds [A999]		
Projects, plans or activities that would directly impact the wetlands and waterbirds habitat within the SPA and/or contribute to habitat loss.	Carlingford Oyster Company) LCC2360352. Operational phase impacts of the existing aquaculture operations within Carlingford Lough resulting from the accidental spillage of hydrocarbons associated with vehicles accessing the oyster trestles.	Potential for cumulative impact, without mitigation during the construction phase of the proposed development.
***Ex situ* sites**		
Rockabill to Dalkey Island SAC		
Reefs [1170]		
Accidental spillage of hydrocarbons	Hydrological link to distant and weak for any potential for impact	No potential for cumulative impacts.
***Phocoena phocoena* (Harbour Porpoise) [1351]**		
Vessels transiting the approaches to Carlingford Lough, utilising the new CTV berths will increase noise levels in this area	The North Irish Sea Offshore Windfarm, which has been awarded a MAC will also contribute to increased noise levels in the area	Potential to act cumulatively with the proposed project but can't be fully assessed as the design of the OWF has not been finalised as full planning permission has not been granted.

Disturbance due to construction noise	Three potential future ORE projects have been identified. Bray offshore Ltd, Kish Offshore wind Ltd (Dublin array: MAC-003 & 004. North Irish Sea Array windfarm: MAC-005 Codling Wind Park Ltd: MAC-006	Site investigation licences have been applied for and granted to these projects. Such applications have been subject to AA, including the consideration of the potential for impacts with mitigation excluded. The applications for planning permission (and associated EIAR and/or Natura Impact Statement) for these projects are due to be submitted in 2024. Should any of these proposed ORE projects secure development permission, the proposed works associated with those projects could potentially overlap with time period of the construction and/or operational phase of the proposed development, and that in-combination impacts may be possible.

11.9.9 Summary

The following Table summarises the identified likely significant effects during the demolition and construction phases of the proposed development before mitigation measures are applied. The description of effects follows the terminology established in the EPA *Guidelines on the information to be contained in Environmental Impact Assessment Reports*.

Table 11.23 Summary of Demolition and Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Type
Pollution (Hydrocarbons)	Negative	Moderate significant impact	5km	Low	Direct
Abrasion and Disturbance	Neutral	Insignificant impact	Direct area of dredging and quay wall/pontoon installation	Low	Direct
Habitat loss	Neutral	Insignificant impact	Direct area of dredging and quay wall/pontoon installation	High	Direct
Introduction of IAS	Negative	Moderate significant impact	Carlingford Lough	Medium	Indirect
Displacement of Seals	Negative	Moderate significant impact	>500m	High	Direct
Displacement of Birds	Negative	Moderate significant impact	>100m	High	Direct

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 11-1. Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Type
Pollution (Hydrocarbons)	Negative	Moderate significant impact	5km	Low	Direct
Introduction of IAS	Negative	Moderate significant impact	Carlingford Lough	Medium	Indirect
Shading/fouling	Neutral	Insignificant impact	25m	N/A	Direct
Displacement of marine mammals	Negative	Moderate significant impact	>1000m	High	Direct
Displacement of Birds	Negative	Moderate significant impact	>100m	High	Direct

11.10 Mitigation Measures

11.10.1 Incorporated Design Mitigation

The design integrates enhancement measures for swifts in the form of 10 swift boxes per OMF building, for a total of 30 boxes.

The landscape design is carefully considered to ensure that all species are capable of thriving within this coastal setting. Native species are included together with pollinators as advised by the All-Ireland Pollinator Plan.

11.10.2 Demolition & Construction Phase Mitigation

Mitigation Measure No. 1

Where feasible, the timing of the clearing of the vegetation within the 'Residential Site' will avoid the bird breeding season (March-August inclusive). Where the construction programme does not allow this seasonal restriction to be observed, a pre-clearance check of that area f the proposed development site for nests will be carried out by a suitably qualified ecologist in advance of commencing the clearance. Where it can be confirmed that no nesting birds are present, the clearance will commence. Where breeding birds are confirmed to be present, the clearance must not commence until it can be confirmed that the chicks have fledged.

Mitigation Measure No. 2

Prior to any works commencing the Construction Environment Management Plan (CEMP) will be reviewed and updated by the Contractor. It will, *inter alia*, include all of the mitigation measures detailed in this section. The CEMP will be reviewed by a qualified ecologist to ensure it meets the requirements of this chapter and the Natura Impact Statement.

In addition, the CEMP will detail the relevant person with overall responsibility for the implementation for the CEMP.

The CEMP will include details of the following:

- Details of all chemical/fuel storage areas (including location and bunding to contain run-off of spillages and leakages).
- Details of how and where hazardous wastes such as oils, diesel and other hydrocarbon or other chemical waste are to be stored and disposed of in a suitable manner.
- Details of emergency plan to deal with the containment of chemical spillage, cement spillage.
- Truck wheel wash details (including measures to avoid and treat runoff).
- Site run-off management, including details of appropriate containment measures to be put in place at the quayside to prevent contamination of the lough.
- A Waste Management Plan (WMP) which clearly sets out the Contractor's proposals regarding the treatment, storage and disposal of waste.

Mitigation Measure No. 3

Care will be taken at all times to avoid contamination of the environment with cementitious material. A protocol for the management of cement will be prepared. Specifically, this should detail measures to:

- Assess where any wastewater associated with the use of cement will run and the most appropriate way to dispose of it.
- Ensure that an appropriate area of the site, at least 50m from the marine area, is designated for concrete delivery. Further, ensure this area is away from stormwater drains or that drains and gutters in the vicinity have been blocked off.
- Use spill mats to contain any spills.
- Use sandbags or diversion booms to direct any run-off to an appropriate safe location away from marine areas.
- Set up a designated Washdown Area away from marine areas or with potential to run-off to it.
- Ensure proper management in the event of an accidental spill.

Mitigation Measure No. 4

The assessment of impacts indicated that the accidental spillage of hydrocarbons had the potential to lead to a localised significant impact on the receiving environment. Therefore, the following mitigation will be implemented during the construction phase to avoid the possibility of accidental spillage of any hydrocarbons associated with the use of plant, machinery or inshore vessels (if used).

The proper use and storage of oils and fuels as set out below will be implemented by the appointed contractor.

- A designated area within the site compound will be established for the storage of plant, machinery and materials during the construction phase of the project. The site compound will be suitably located with due regard for the receiving environment and in particular the sensitive receiving waters.

- All plant and machinery will be refuelled at a dedicated refuelling area within the site compound with appropriate spill controls in place.
- All plant and machinery will be regularly checked for leaks.
- Any hydrocarbons used on the project site will be contained within a bunded container or area.
- A hydrocarbon oil boom to be available at all times onsite in the event of it needing to be deployed.
- If required, generators to be on a hydrocarbon mat at all times.
- A spill kit to deal with any accidental spillage of hydrocarbons will be available at the project site.
- The roles and responsibilities of construction and associated staff regarding the protection of the receiving environment will be clearly set out and documented.

Mitigation Measure No. 5

The assessment of impacts indicated the potential for the introduction of IAS associated with plant and small vessels working in the intertidal and subtidal areas. Therefore, the following mitigation will be implemented by the developer:

Boats, barges and marine equipment working in the intertidal and nearshore area will be free of fouling by the use of appropriate application of antifouling paints and/or washdowns for smaller boats and plant. All visible hitchhikers will be removed from any tracked plant and equipment entering the intertidal area.

Mitigation Measure No. 6

Where feasible, the pile driving element of the marine piling works will not take place between the 20th of May and the 30th of June. Where the construction programme does not allow this seasonal restriction to be observed, a pre-construction check of the breakwater for nesting black guillemot will be carried out by a suitably qualified ecologist in advance of commencing the pile driving works. Where it can be confirmed that no nesting birds are present, the pile driving will commence. Where birds are confirmed to be present, the pile driving works must not commence until it can be confirmed that the chicks have fledged, and the site has been abandoned.

Mitigation Measure No. 7

Where feasible, any rock-breaking element of the capital dredge will not take place between the 20th of May and the 30th of June. Where the construction programme does not allow this seasonal restriction to be observed, a pre-construction check of the breakwater for nesting black guillemot will be carried out by a suitably qualified ecologist in advance of commencing the rock-breaking works. Where it can be confirmed that no nesting birds are present, the rock breaking will commence. Where birds are confirmed to be present, the rock-breaking works must not commence until it can be confirmed that the chicks have fledged, and the site has been abandoned.

Mitigation Measure No. 8

To mitigate any startle effect from the pile-driving element of the marine piling works on overwintering birds, a suitably qualified observer will monitor that aspect of the works, and piling driving will start later than the general construction operation commencement on each day to ensure a slow start-up to habituate the birds.

Mitigation Measure No. 9

NPWS (2014) provides guidance to manage the risk to marine mammals from man-made sound sources in Irish waters. This document provides guidance and mitigation measures to address key potential sources of anthropogenic sound that may impact negatively on marine mammals in Irish waters. The mitigation methods should follow the guidance prescribed by the NPWS to avoid PTS. The guidance set out in NPWS (2014),

Mitigation Measure No. 10

A suitably qualified, and experienced Marine Mammal Observer during piling and dredging to implement NPWS (2014) Guidelines (and any amendments).

Mitigation Measure No. 11

A pre-demolition bat survey of structures proposed for demolition for bats will be carried out by a suitably qualified ecologist.

The mitigation measures for dust are contained in Chapter 14 of this EIAR and water in Chapter 10.

11.10.3 Operational Phase Mitigation

Mitigation Measure No. 12

The assessment of impacts indicated that the accidental spillage of hydrocarbons from smaller vessels using the pontoon had the potential to lead to a localised impact on the receiving environment. Therefore, the following mitigation will be implemented during the operational phase of the project to avoid the possibility of accidental spillage of any hydrocarbons:

- Refuelling of vessels via decanting from containers will not be permitted at the pontoon or within the port area.
- Bilges and/or ballast water (if relevant) will not be emptied at the pontoon.
- Detergent will not be used to clear up small spills of hydrocarbons. Oil absorbent cloths will be used instead.
- Greenore Port will maintain a kit of oil absorbent cloths and small booms to deal with accidental spillages.
- Oil absorbent collars will be fitted around the fuel nozzle to catch any drips or overflow.
- Clear signage indicting refuelling protocols will be displayed at the pontoon.

Mitigation Measure No. 13

The assessment of impacts indicated the potential for the introduction of IAS through small boats using the marina. Therefore, the following mitigation will be implemented by the developer:

- Recreational vessels will not be permitted to use the pontoon.
- Ballast water (if relevant) will not be discharged within the port area.
- Regular inspections of the hulls of visiting vessels for obvious IAS will be carried out by the operators.
- Clear signage indicating biosecurity protocols will be displayed at the pontoon.
- Staff will be trained in the identification of obvious IAS.
- Fouled vessels should not be allowed to enter the pontoon area.
- Any IAS recorded will be reported to the National Biodiversity Data Centre.

Mitigation Measure No. 14

Outside of Carlingford Lough, disturbance to marine mammals during operation may occur as vessel traffic will increase. The new quay wall and pontoons will provide berths for up to 11 CTV which will access the North Irish Sea from Greenore. These vessels will be required to use existing channels on the approach to and from the port. Each vessel pilot and captain is responsible to act accordingly and slow speeds to match environmental conditions and restrict any risk of wake. Once clear of the Lough vessels will reach operational speed, which could cause disturbance and a collision risk to marine mammals. In accordance with Maritime Notice 15, a speed limit of 7knots is to be adhered to when encountering areas of mammal populations. These routes have not yet been established and disturbance and displacement will need to be considered by each ORE project through the environmental assessment undertaken for those projects.

Mitigation No. 15

Post-construction (Phase 1 and Phase 2) survey of seals in June and September to ensure haul out sites still being used by common and grey seals.

11.11 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

Table 11.24 Demolition and Construction Phase Residual Effects

Likely Significant Effect	Significance Pre Mitigation	Mitigation Proposed	Significance Post Mitigation
Pollution (Hydrocarbons)	Moderate significant impact	Yes	No Significant Effect will arise.
Abrasion and Disturbance	Insignificant impact	Yes	No Significant Effect will arise.
Habitat loss	Insignificant impact	No	No Significant Effect will arise.
Introduction of IAS	Moderate significant impact	Yes	No Significant Effect will arise.
Displacement of Seals	Moderate significant impact	Yes	No Significant Effect will arise.
Displacement of Birds	Moderate significant impact	Yes	No Significant Effect will arise.

Table 11.25 Operational Phase Residual Effects

Likely Significant Effect	Significance	Mitigation proposed	Significance Post Mitigation
Pollution (Hydrocarbons)	Moderate significant impact	Yes	No Significant Effect will arise.
Introduction of IAS	Moderate significant impact	Yes	No Significant Effect will arise.
Shading/fouling	Insignificant impact	No	No Significant Effect will arise.
Displacement of marine mammals	Moderate significant impact	Yes	No Significant Effect will arise.
Displacement of Birds	Moderate significant impact	Yes	No Significant Effect will arise.

11.11.1 Cumulative Residual Effects

Neither the development proposed, nor any other projects or plans will give rise to any significant impacts on biodiversity and there are no predicted cumulative impacts in relation to biodiversity, for example in terms of habitat loss or disturbance to protected species, as a result of the Proposed

Development in combination with existing / proposed plans or projects. Therefore, no significant effect will arise.

11.12 Risk of Major Accidents or Disasters

Considering the sensitivity of Carlingford Lough, the landscape design at the interface of the terrestrial and nearshore area has been developed in consultation with the project ecologist to ensure that the species selected are appropriate and will not pose a threat to lough.

11.13 Worst Case Scenario

The worst-case scenario would be that the mitigation measures proposed were not implemented, and the effect would be as per the summary set out in Section 11.9.9.

11.14 Interactions

There are interactions between this Biodiversity Chapter and those of Landscape & Visual (Chapter 5), Land and Soils (Chapter 9), and Water and Hydrology (Chapter 10).

In terms of Land and Soils, there is overlap with the biodiversity chapter in that the potential impact of the construction works, through excavation, construction etc., have the potential to adversely affect the receiving environment; both geological and ecological. The mitigation measures in both chapters overlap somewhat as they deal with protecting the receiving environment from the construction works e.g., protecting waterbodies from pollution and sedimentation.

Likewise, with Hydrology, the mitigation measures proposed in these chapters address the potential for the Construction Phase to impact receiving waterbodies and ecology in the vicinity of the Site.

In terms of Landscape and Visual, the proposed landscaping of the Site interacts with its biodiversity and ecology; through the changes that will occur to the existing habitats and flora at the Site. The landscaping proposals will entail losses and contributions in terms of vegetation at the Site, which in turn will affect the ecology of the Site. The Site in its current condition is not of high ecological value, and the proposed landscaping will not result in significant adverse effects in this regard.

A series of mitigation measures have been prepared to minimise dust emissions and they are set out in Chapter 14, Air Quality. It is concluded that provided the dust minimisation measures outlined in the plan are adhered to, the predicted residual air quality effects during the construction phase including demolition are direct, short-term, negative, and not significant. Best practice mitigation measures are proposed for the construction phase of the proposed development, which will focus on the proactive control of dust and other air pollutants, to minimise generation of emissions at source. The mitigation measures that will be put in place during construction will ensure that the impact complies with all EU ambient air quality legislative limit values, which are based on the protection of human health (see Table 14.1). Therefore, the predicted residual, dust-related, human health effect of the construction phase of the proposed development is direct, short-term, negative, and not significant.

11.15 Monitoring

The project will be monitored by a suitably qualified ecologist. The ecologist will be familiar with the ecological significance of the site, the practical constrains of the site and all of the proposed mitigation outlined in this document and any associated relevant conditions that may be a condition of consent. The project ecologist will liaise closely with the on-site project supervisor during both the pre-construction and construction phase of the project.

- The project ecologist will have the authority to halt works that may appear to be leading to any previously unforeseen impact and will ensure that all mitigation specified is carried out.
- The role of the ecologist will include informing site staff, as well as supervisors on the sensitivity of the environment where works are proposed. The project ecologists' role will include weekly site walkovers of the planned areas of work in advance of any operations. The ecologist will liaise with the site supervisor on a weekly basis to discuss potential areas of sensitivity, including the presence of Invasive Alien Species, and advice on any further actions that may be required to avoid potential impacts. The site supervisor will advise all staff working on the site of the relevant sensitivities at weekly tool box meetings in advance of any work taking place. Compliance with such advice will be overseen by the site ecologist.
- An Invasive Species Management Plan (ISMP) for the proposed new pontoon will be prepared. The ISMP will include an annual monitoring schedule by a marine ecologist experienced in the identification of IAS, including cryptic IAS. The monitoring schedule will include inspections of the wetted surfaces of the pontoon and quay walls. All IAS recorded will be identified to species level and records provided to the National Biodiversity Data Centre. An inspection log recording the surveys undertaken and any IAS recorded will be maintained by the developer/occupier of the O&M units.
- A record of all antifouling procedures implemented will be kept for the duration of the project.

11.16 Conclusion

This assessment demonstrates that if the identified mitigation measures are implemented during the demolition, construction and operational stages, the identified significant effects can be appropriately mitigated and reduced to a level whereby no significant effect will arise.

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CHAPTER 12
COASTAL PROCESSES

VOLUME II
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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12 Coastal Processes

12.1 Introduction

This chapter assesses the potential impact of the proposed O&M Facility on coastal processes around the Greenore Port area and includes information about the tidal regime, inshore wave climate and sediment dispersion to enable the competent authority to assess the potential impacts on coastal processes.

The assessment presented in this chapter is based on the project description detailed in Chapter 2.

12.2 Expertise & Qualifications

The author, Penny Haywood, is a Project Scientist within RPS and holds a BSc (Hons) in Marine Science, an MSc in Applied Marine Geoscience and an MSc in Civil Engineering and has 10 years of experience working in the field of offshore and coastal hydrodynamics.

The reviewer, Kristopher Calder, is a Technical Director within RPS and holds a BSc (Hons) in Marine Biology and an MSc (Distinction) in Physical Oceanography and has over ten years of experience in the field of coastal processes and numerical modelling. Kristopher is a Chartered Scientist (CSci) and Water and Environment Manager (CWEM) and a full member of the Chartered Institute of Water and Environmental Management (CIWEM) an Associate Member of the Institute of Civil Engineers (AMICE).

12.3 Proposed Development

A full description of the proposed development is set out in Chapter 2 of this EIAR. The following is a summary of the proposed works.

A full description of the proposed development is provided in **Chapter 2** of this EIAR. The following is a summary of the proposed works:

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare) and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. Where rock is encountered (estimate max of 1,000m^3), it will be reused on site.

Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 of the development.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA). The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine room wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary,, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

1. **'Terrestrial Port Area'**, (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.

2. **'Nearshore Environment'** (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
3. **'Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
4. **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

The following is a general location plan of the plots identified above.

Figure 12.1 Development Areas

12.3.1 Aspects Relevant to this Assessment

The aspects of the development that considered relevant and therefore considered as part of this chapter are the existing site conditions in context of the tide, wave and sediment transport regimes and the impact of dredging works during the construction period. These aspects will be considered in addition to the potential operational phase impacts of the proposed development on these key coastal processes.

This section should be read in conjunction with the design drawings and reports which accompany this planning application.

12.4 Assessment Methodology

The assessment of the impacts of the proposed development in context of coastal processes was undertaken as per the numerical modelling methodology described in section 12.4.5.

12.4.1 Relevant Legislation & Guidance

Specific to the assessment of Coastal Processes, the following guidance documents and codes were considered:

- Advice to Inform Development of Guidance on Marine, Coastal and Estuarine Marine Processes Numerical Modelling Assessments (Pye, et al., 2017).
- Guidance on Best Practice for Marine and Coastal Marine Processes Baseline Survey and Monitoring Requirements to inform EIA of Major Development Projects (Brooks, et al., 2018).
- EN 1991-1-4 (2005) (English): Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions [Authority: The European Union Per Regulation 305/2011, Directive 98/34/EC, Directive 2004/18/EC.
- CP 3:Chapter V-2:1972. Code of basic data for the design of buildings. Loading - Wind loads.

12.4.2 Study Area

As detailed in Section 12.4.7, the study area considered for this assessment included all of Carlingford Lough, extending from Newry in the north west to *c.*3km beyond Ballagan Point in the south east at the entrance to the Lough. This extent study area was determined based on two factors. Firstly the large extent was required to ensure the hydraulics was sufficiently represented in all numerical simulations. Secondly, it was necessary, to ensure the model sufficiently covered the extent of two tidal excursions (i.e., the distance that a suspended particle could potential be transported).

This was determined by releasing neutrally buoyant particles within the vicinity of Greenore Port. The excursion (i.e., distance travelled) of these particles was examined over the course of a spring tide cycle and used to ensure the study area encompassed this extent.

12.4.3 Site Surveys/Investigations

Data from the following site surveys and/or investigations were used to inform the assessment presented in this chapter:

- Greenore Port Geotechnical Interpretive Report as supplied by Gavin & Doherty Geosolutions (2024).
- Bathymetry data/drawing no. MG230307 as supplied by Six West Ltd (2023).
- Topography data/drawing no. MG230104_Rev1_Overview as supplied by Six West Ltd (2023).
- Groyne survey as supplied by Six West Ltd (2023).

12.4.4 Consultation

As part of the design process, the applicant engaged and consulted extensively with a range of relevant statutory and non-statutory stakeholders, including Louth County Council, local pilots for the lough and the existing port operational team. A vessel simulation modelling exercise was undertaken to ensure the configuration of the maritime development and proposed vessels did not negatively interact with existing operations. In addition, the applicant consulted with owners of nearby oyster farming operations regarding the potential impact of the proposed development on these operations.

Whilst the findings presented in this chapter directly address potential issues regarding the impact of dredging operations on water quality, stakeholders confirmed that the previous development of Berth 2, including dredging works, had no adverse impact in context of coastal processes.

12.4.5 Modelling Methodology

RPS used the MIKE 21 hydrodynamic numerical modelling software package by Danish Hydraulic Institute (DHI)(described in the following section) to address potential coastal processes issues. This was achieved by developing a range of two-dimensional numerical models to represent:

- The pre-project scenario.
- The post-project scenario with the proposed development in place.

These models were used in conjunction with hydrographic survey data to assess the construction and operational impacts of the Greenore O&M Facilities Project in the context of the following coastal processes:

- The tidal regime;
- The inshore wave climate;
- The dispersion and settlement of sediment plumes generated during dredging operations; and
- Sediment dynamics and the morphological response of the seabed around Greenore Port.

The impact of the proposed development on these coastal processes has been quantified using difference plots throughout this chapter, i.e. post-project minus pre-project conditions. As such, the extent and magnitude of potential impacts as a result of the proposed development can be identified and compared against baseline conditions.

To conclude the assessment, mitigation measures are proposed to reduce impacts, where appropriate. This enables a "with mitigation" assessment to be made of any residual impact as a result of the construction and operational phases of the proposed development and/or in combination with other projects in the vicinity.

12.4.6 Coastal Process Modelling Software

A suite of coastal process models, based on the MIKE software developed by DHI was used to assess the potential impact of the O&M facilities on the coastal processes at Greenore Port within Carlingford Lough. The MIKE system is a state-of-the-art, industry standard modelling application, based on a flexible mesh approach. This software was developed for applications within oceanographic, coastal and estuarine environments.

A brief synopsis of the MIKE system and modules used for this assessment is outlined below:

- **MIKE 21 Flow Model FM system** - Using these flexible mesh modelling systems, it is possible to simulate the mutual interaction between currents, waves, and sediment transport by dynamically coupling the relevant modules in both two and three dimensions. Hence, a full feedback of the bed level changes on the waves and flow calculation can be included.
- **The Hydrodynamic module** –This module is capable of simulating water level variations and flows in response to a variety of forcing functions in lakes, estuaries, and coastal regions. The HD Module is the basic computational component of the MIKE 21 and MIKE 3 Flow Model systems providing the hydrodynamic basis for the Mud Transport and Spectral Wave modules

The Hydrodynamic module solves the two -dimensional incompressible Reynolds averaged Navier- Stokes equations subject to the assumptions of Boussinesq and of hydrostatic pressure.

Thus, the module consists of continuity, momentum, temperature, salinity, and density equations. When being used in three dimensions, the free surface is taken into account using a sigma coordinate transformation approach whereby the vertical layer is divided equally into a discrete number of layers.

- **The Spectral Wave (SW) module** – This module simulates the growth, decay and transformation of wind-generated waves and swell in offshore and coastal areas and accounts for key physical phenomena including wave growth by wave action, dissipation, refraction, shoaling and wave-current interaction.
- **The Mud Transport module** - The Mud Transport module simulates the erosion, transport, settling and deposition of cohesive and fin-grain non-cohesive material in marine, brackish and freshwater areas. The module can be used to assess the impact of dredging operations, dispersion of material, siltation, and contaminated sediment studies.

12.4.7 Coastal Process Models and Data Sources

The models used to assess the impact of the proposed development on coastal processes were created using flexible mesh technology to provide detailed information on the coastal processes around Greenore Port and Carlingford Lough. The model mesh sizes varied from *c.* 15,000m^2 (equivalent to *c.*122m x 122m squares) at the boundary to *c.* 50m^2 (equivalent to 7m x 7m squares) within the vicinity of Berth 3 as shown in Figure 12.2. The bathymetry of the pre and post-project scenario models are illustrated in Figure 12.3.

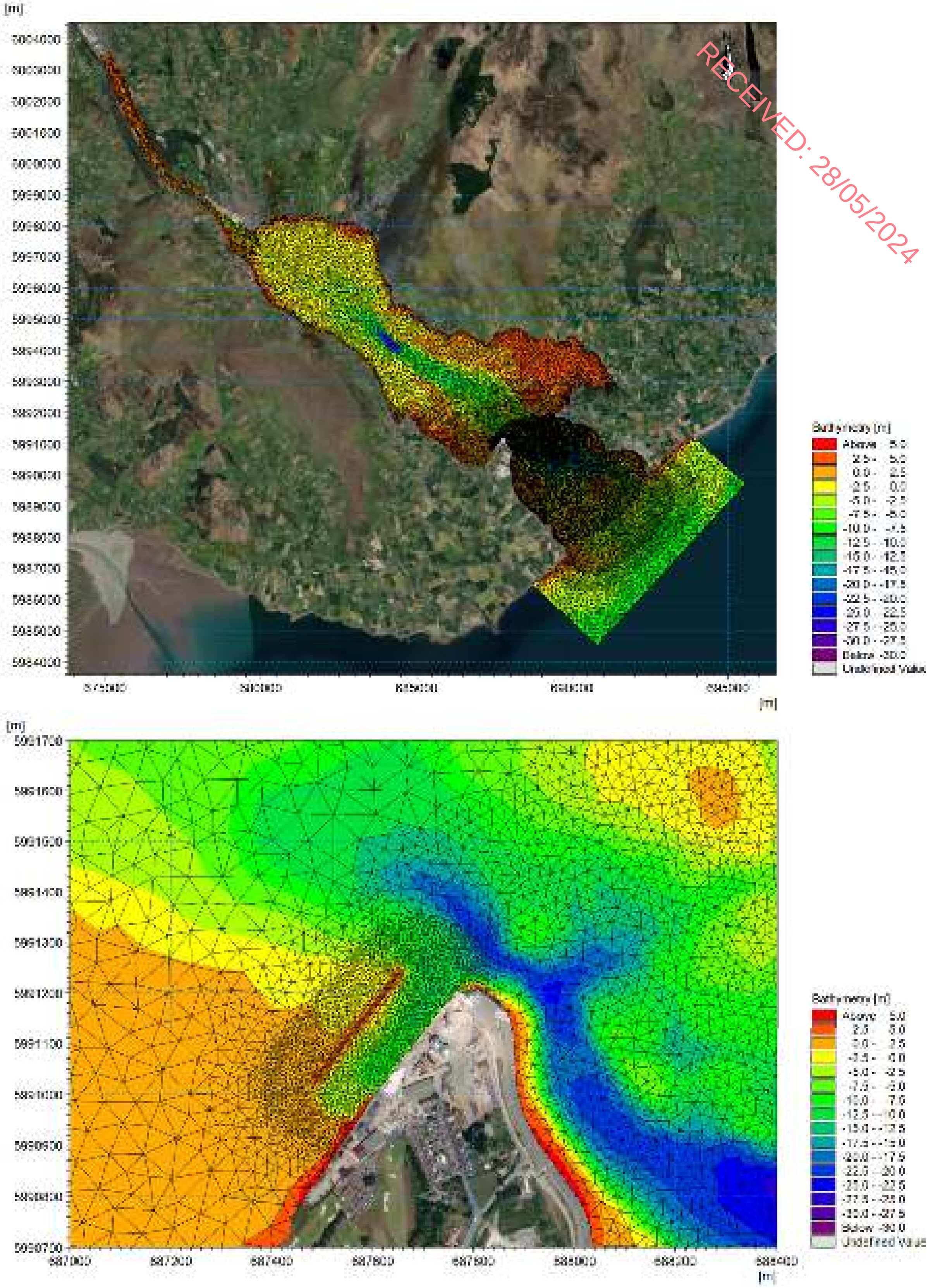

Figure 12.2 Extent of bathymetry and mesh structure of the Greenore and Carlingford Lough model.

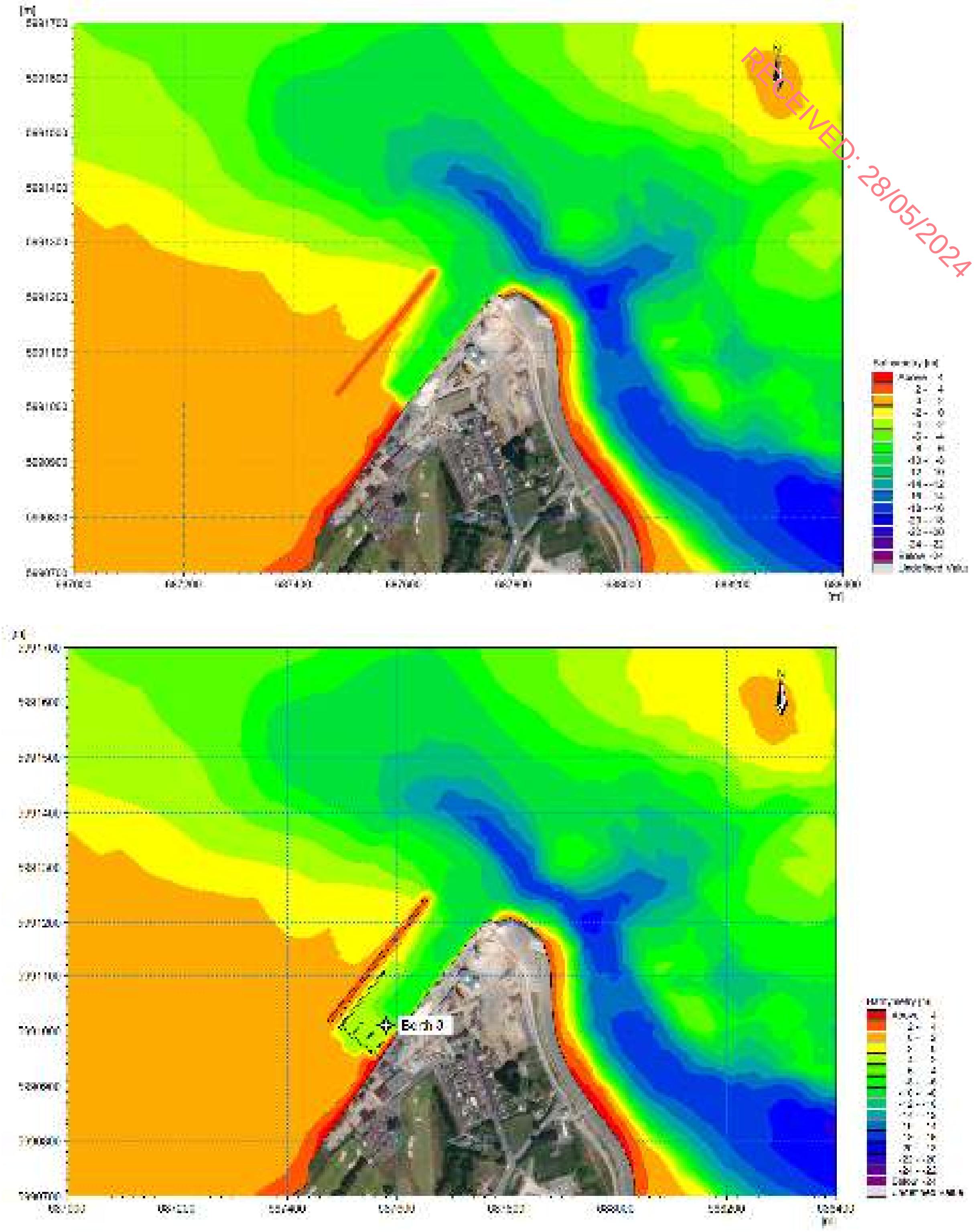

Figure 12.3 Bathymetry at Greenore Port in the pre-project (upper) and post-project (lower) models with the location of Berth 3 illustrated.

12.4.7.1 Data Sources

12.4.7.1.1 Wind data

The berths at Greenore Port are exposed to storm waves generated over the waters of Carlingford Lough, mainly from the area of the Lough upstream of the port. As such, the wave climate is primarily governed by winds acting over the various local fetches. The wind speeds for wave generation are affected by the local topography with higher wind speeds along the axis of the lough due to the nature of the mountains on either side of Carlingford Lough. Waves generated in the Irish Sea can enter the Lough and at times also reach the approaches of Greenore Port but these waves are highly modified by the complex bathymetry around the mouth of the Lough.

Wind data from BS EN 1991-1-4:2005:A1:2010, which gives extreme overland wind speed throughout GB and parts of Ireland has been used for this study with the wind speeds increased by 17% to account for the increase in wind speed over the water adjoining the shoreline.

In the case of the winds blowing along the axis of the Lough, the wind speed for wave generation was based on the full overwater wind speed due to the local increase in wind velocity resulting topographical effects. For wind from these directions the winds peed can be some 30% above the equivalent overland speed as identified in BS CP3 part V. Similarly, full overwater wind speeds were used for the generation of waves in the Irish Sea which can enter the Lough during storms from the 90°N to 165°N sector.

The mean hourly wind speed for the various storm directions was then adjusted using the directional coefficient given in BS EN 1991-1-4:2005:A1:2010. Finally, the wind speeds were adjusted for the length of time required to fully develop the waves over the fetches. The resulting wind speed by direction is given in Table 12.1 for the local fetches and in Table 12.2 for the fetches across the Irish Sea.

Table 12.1 Storm wind speed (m/s) by return period for various local fetch directions

Storm Direction °N	Wind Speed m/s	Wind Speed m/s	Wind Speed m/s	Wind Speed m/s
	1 in 1 yr	1 in 10 yr	1 in 50 yr	1 in 100 yr
270	22.36	26.73	29.72	31.22
285	21.55	25.75	28.63	30.07
300	22.83	27.28	30.33	31.86
315	21.43	25.69	28.61	30.08
330	21.42	25.59	28.46	29.89
345	20.69	24.72	27.49	28.87
0	19.70	23.54	26.17	27.49
15	17.90	21.39	23.78	24.98
30	17.67	21.11	23.48	24.66
45	17.21	20.56	22.86	24.01
60	16.84	20.12	22.38	23.50
75	16.64	19.89	22.12	23.23
90	16.35	19.54	21.73	22.82

Table 12.2 Storm wind speed (m/s) by return period and directions for Irish Sea fetches

Storm Direction °N	Wind Speed m/s	Wind Speed m/s	Wind Speed m/s	Wind Speed m/s
	1 in 1 yr	1 in 10 yr	1 in 50 yr	1 in 100 yr
90	15.07	18.08	20.15	21.18
105	15.34	18.40	20.51	21.56
120	16.05	19.25	21.45	22.56
135	16.72	20.06	22.35	23.50
150	17.08	20.49	22.84	24.01
165	17.38	20.85	23.24	24.43

12.4.7.1.2 Water levels

The Environmental Agency in NI (NIEA) together with DEFRA/EA and SEPA has issued predicted extreme water levels at a 2-kilometre spacing around the coast of the UK. These figures have been derived from a sophisticated skew surge analysis of long-term tidal gauge records (Environment Agency, 2018). The extreme water levels for various return period events based on the estuary point off Greencastle, have been converted to OD Malin and CD Greenore and are shown in Table 12.3.

Table 12.3 Extreme water levels at the study area (Environment Agency, 2018)

Storm return period (years)	Extreme Water levels	
	m OD Malin	m CD
1 in 1	2.82	5.89
1 in 2	2.92	5.99
1 in 5	3.06	6.13
1 in 10	3.14	6.21
1 in 20	3.24	6.31
1 in 25	3.26	6.33
1 in 50	3.35	6.42
1in 75	3.40	6.47
1 in 100	3.44	6.51
1 in 200	3.58	6.65
1 in 500	3.85	6.92
1 in 1000	3.97	7.04

12.4.7.1.3 Bathymetry Data

The bathymetry data used to construct all numerical models consisted of a combination of detailed surveys of Carlingford Lough undertaken for previous projects and specific surveys undertaken by 6-West around Greenore Port for this project. The data points around Greenore Port and Carlingford Lough used in the models are shown in Figure 12.44.

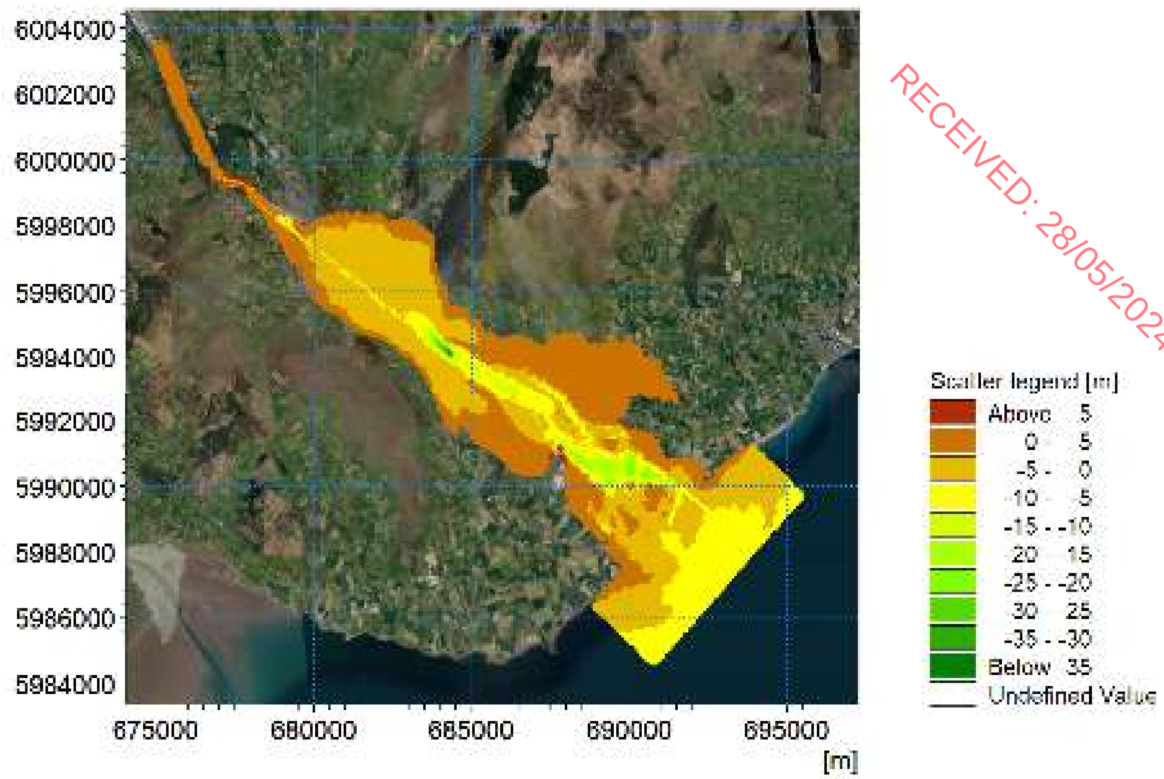

Figure 12.4 Bathymetry data around Greenore and Carlingford Lough used to develop the numerical models.

12.4.7.2 Boundary Conditions

The hydrodynamic models used for this assessment were driven by a surface elevation boundary which was derived from the Admiralty tide tables based on the tidal constituents provided for Greenore Point. An example of this boundary condition is illustrated in Figure 12.5.

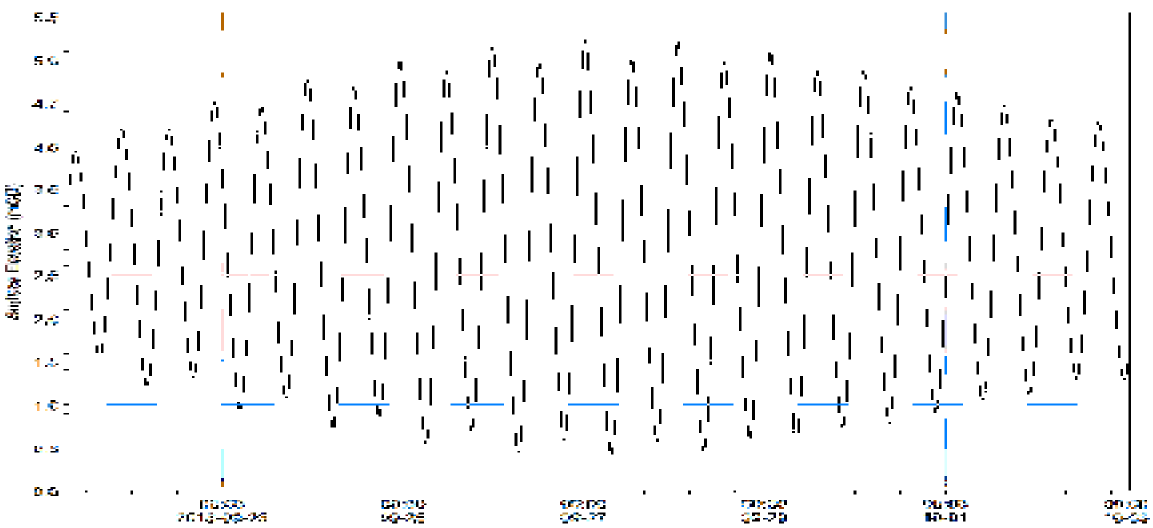

Figure 12.5 Typical surface elevation boundary used to inform the Greenore hydrodynamic model.

Boundary conditions for the spectral model of Carlingford Lough were taken from specific simulations of the RPS Irish Sea wave model for the appropriate storm conditions. An example of the significant wave heights in part of the Irish Sea Model during a 1 in 50 year storm from 105°N is shown in Figure 12.6.

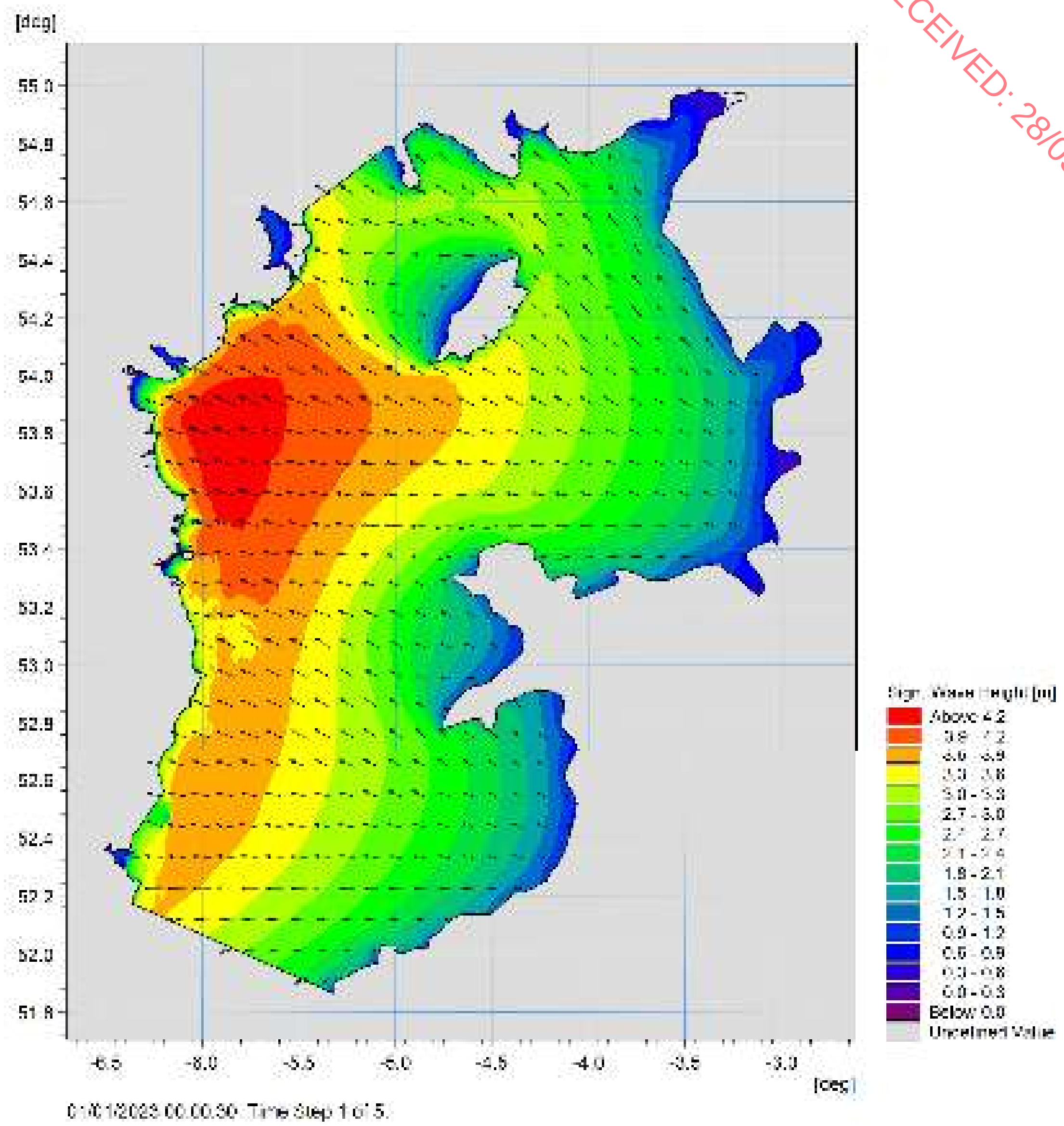

Figure 12.6 Significant wave heights and mean wave directions in the Irish Sea – 1 in 50 year return period storm from 105°N at MHWS.

12.5 Difficulties Encountered

There were no significant difficulties encountered in compiling the specified information for this EIAR chapter

12.6 Baseline Environment

In this section of the environmental appraisal, the following coastal processes were considered based on the existing scenario:

- **Tidal regime:** Current speeds and direction.
- **Wave patterns:** Significant wave heights and directions.
- **Littoral Currents:** Wave and tidal-driven current speeds affecting sedimentation.

This assessment was undertaken based on the output of bespoke hydraulic modelling of coastal processes within the study area.

12.6.1 Tidal Regime - Baseline Scenario

The MIKE 21 Hydrodynamic module described in Section 12.4.6 was used to derive baseline tidal regime information for Greenore Port.

Figure 12.7 and Figure 12.8 illustrate spring tide flows into and out of Carlingford Lough during mid-flood and mid-ebb respectively. It will be seen from these figures that current velocities tend to be greatest between Greenore Point and Greencastle Point whereby tidal velocities can regularly exceed 1.0m/s owing to the nature of constricted flows in this region. Current velocities subsequently decrease further within the Lough as the tidal regime becomes less constricted.

Figure 12.9 to Figure 12.12 provide a more detailed illustration of current speeds and directions around Greenore Port during typical spring mid-flood, high tide, mid-ebb and low tide conditions. It will be seen from these Figures that current velocities within the Port area do not typically exceed 0.5m/s during most tidal phases owing to the sheltering effect of Greenore Point except during mid-ebb conditions during which current velocities can exceed 1.0m/s.

These results indicate that the baseline tidal regime is sufficient to create natural flushing conditions within the Port which in turn would generally reduce sedimentation and thus the need for extensive maintenance dredging. These findings are in line with observations and records of the harbour master.

It will be seen from Figure 12.13 which illustrates current velocities during typical mid-ebb neap tides that current velocities throughout the Port are not generally less than 0.3m/s. These velocities would be sufficient to keep fine silt material in suspension thus indicating that the Port would be unlikely to silt even during neap conditions.

Typical surface elevations, current speed and direction at the location of the proposed Berth 3 are shown in Figure 12.14 12.14. The location from which this data was extracted is illustrated in Figure 12.3.

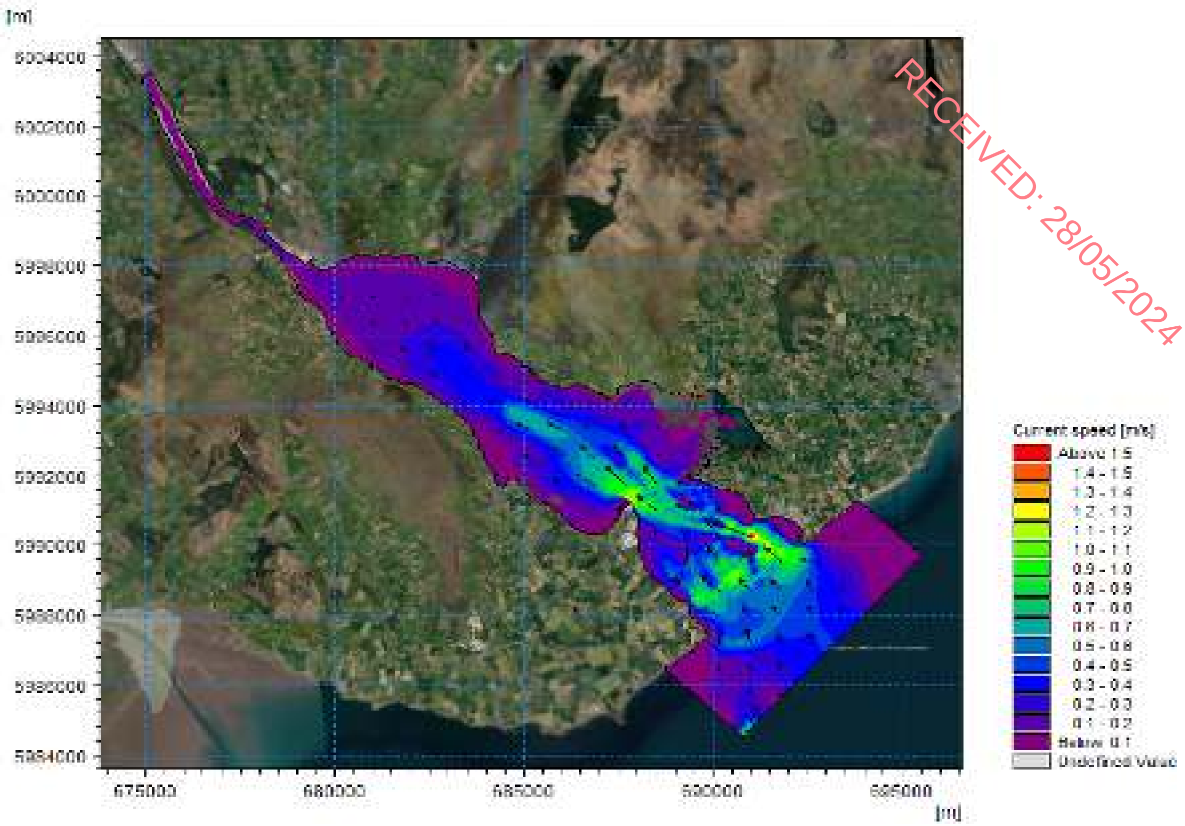

Figure 12.7 Typical current velocities and directions in Carlingford Lough during spring mid-flood conditions – Baseline scenario.

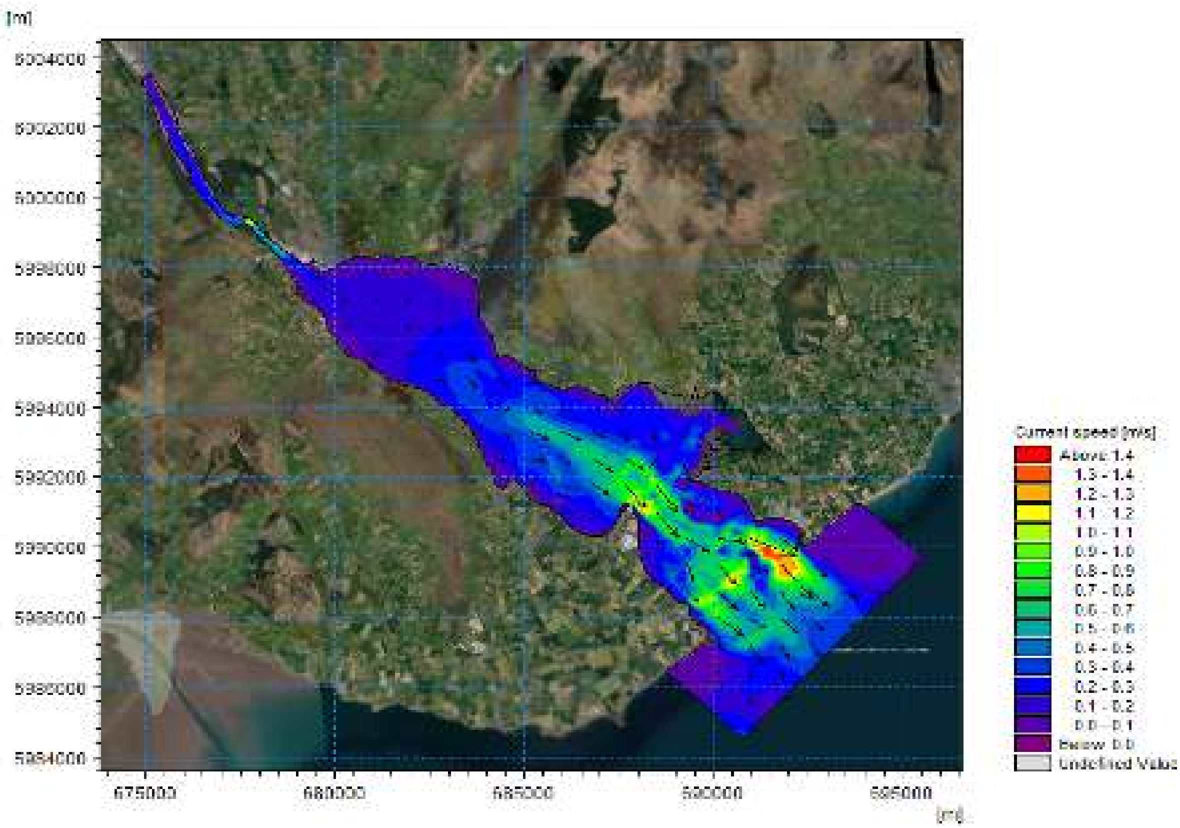

Figure 12.8 Typical current velocities and directions in Carlingford Lough during spring mid-ebb conditions – Baseline scenario.

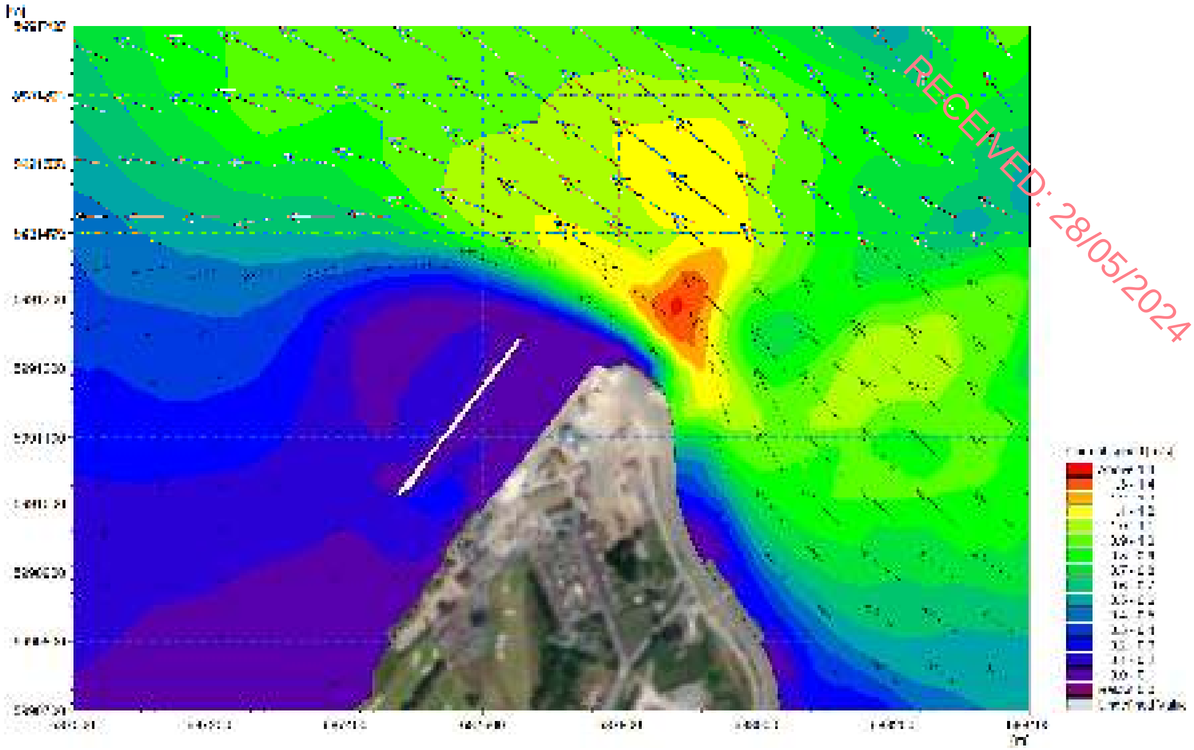

Figure 12.9 Typical current velocities and directions at Greenore Port during spring mid-flood conditions – Baseline scenario.

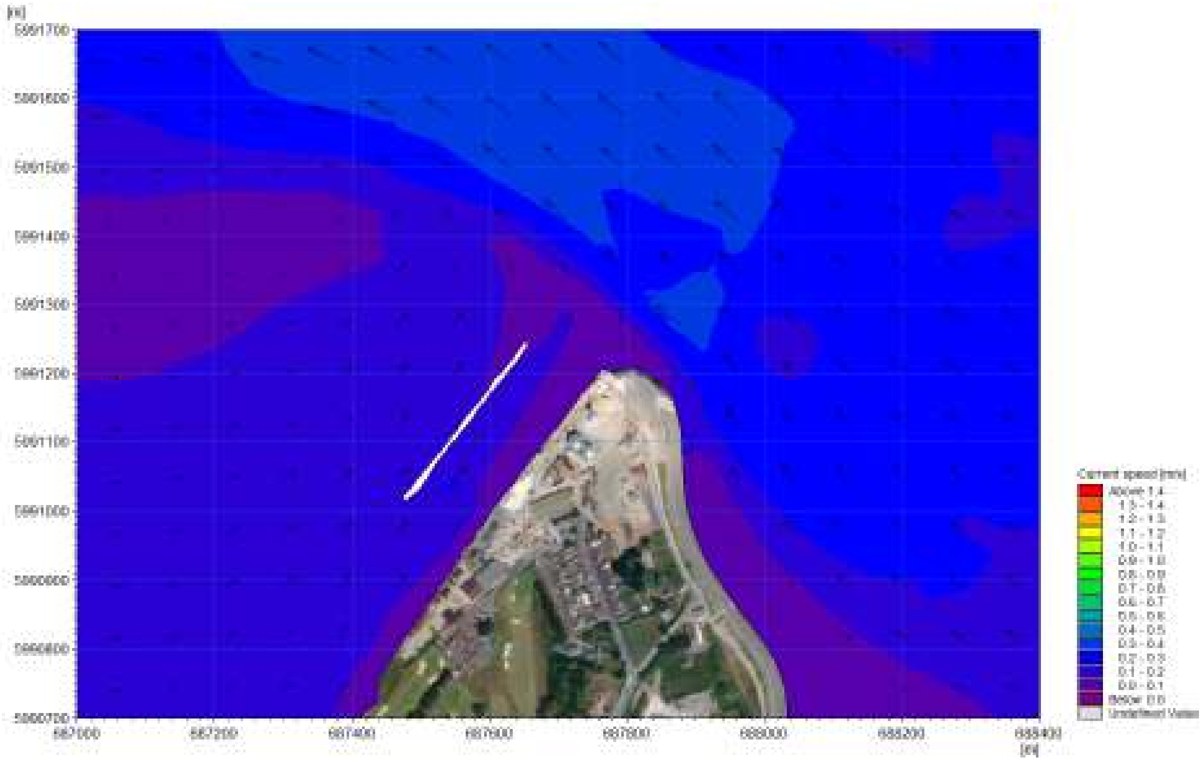

Figure 12.10 Typical current velocities and directions at Greenore Port during spring high tide conditions – Baseline scenario.

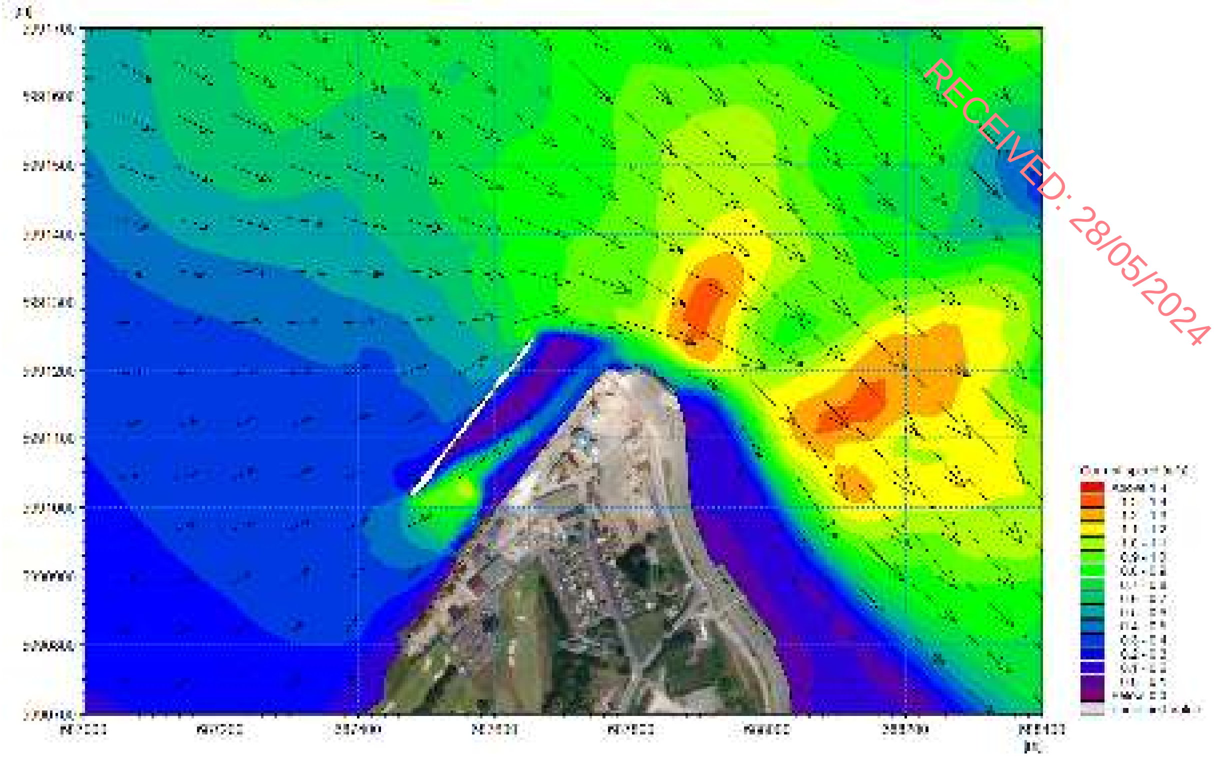

Figure 12.11 Typical current velocities and directions at Greenore Port during spring mid-ebb tide conditions – Baseline scenario.

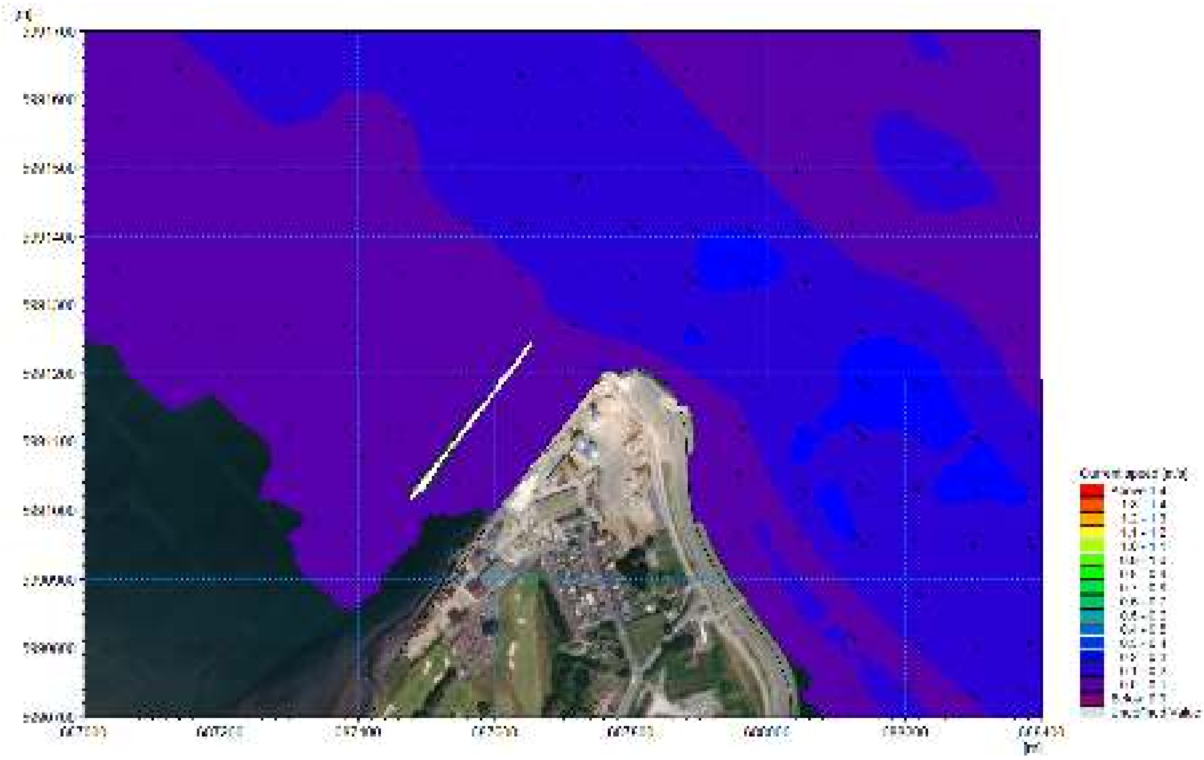

Figure 12.12 Typical current velocities and directions at Greenore Port during spring low tide conditions – Baseline scenario.

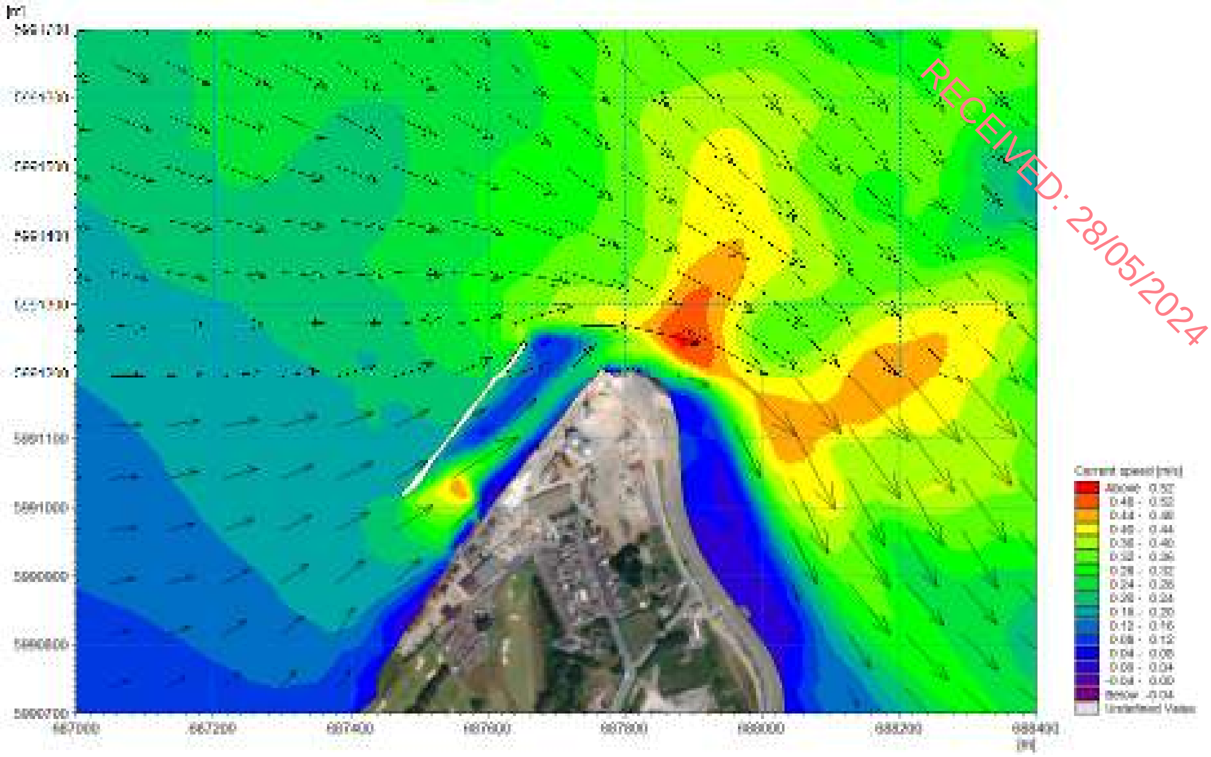

Figure 12.13 Typical current velocities and direction at Greenore Port during neap-ebb tidal conditions – Baseline scenario.

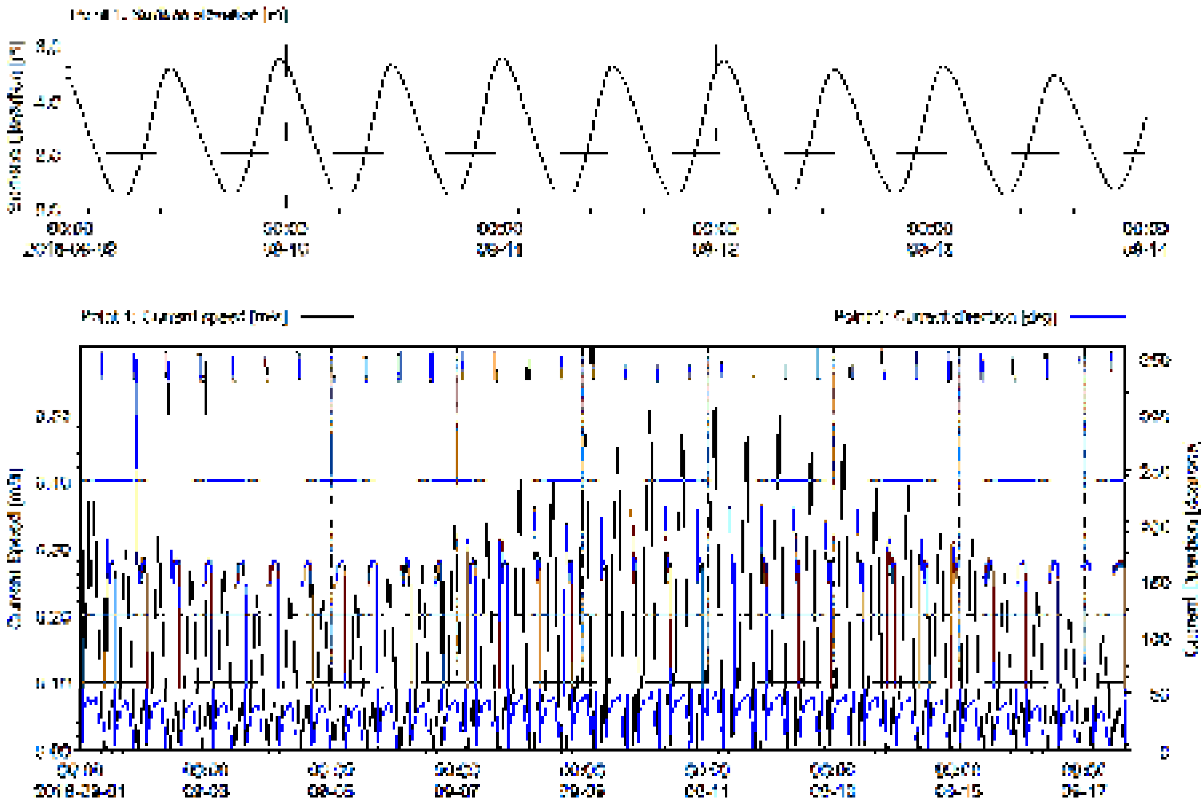

Figure 12.14 Surface elevations (upper), current velocities and directions (lower) during a typical spring tidal regime within the vicinity of Berth 3 at Greenore Port.

12.6.2 Wave Climate - Baseline Scenario

The Spectral Wave (SW) module described in Section 12.4.6 was first used to simulate the generation and transformation of a series of storms with a return period of 1 in 50 years with wind directions at 15°N intervals from 90°N through to 165°N directions across the Irish Sea. As described in Section 12.4.7.2, these simulations provided boundary conditions for the Carlingford Lough model for storms running in from the Irish Sea. In addition to providing boundary condition data, the purpose of this assessment was to determine if waves propagating from the Irish Sea would contribute significantly to the wave climate at Greenore Port.

As illustrated in Figure 12.15 to Figure 12.17, this assessment of 1 in 50-year return period storm conditions during periods of Highest Astronomical Tide (HAT) found that storm waves from the Irish Sea are greatly attenuated by the complex bathymetry at the entrance to the Lough. Consequently, the size of the waves at Greenore Port will be very much smaller than those generated by storm winds over local fetches in Carlingford Lough itself. Furthermore, the wave period of the waves reaching the Port during these offshore storm events will be short as the longer period fraction of the wave spectra are refracted into the shorelines before reaching the Port.

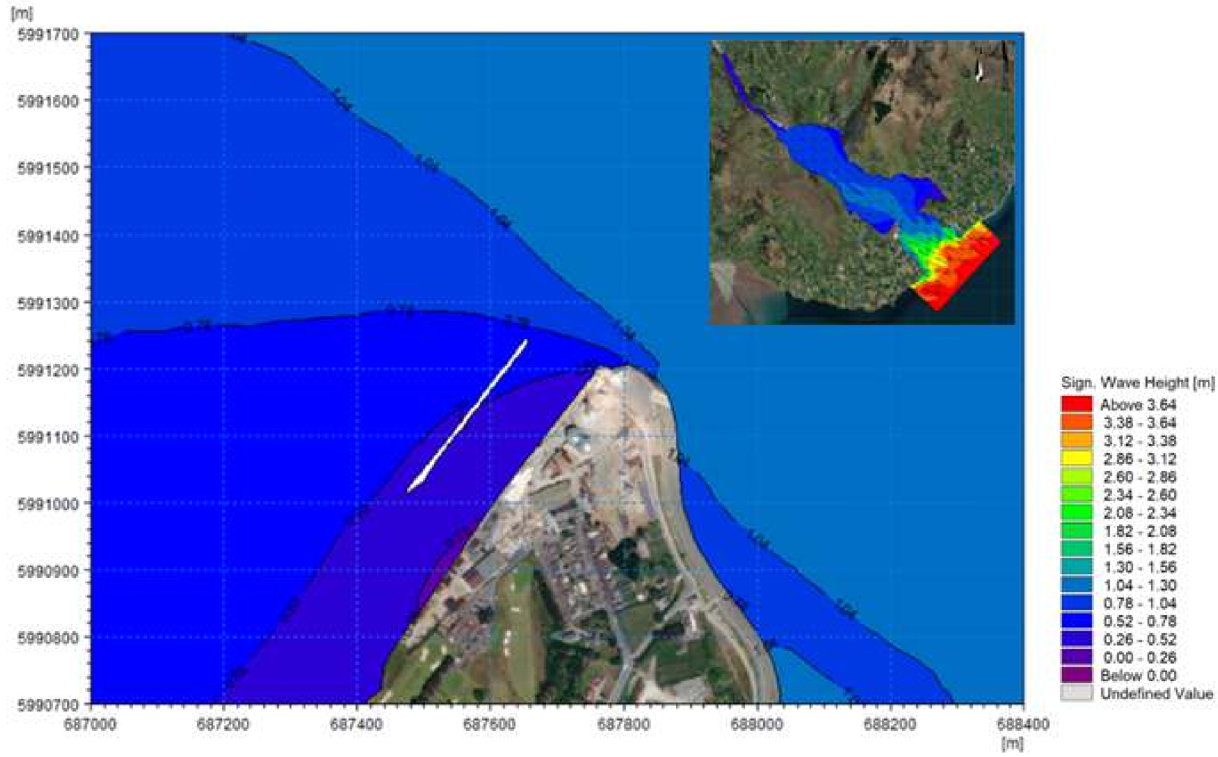

Figure 12.15 Significant wave heights at Greenore Port during 1 in 50 year storm in the Irish Sea from 105°N at HAT – Baseline scenario.

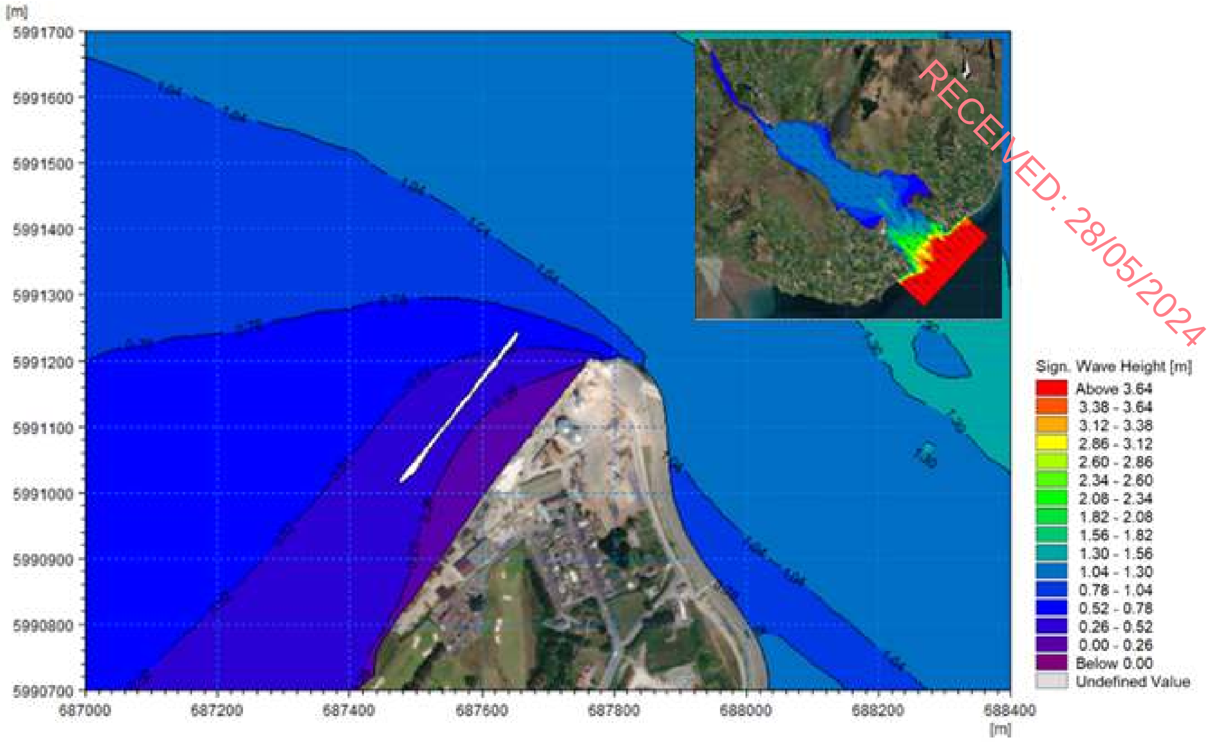

Figure 12.16 Significant wave heights at Greenore Port during 1 in 50 year storm in the Irish Sea from 135°N at HAT – Baseline scenario.

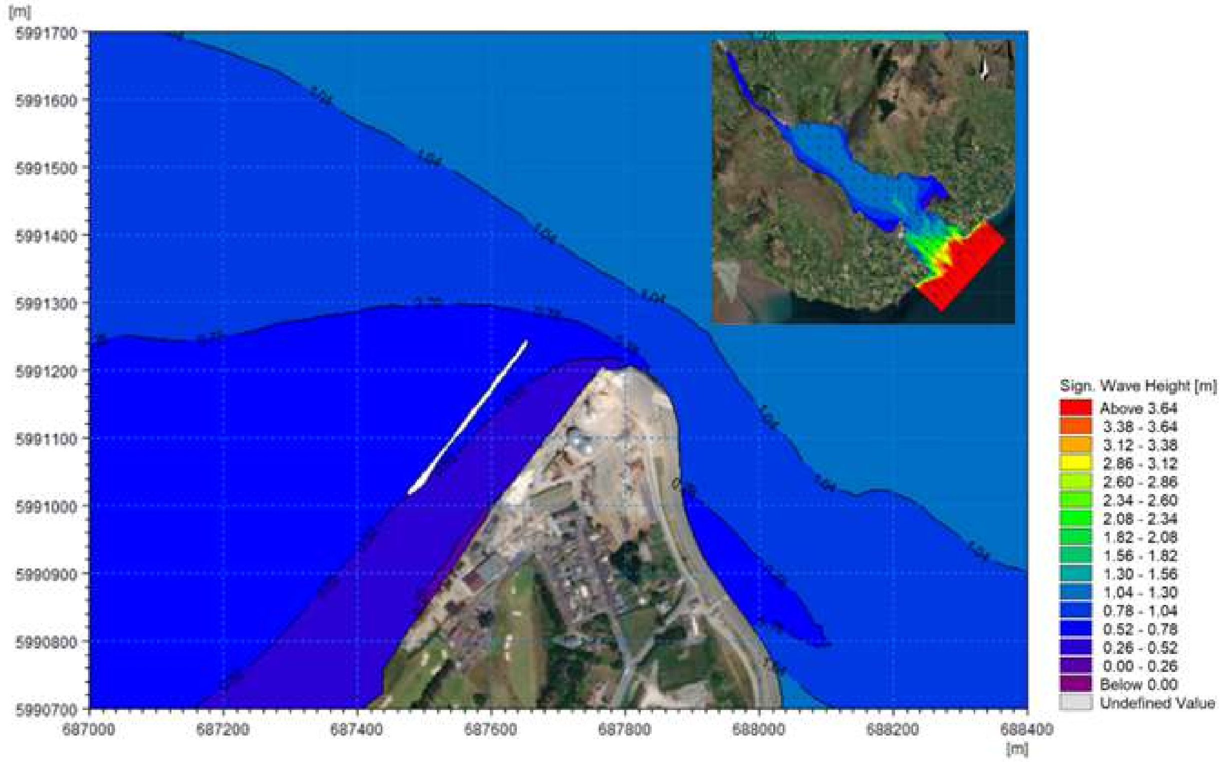

Figure 12.17 Significant wave heights around the Greenore Point berths during 1 in 50 year storm in the Irish Sea from 165°N at HAT – Baseline scenario.

Initial simulations demonstrated that the wave climate at Greenore is most affected by storms generated over the local fetches of Carlingford Lough itself. Thus, simulations were undertaken for 1 in 1, 10, 50, and 100 year return period events for every 15°N sector from between 270°N through north to 90°N. All simulations were again undertaken at Highest Astronomical Tide as wave penetration over the old breakwater is greatest during periods of high tidal levels.

This assessment found that storms from 300ºN produced the largest waves at Greenore Port. Outputs from the 1 in 50 year return period storm event simulation with waves from 270°N, 300°N and 15°N are presented in Figure 12.18 to Figure 12.20. This assessment found that it was storms from 300°N that produced the most arduous conditions at Greenore Port, with significant wave heights of 1.34m and corresponding wave peak wave periods of 4.13s being observed within the vicinity of the Port.

A summary of the inshore wave conditions at Greenore Port within the vicinity of Berth 3 for a range of storm directions during 1 in 50 return period conditions at periods of HAT is presented in Table 12.4. The location from which this data was extracted is illustrated in Figure 12.3.

Table 12.4 Wave parameters at Berth 3 for a range of storm directions approaching Greenore Port, during 1 in 50 year conditions at HAT.

Storm Direction °N	Significant Wave Height (m)	Maximum Wave Height (m)	Peak Wave Period (s)	Wave Period, T01 (s)	Mean Wave Direction °N
270	1.12	2.25	3.79	3.012	311
285	1.18	2.36	3.97	3.16	321
300	1.34	2.59	4.13	3.37	329
315	1.29	2.52	4.09	3.34	332
330	1.27	2.48	4.03	3.28	335
345	1.18	2.32	3.73	3.16	341
360	1.07	2.14	3.57	3.03	351
15	0.90	1.83	3.25	2.83	2
30	0.80	1.63	3.20	2.68	15
45	0.71	1.46	3.18	2.57	212
60	0.62	1.28	3.15	2.47	26
75	0.53	1.09	3.09	2.36	30
90	0.48	0.99	3.08	2.30	32
105	0.35	0.73	3.01	2.15	33
120	0.21	0.43	3.15	2.37	32
135	0.14	0.29	7.13	2.27	18
150	0.25	0.52	1.81	1.36	219
165	0.38	0.79	2.07	1.45	220

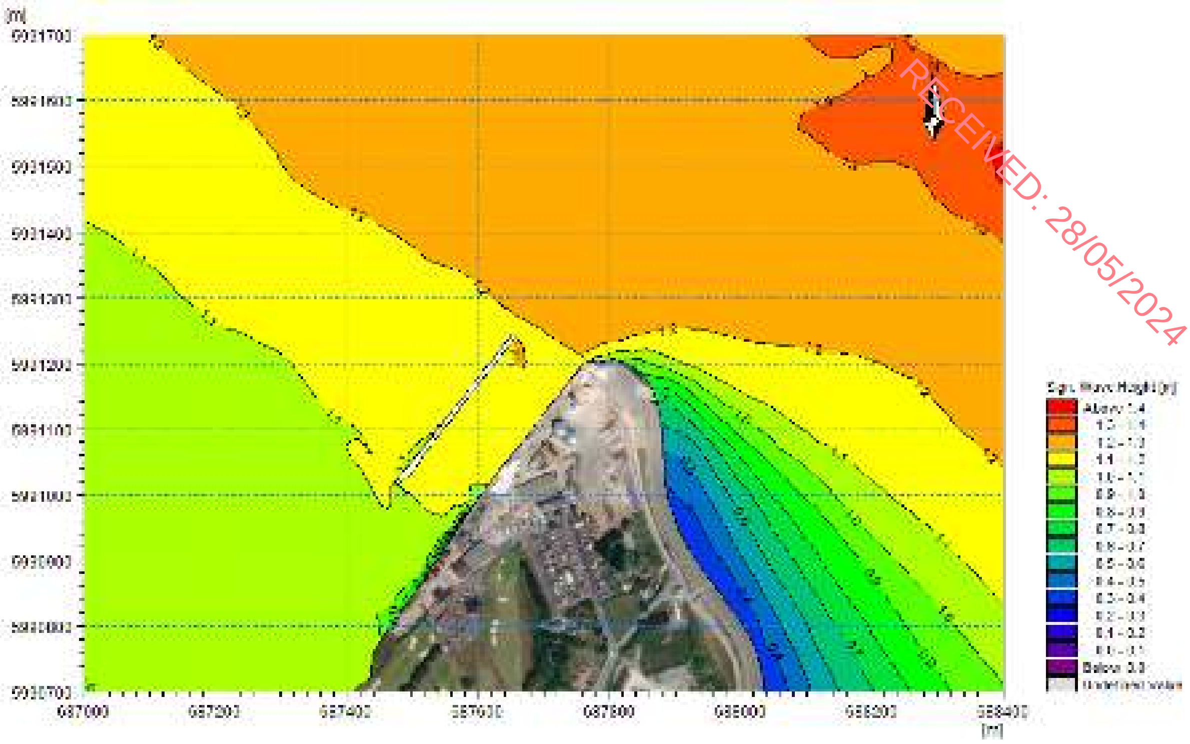

Figure 12.18 Significant wave height and mean wave directions around Greenore during a 1 in 50 year return period storm from 270°N at HAT water level – Baseline scenario.

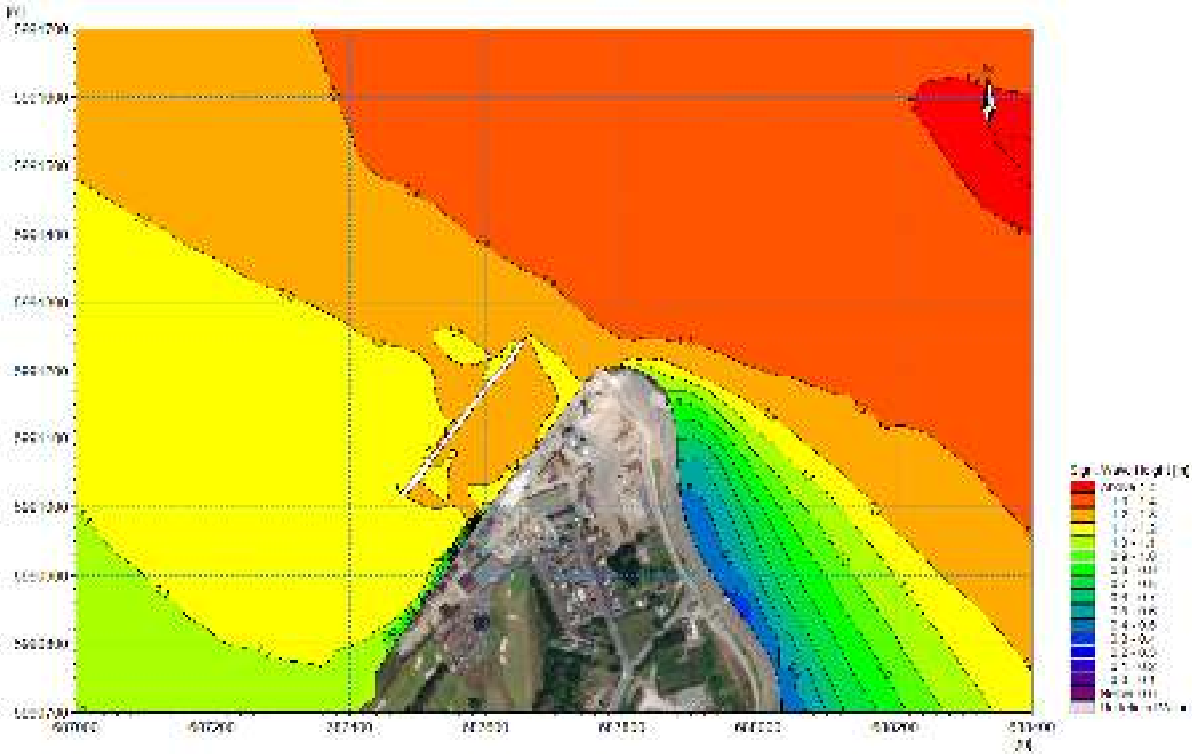

Figure 12.19 Significant wave height and mean wave directions around Greenore during a 1 in 50 year return period storm from 300°N at HAT water level – Baseline scenario.

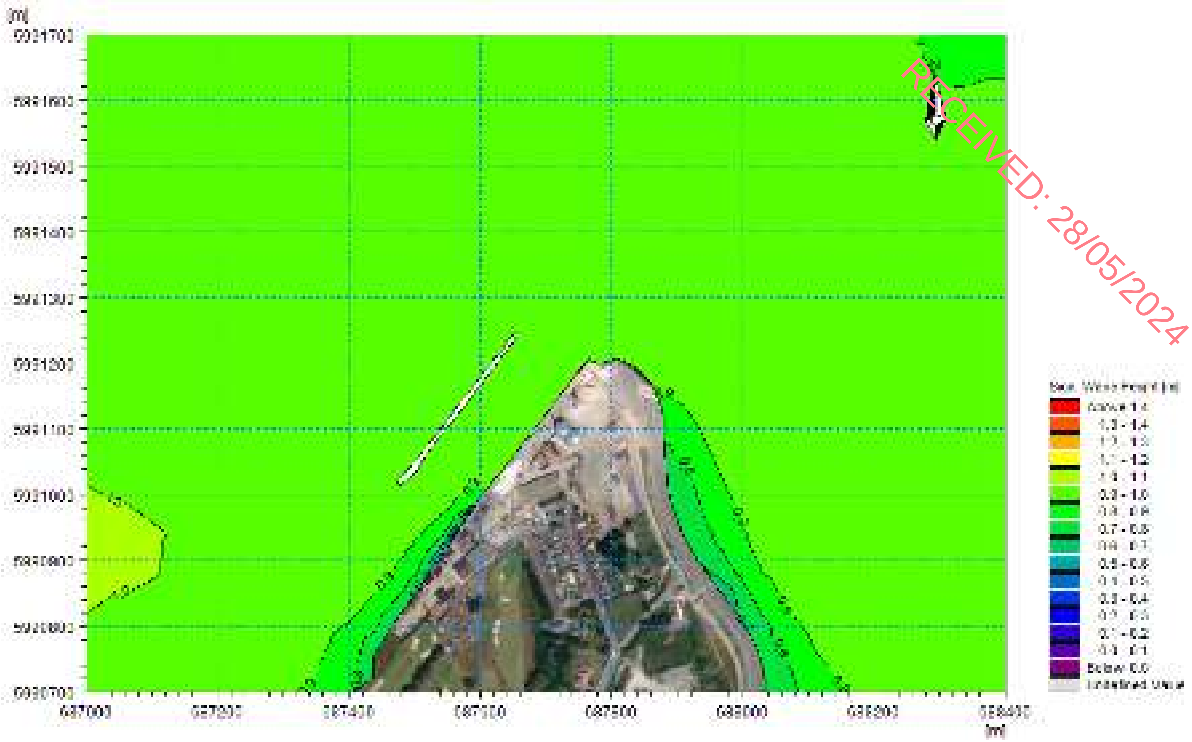

Figure 12.20 Significant wave height and mean wave directions around Greenore during a 1 in 50 year return period storm from 15°N at HAT water level – Baseline scenario.

12.6.3 Littoral Currents - Baseline Scenario

Littoral currents are the result of the combined action of tides, wind and waves on the current regime and are primarily responsible for the suspended and bed-load transport of sediment material within a coastal environment. As such, littoral currents can be used as a proxy to infer the potential direction and rate of sediment transport.

To assess baseline littoral currents, a coupled hydrodynamic and spectral wave model which also included a variable wind field was used to simulate and quantify littoral currents during a typical 1 in 1 year return period storm event from 300°N.

The output from this assessment is presented in Figure 12.21 to Figure 12.24 for typical spring mid-flood, high water, mid-ebb and low water conditions respectively. It was found that the inclusion of wind and wave conditions enhanced current velocities throughout the study area, particularly during mid-flood conditions whereby velocities around Greenore Point increased from *c.* 1.1m/s to more than 1.4m/s.

Current velocities were also increased by a similar magnitude during mid-ebb conditions within the vicinity of Greenore Port. This can be attributed to a marginally greater volume of water having to flow back out of Carlingford Lough which would in turn increase velocities and the natural tidal flushing capacity of the Port.

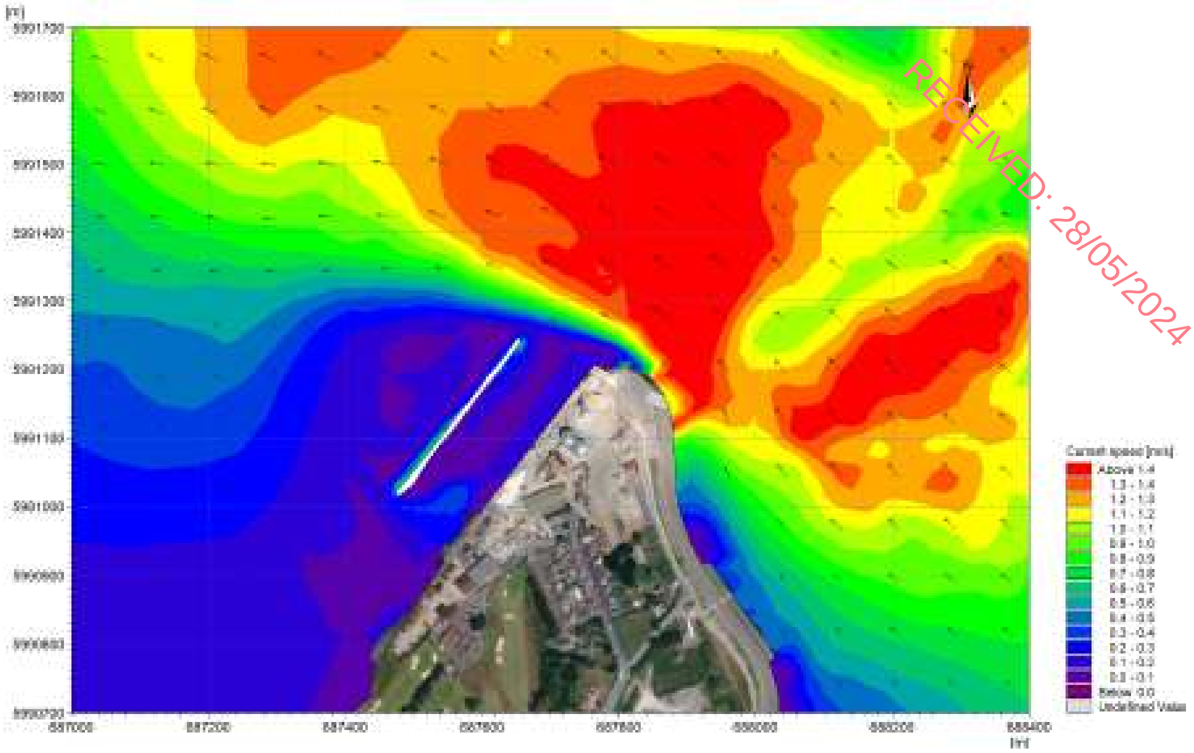

Figure 12.21 Littoral current velocities and direction during a mid-flood, 1 in 1 year storm conditions from 300°N - Baseline scenario.

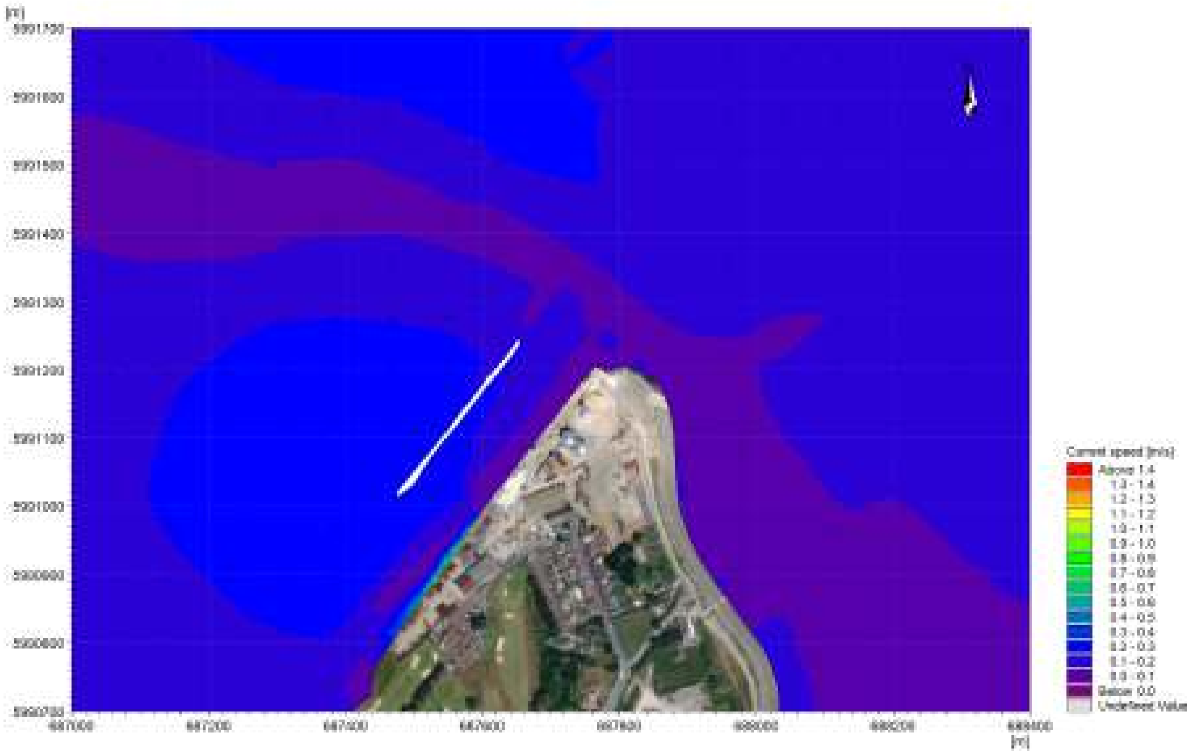

Figure 12.22 Littoral current velocities and direction during high tide, 1 in 1 year storm conditions from 300°N - Baseline scenario.

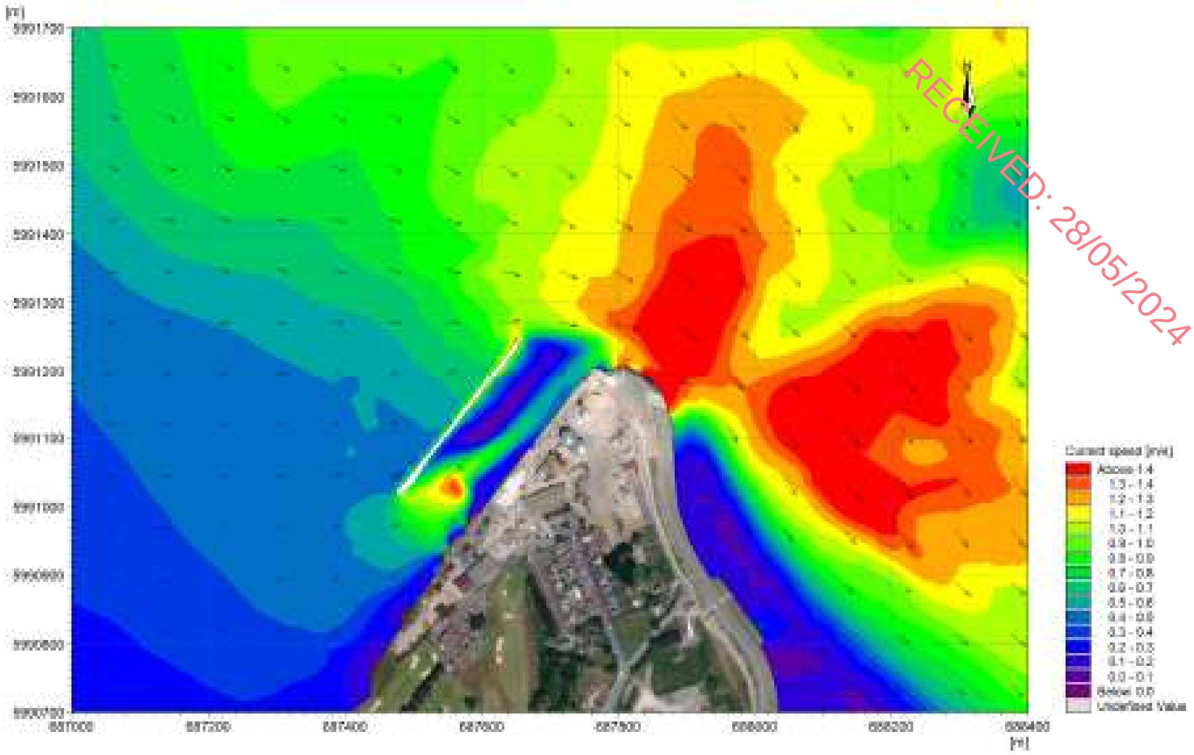

Figure 12.23 Littoral current velocities and direction during a mid-ebb tide, 1 in 1 year storm conditions from 300°N - Baseline scenario .

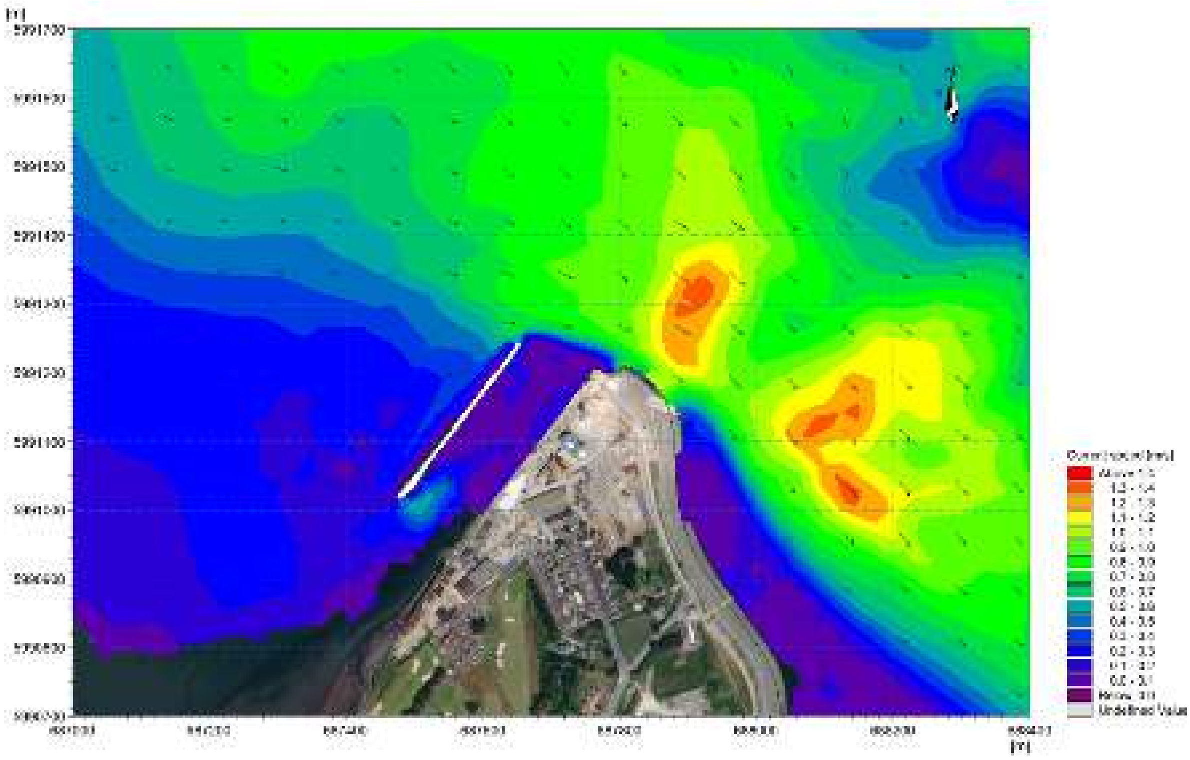

Figure 12.24 Littoral current velocities and direction during low tide, 1 in 1 year storm conditions from 300°N - Baseline scenario.

12.7 The 'Do Nothing' Scenario

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no dredging works or alteration to the existing maritime development. As such, there would be a neutral effect on the existing coastal processes, i.e., the tide, wave and sediment transport regime.

12.8 Potential Significant Effects

An analysis of the potential impacts of the proposed development on the existing coastal processes during the demolition, construction and operational phases are outlined below. Due to the inter-relationship between water & hydrology the following impacts discussed will be considered applicable to Chapter 10 of the EIA Report.

Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 12.9.

12.8.1 Demolition Phase

No demolition works are proposed as part of the maritime development.

12.8.2 Construction Phase

The major marine elements of the proposed development are outlined in Chapter 2. In the context of coastal processes, the element of the O&M facilities that has the potential to result in construction phase impacts is the dredging works within the vicinity of Berth 3. Approximately 45,000 cubic meters of material will be dredged in this area to facilitate navigable access with material being disposed of on land.

Temporary impacts on water quality have the potential to occur during the construction phase of the works, i.e. the dredging operations. Mobilised suspended sediment release through backhoe dredging is the principal potential source of environmental impact.

The potential impacts from the increase in background suspended sedimentation concentrations and deposition levels as a result of the capital dredging operation of the construction phase are assessed in the following sections.

The proposed piling works required to fix the proposed pontoon berths are not expected to result in an increase of suspended sediments given that all piles will be driven as opposed to augured.

Figure 12.25 Visualisation of the proposed development.

12.8.2.1 Potential impacts as a result of dredging

As described in Chapter 2, the proposed development will include dredging activities in the nearshore area to achieve a seabed level of -4m relative to chart datum as illustrated in Figure 12.26 12.26. The dredging operations will result in the removal of *c.* 45,000m^3 of marine sediment.

Figure 12.26 Dredge plan drawing extract (Drawing Number: D5111 McCarthy Browne).

Notwithstanding the application of mitigation measures, the process of dredging unavoidably causes disturbance of sediment on the seabed and dispersal of some material in the water column. This chapter considers the effect of same on the tidal regime, inshore wave climate and sediment dispersion within the Study Area. The potential impacts arising from the dredging activity have therefore been assessed as described in the following sections of the report.

A project-specific geotechnical report (Gavin & Doherty Geosolutions, 2024) summarised the geology of the area to be dredged and is shown in Table 12.5 below.

Table 12.5 Summarised geology (Gavin & Doherty Geosolutions, 2024).

Top of Stratum (mCD)	Thickness (m)	Description
-1	3.2	Sandy Silty **CLAY**
-4.2	2.8	Silty fine to medium **SAND** containing cobbles and boulders
-4.4	0.6	Silty fine to medium **SAND** containing a little gravel with occasional cobbles and boulders.
-5.1	0.9	Silty **CLAY** containing occasional shells

The only particle size analysis data available for this area was from a site investigation report by Glover Site Investigations Ltd. in 1998. Of the 17 samples sieved three had no fines content, twelve had a fines content between 1% - 7%, and two samples had a fines content between 20% - 25% (Glover Site Investigations Ltd., 1998). The low prevalence of fine material across this area is consistent with observations from previous dredge campaigns which reported only minimal dredge plumes being produced as a result of dredging works.

To assess the potential for sediment plumes as a result of the dredging activities under the proposed development, a coupled hydrodynamic and mud transport model was run for a dredging campaign which lasted for 50 days, thus covering a full range of spring and neap tidal flow conditions. The dredge material in the dispersion model was characterised using two distinct sediment fractions, one to represent fine sand material and another to represent silt material. In line with industry-standard practice, sediment material was introduced as a source term based on an overspill rate of 3% of the fine sediment content from the backhoe dredger. The dredge simulation parameters are summarised in Table 12.6.

Table 12.6 Dredge simulation input parameters.

Parameter	Value
Dredge Quantity	45,000 m^3
Dredge rate	80m^3/hr
Fines Content	20% **is considered very conservative given presence of fines is expected to be considerably less.*
Overspill	3%
Active Dredging	12.21 hrs per day
Length of simulation	50 days
Sediment Fraction 1 – Fine Sand	0.125mm
Sediment Fraction 2 – Silt	0.0310mm

The dredge path along which the sediment material was introduced as a source term is illustrated in Figure 12.27.

The dispersion of material during the dredging operations is illustrated by a series of plume envelope diagrams that show total suspended sediment concentrations (SSCs) in the water column. Figure 12.28 12.28 to Figure 12.31 illustrates the total SSCs during typical spring mid-flood, high water, mid-ebb and low water conditions.

Figure 12.28 demonstrates that during periods of mid-flood conditions there is very little dispersion of the resultant plume envelope. This can be attributed to the asymmetry between peak current velocities and tidal phases, in that atypically at Greenore, currents are near slack during mid-flood conditions but then peak near high water conditions.

During periods of high water, SSC plumes can be seen to extend north-east for up to *c.* 250m before sediment settles back to the seabed or is fully dispersed to below background levels. As demonstrated byFigure 12.29, the total SSC of these plumes is typically less than 4.0mg/L. Similar dispersion characteristics are observed during mid-ebb tidal conditions as illustrated in Figure 12.30.

Resultant sediment plumes during typical low water conditions are illustrated in Figure 12.31. Owing to near slack conditions during this period, the dispersion of sediment is extremely limited and confined exclusively within the limits of Greenore Port.

Figure 12.27 Dredge path used in the model for suspended sediments.

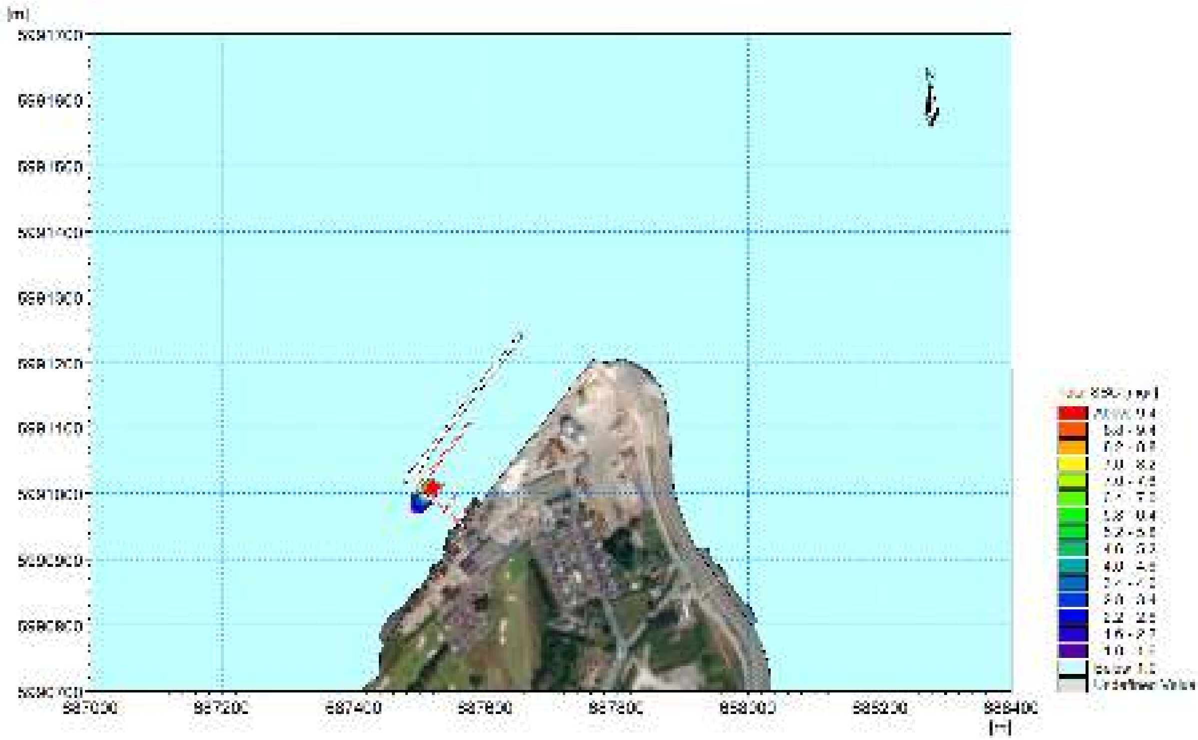

Figure 12.28 Suspended sediment concentration plume during typical mid-flood conditions.

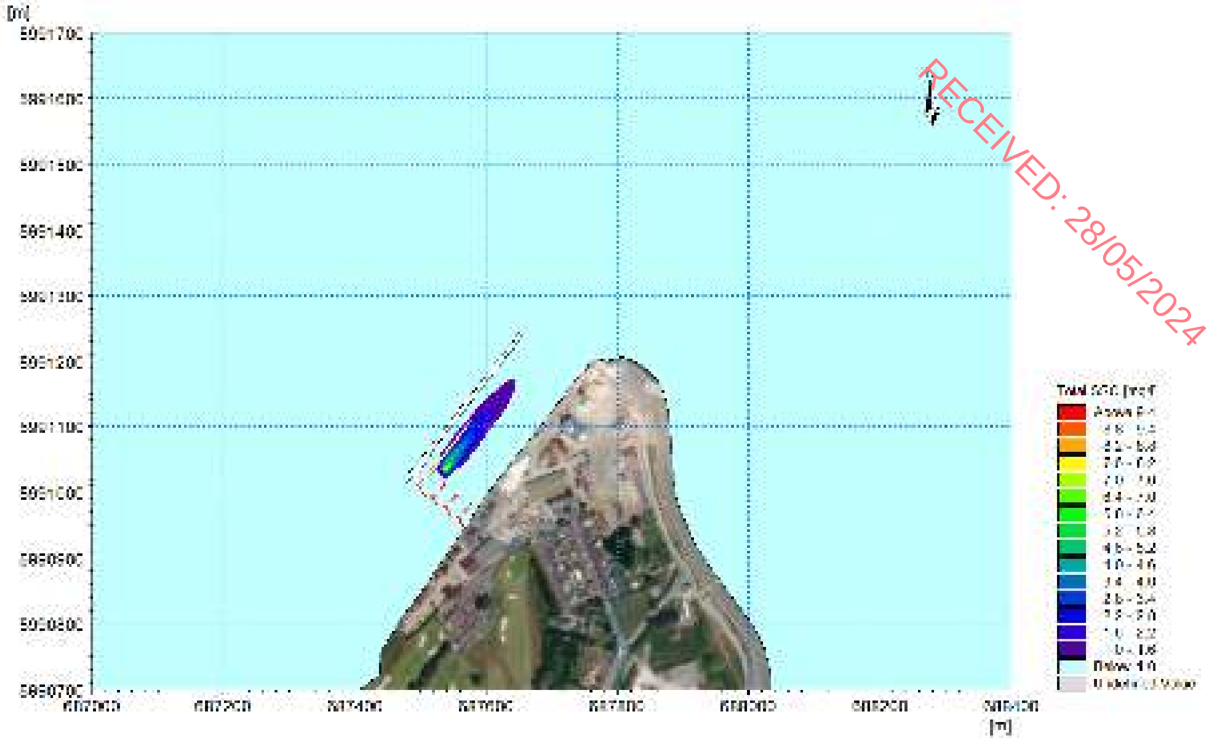

Figure 12.29 Suspended sediment concentration plume during typical high tide conditions.

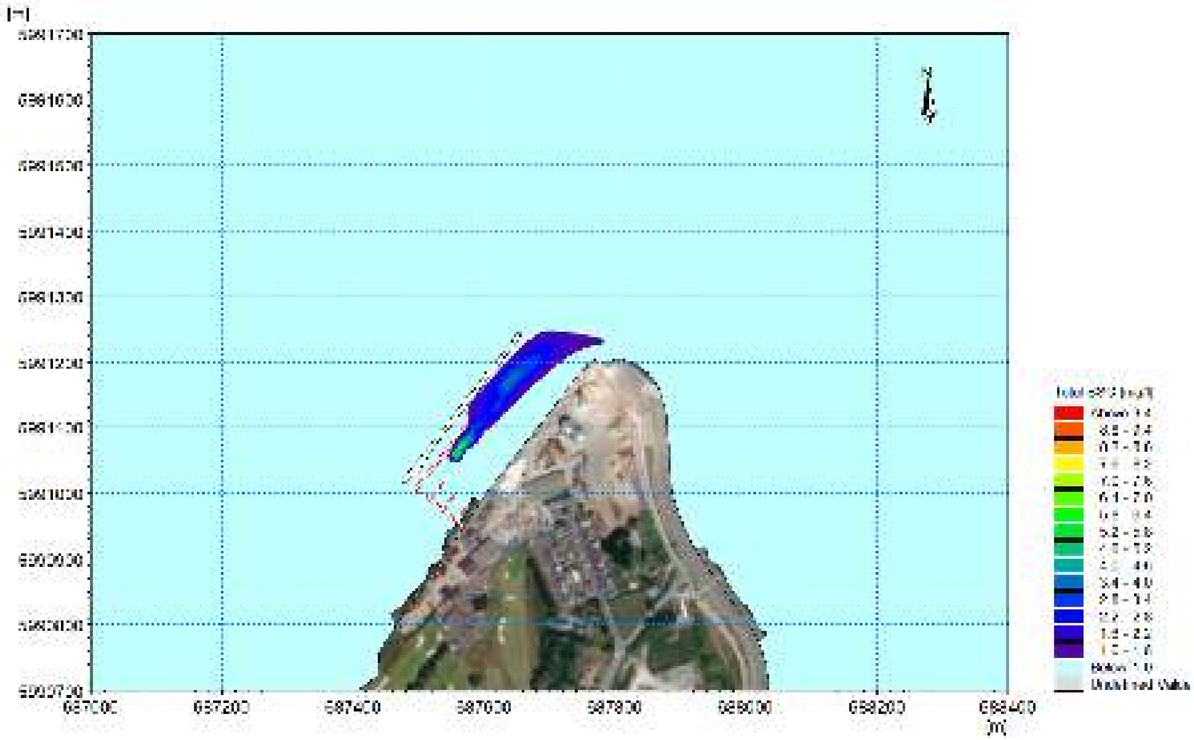

Figure 12.30 Suspended sediment concentration plume during typical mid-ebb conditions.

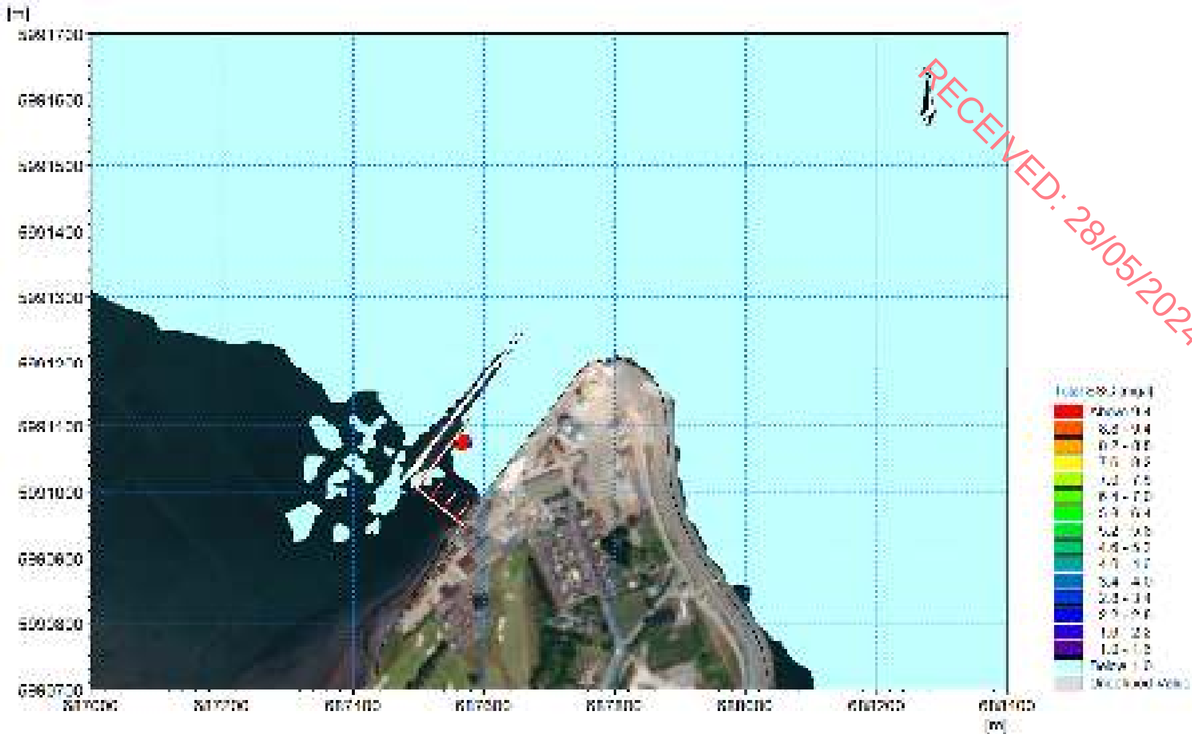

Figure 12.31 Suspended sediment concentration plume during typical low tide conditions.

Figure 12.32 illustrates the average total SSC within the vicinity of Greenore over the course of the dredging activity. It will be seen from this figure that the average SSC is generally less than 1.0mg/L and the plume is mostly confined to within the Greenore Port area. Beyond the Port area, the SSC of plumes is generally less than 0.5mg/L. Importantly, there is no detectable increase in sediment concentrations within the vicinity of the nearby aquaculture sites within Carlingford Lough.

Figure 12.33 demonstrates that the total deposition of sediment material upon completion of the dredging works is less than 5cm. It should be noted that in reality, dredging would proceed until the specified design depth is reached and any material deposited within the dredge area will be removed by the dredger until the specification is met.

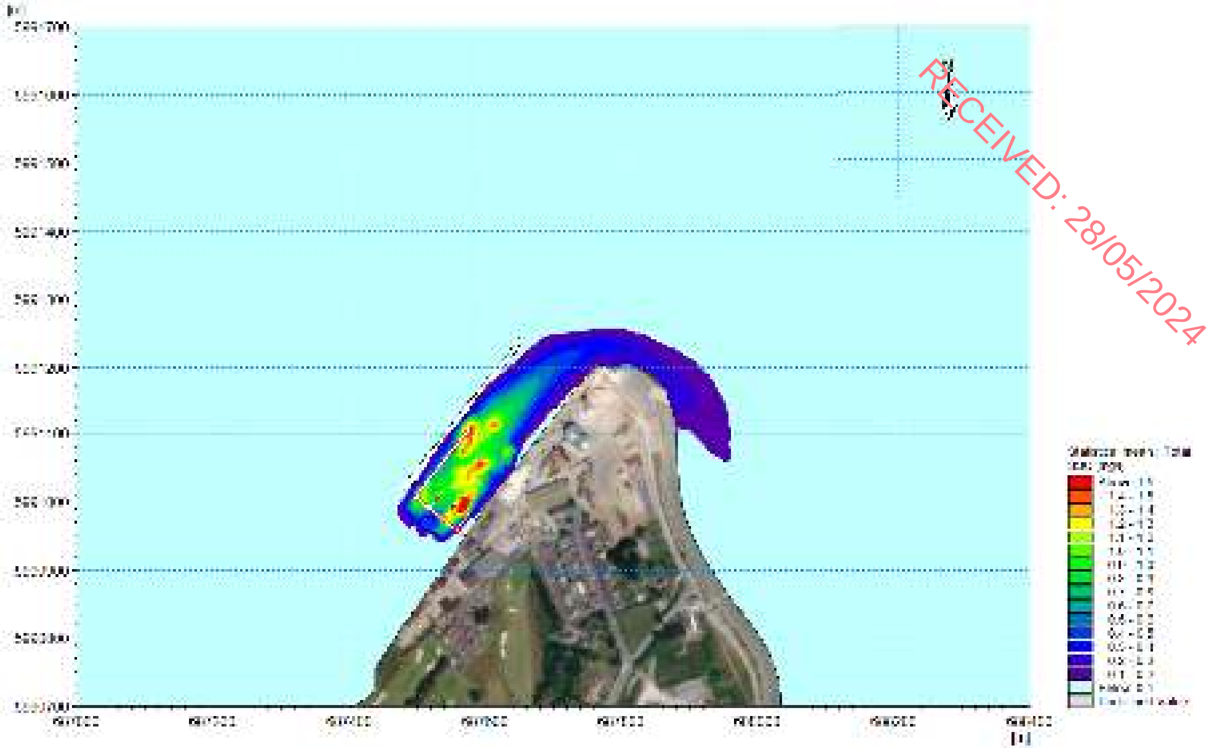

Figure 12.32 Average suspended sediment concentrations during dredge works.

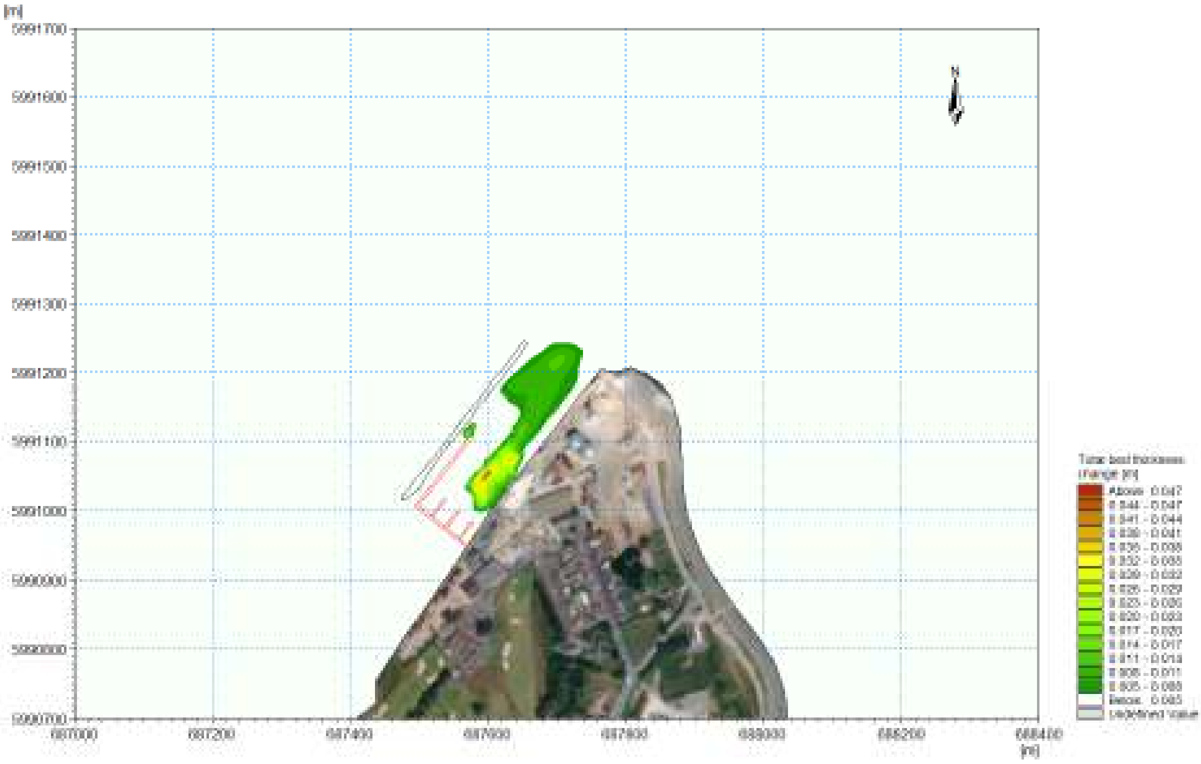

Figure 12.33 Total deposition of sediment material upon completion of the dredge works.

12.8.3 Operational Phase

Port development consisting of the construction of structures and/or changes in the configuration of the seabed bathymetry through capital dredging works has the potential to impact coastal processes. In particular, the proposed depth alterations to the seabed and associated restoration of the existing breakwater to -4.0m Chart Datum (CD) crest level has the potential to impact the following coastal processes during the operational phase of the project:

- Tidal current patterns within Greenore Port and Carlingford Lough.
- Sedimentation and erosion patterns within Greenore Port and Carlingford Lough.
- The inshore wave climate within Greenore Port and the surrounding area.
- Prevailing water levels and the existing flood risk in Greenore Port and Carlingford Lough.

The operational phase impacts in the context of these coastal processes are assessed in the followings Sections.

12.8.3.1 Potential changes to the existing tidal regime

The potential for changes with the proposed development in place was assessed to consider operational phase impacts. The MIKE 21 Hydrodynamic module described in Section 12.4.6 was used in conjunction with the post-development scenario 2D model to simulate the tidal regime at Greenore Point following the construction of the scheme.

Figure 12.34 to Figure 12.37 12.37 illustrate tidal current velocities and directions following the construction of the proposed development at typical spring mid-flood, high water, mid-ebb and low tide conditions.

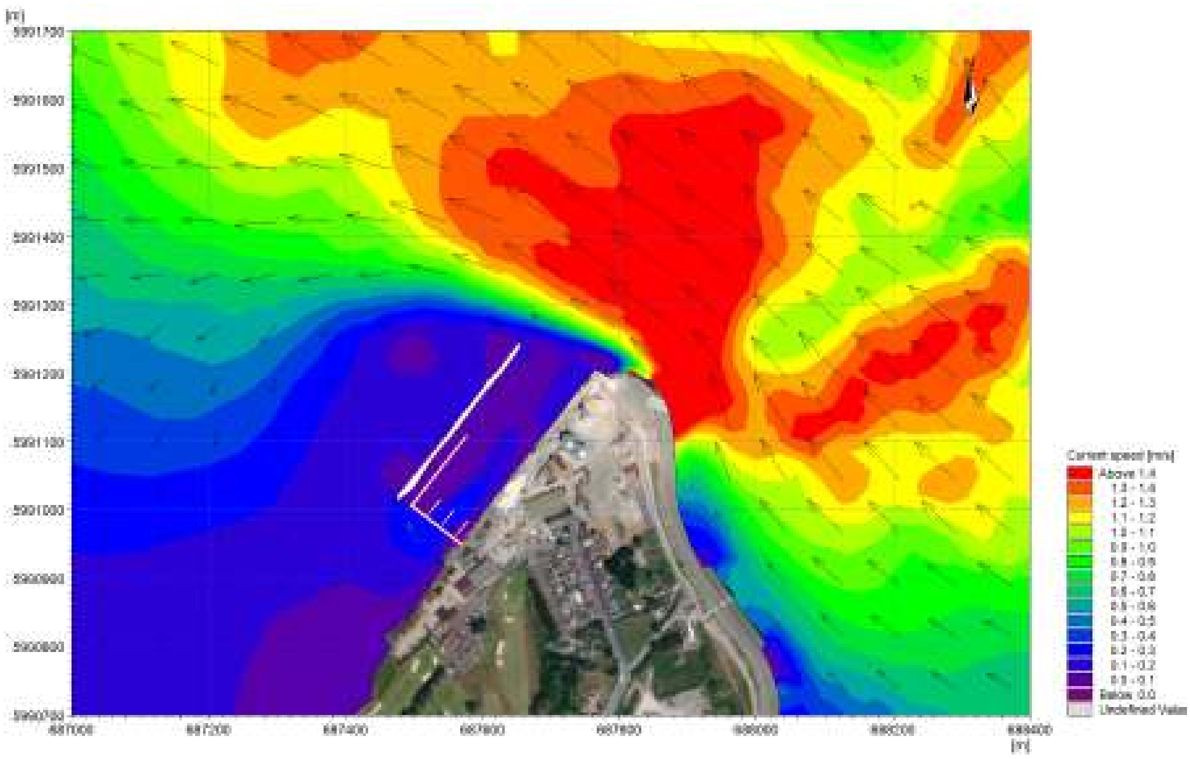

Figure 12.34 Typical current velocities and directions at Greenore Port during spring mid-flood conditions – Proposed scenario.

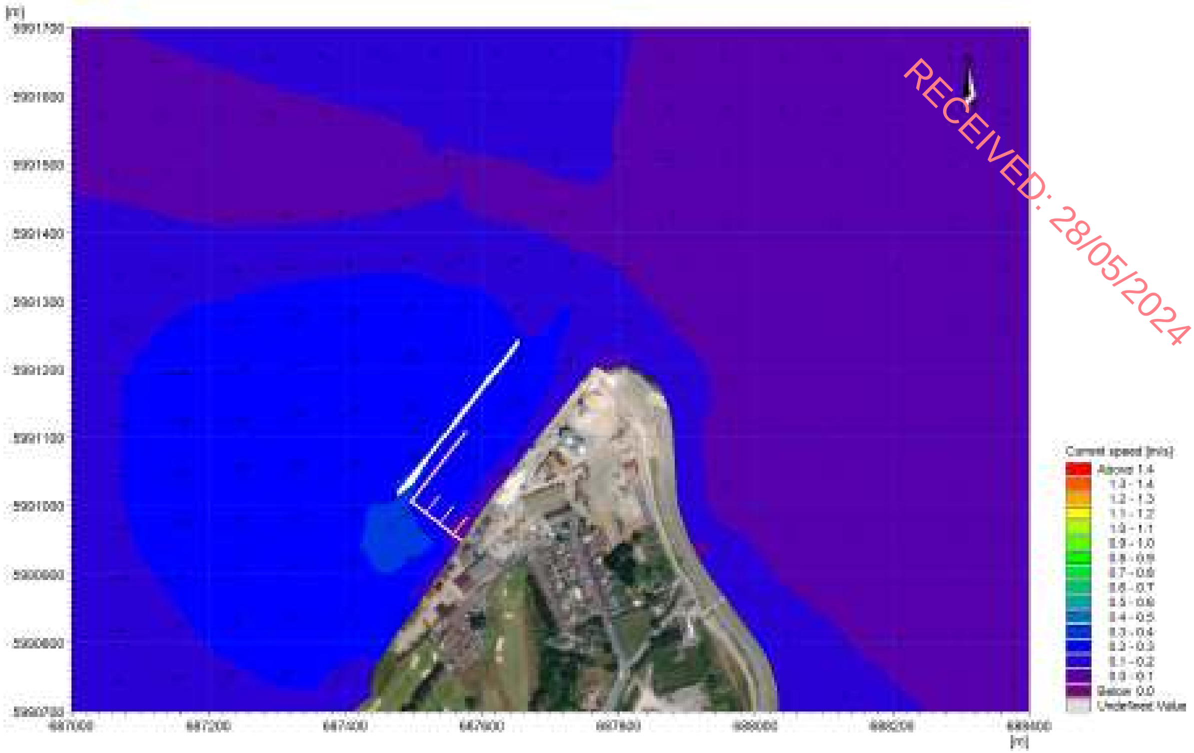

Figure 12.35 Typical current velocities and directions at Greenore Port during spring high tide conditions – Proposed scenario.

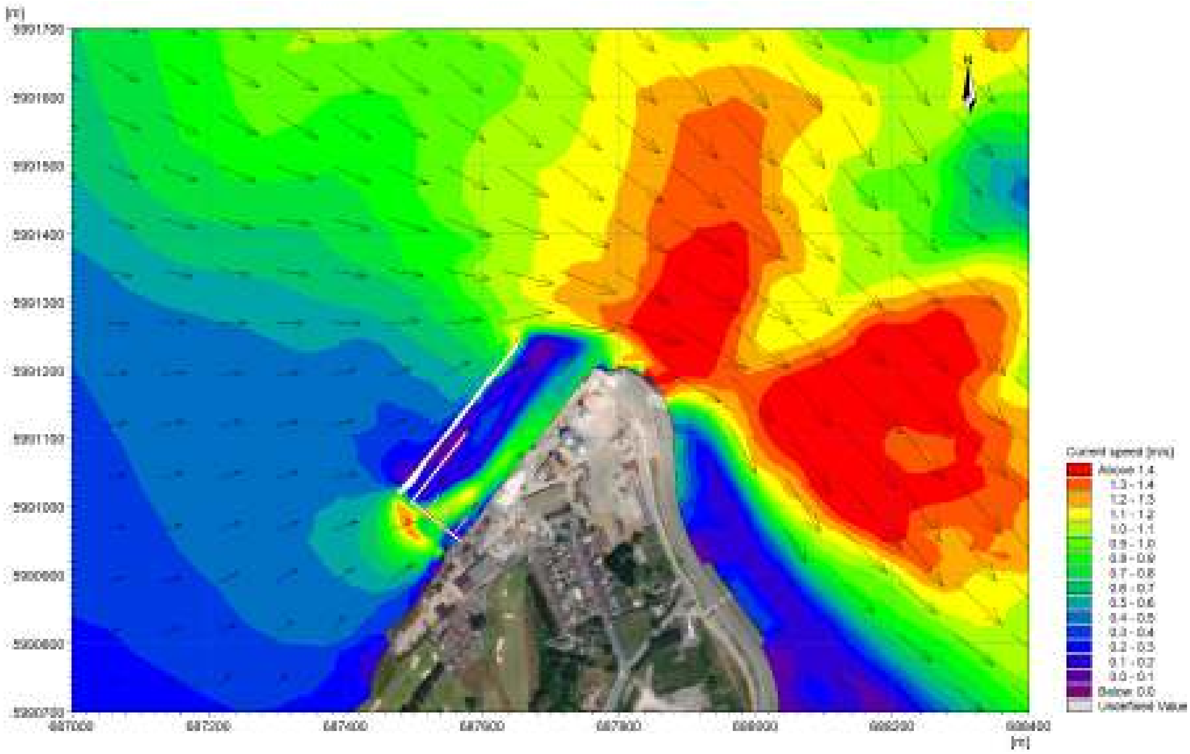

Figure 12.36 Typical current velocities and directions at Greenore Port during spring mid-ebb conditions – Proposed scenario.

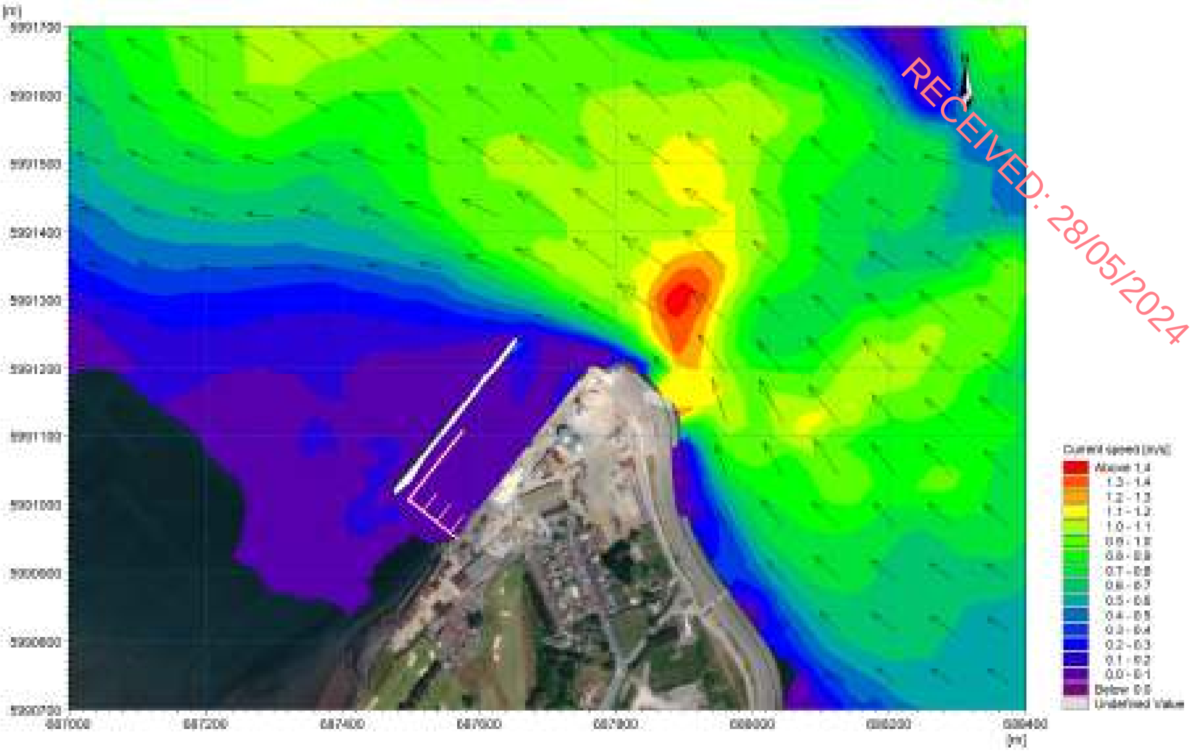

Figure 12.37 Typical current velocities and directions at Greenore Port during spring low tide conditions – Proposed scenario.

The difference in modelled current velocities for the pre and post development simulations have been computed for the same typical spring mid-flood, high tide, mid-ebb and low tide conditions and are presented in Figure 12.37 and Figure 12.41 respectively. It should be noted that spring tides are periods of greatest current velocities and that any changes in the tidal regime would therefore be greatest during these periods.

These figures show that the maximum predicted change to the mid-flood or ebb current speeds *within* the confines of Greenore Port is generally less than ±0.65m/s. During periods of high or low tide, changes *within* the confines of Greenore Port do not generally exceed ±0.35m/s. These highly localised changes can be attributed to the dredged seabed levels which result in local changes to the hydrodynamic regime.

Importantly, it will be seen from Figure 12.37 and Figure 12.41 12.41 that changes to the current velocities *beyond* the confines of Greenore do not typically exceed ±0.35m/s and are limited to within a *c.* 200m vicinity of Greenore Port. The greatest changes to the tidal regime are experienced during the mid-ebb phase of the tidal regime as illustrated in Figure 12.39. This would be expected as the tidal regime tends to flow parallel to the coastline during these periods and therefore “experiences” changes to the seabed to a greater extent relative to mid-flood phases the Port is sheltered by Greenore Point.

Based on this assessment, the tidal regime is predicted to remain substantially unchanged following the construction of the proposed development and no notable changes to the tidal regime were detected beyond the immediate vicinity of Greenore Port (i.e., beyond +200m).

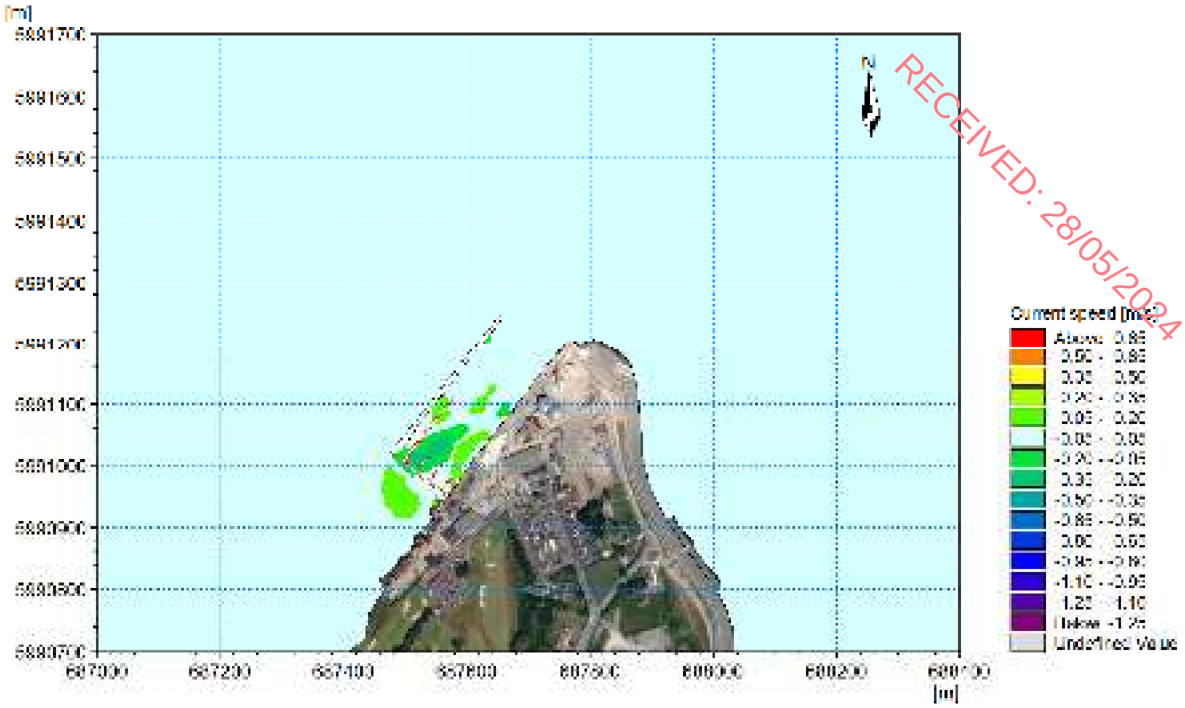

Figure 12.38 Difference in tidal current velocities plot during mid-flood as a result of the dredge campaign.

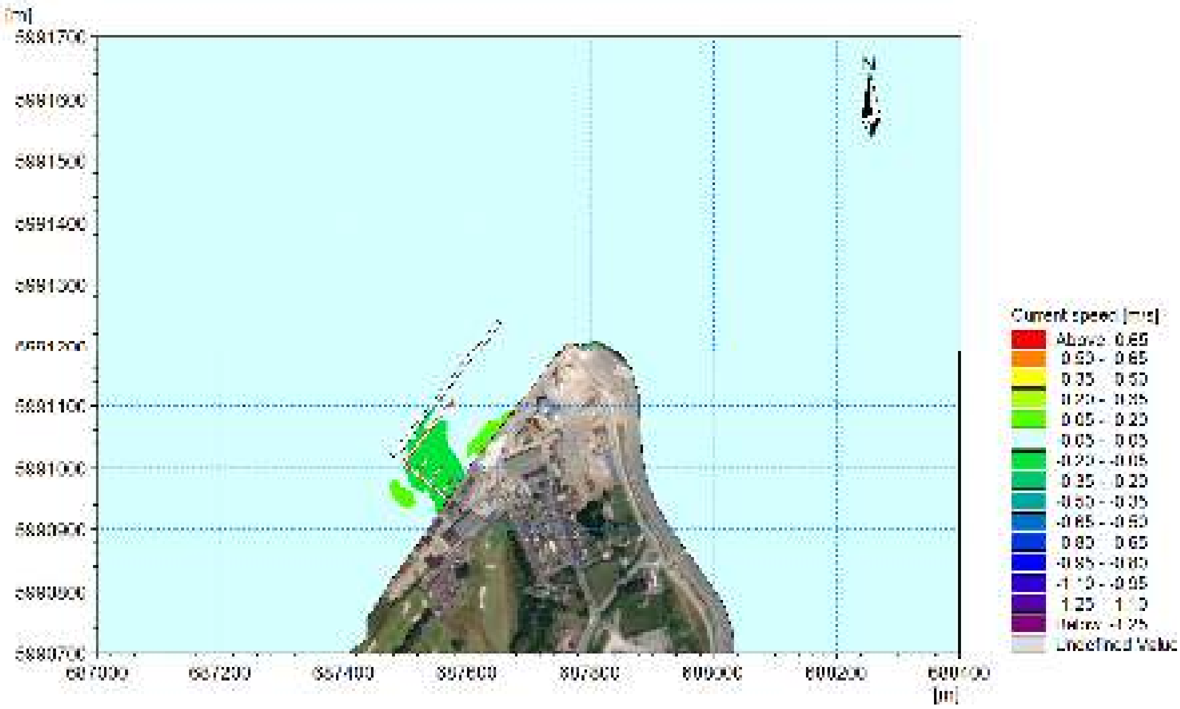

Figure 12.39 Difference in tidal current velocities plot during high tide as a result of the dredge campaign.

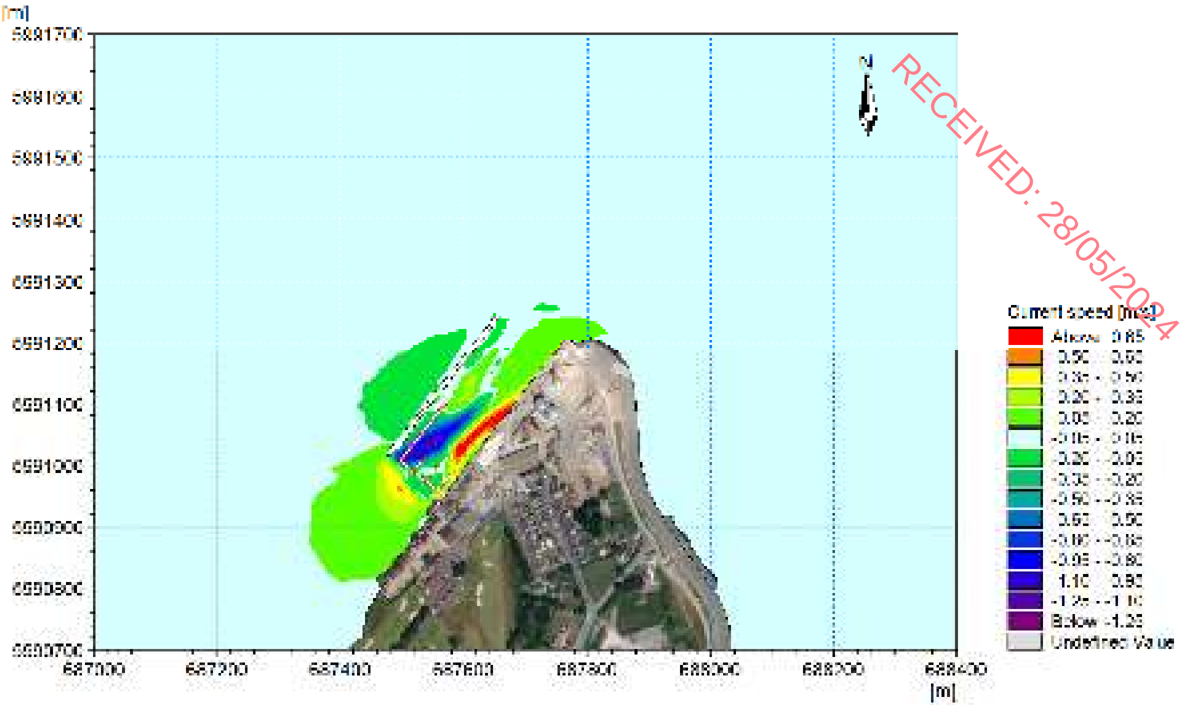

Figure 12.40 Difference in tidal current velocities plot during mid-ebb as a result of the dredge campaign.

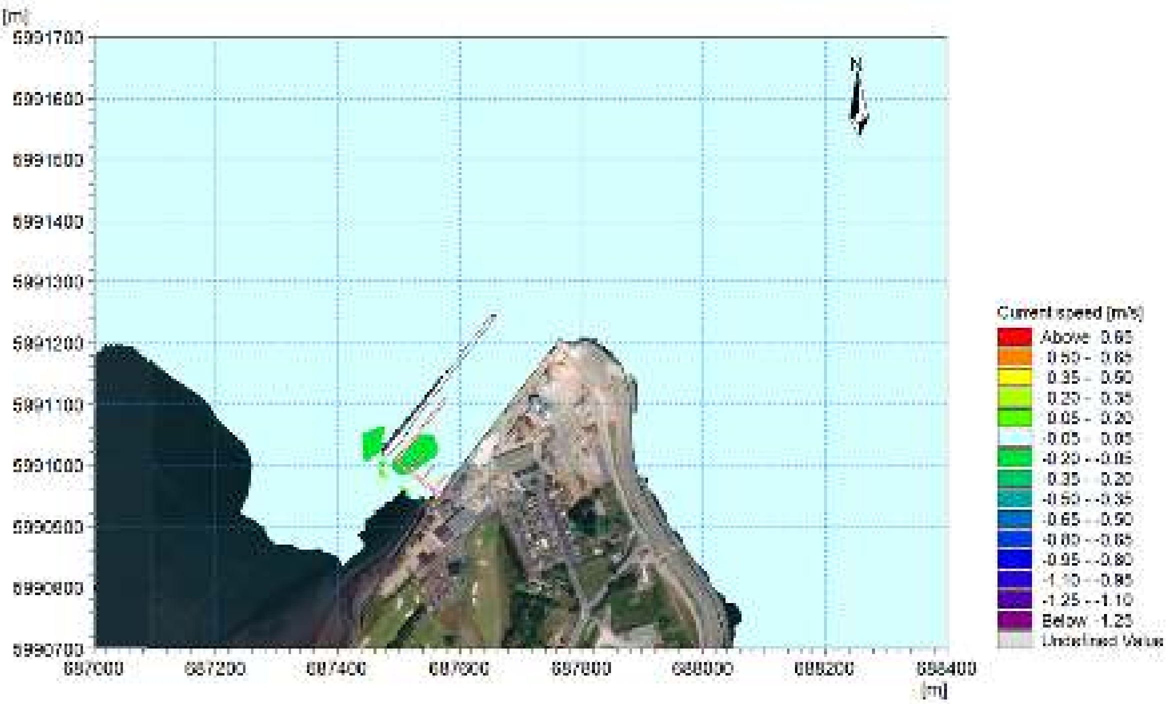

Figure 12.41 Difference in tidal current velocities plot during low tide as a result of the dredge campaign.

12.8.3.2 Potential changes to the wave climate

Operational phase impacts also considered included potential alteration to wave climate and its associated possible impact on the coastline with respect to erosional pressure. The MIKE 21 Spectral Wave module described in Section 12.4.6 was used in conjunction with the post-development scenario 2D model to re-run the most arduous inshore 1 in 50-year return period storm event which occurred during winds from 300°N.

The simulated inshore wave climate within the study area for this particular event post-project development is illustrated in Figure 12.42.

A wave height difference plot for this event is presented in Figure 12.43. This effectively illustrates the differences between Figure 12.19 and Figure 12.42. It will be seen that the proposed development results in a decrease of significant wave heights within the confines of Greenore Port by up to *c.* 0.25m. This would be expected should the proposed development require some restoration of crest levels along the existing breakwater to *c.*4.0m Chart Datum (CD).

Whilst there is a very localised increase in significant wave heights of *c.* 0.25m along a short section of the coastline *within* Greenore Port. This localised change will not increase erosional pressures given that this section of the coastline is comprised of hard infrastructure complete with coastal defences as illustrated in Figure 12.25(labelled "Quayside *OMF area*"). This change is considered permanent, neutral and imperceptible.

Whilst there was a very localised increase in significant wave heights of c. 0.25m along a very localised section of the coastline within Greenore Port, this change was considered negligible. This localised change is not expected to increase erosional pressures given that this section of the coastline is comprised of hard infrastructure complete with coastal defences.

In summary, changes to the wave climate following the construction of the proposed development are not considered significant and will not impact operations within the Port or erosional pressures on adjacent coastlines beyond the vicinity of Greenore Port.

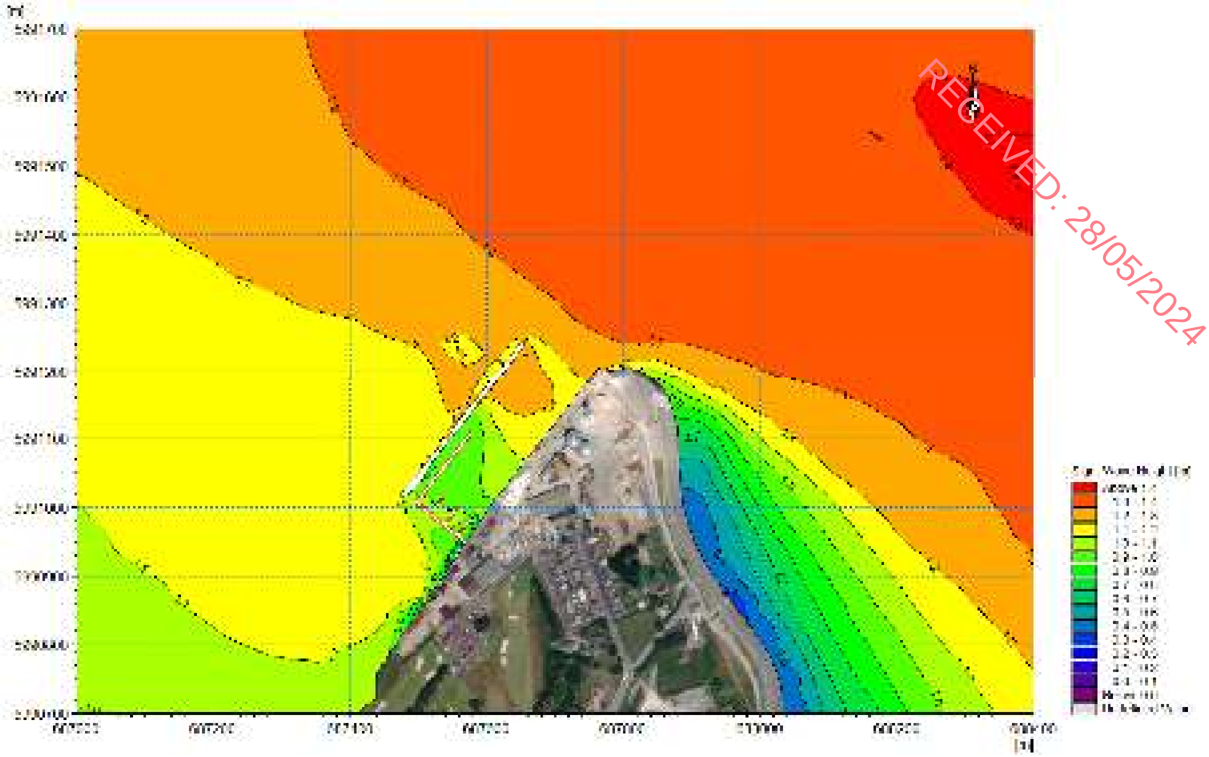

Figure 12.42 Significant wave height and mean wave directions around Greenore during a 1 in 50 year return period storm from 300°N at HAT water level – Proposed scenario.

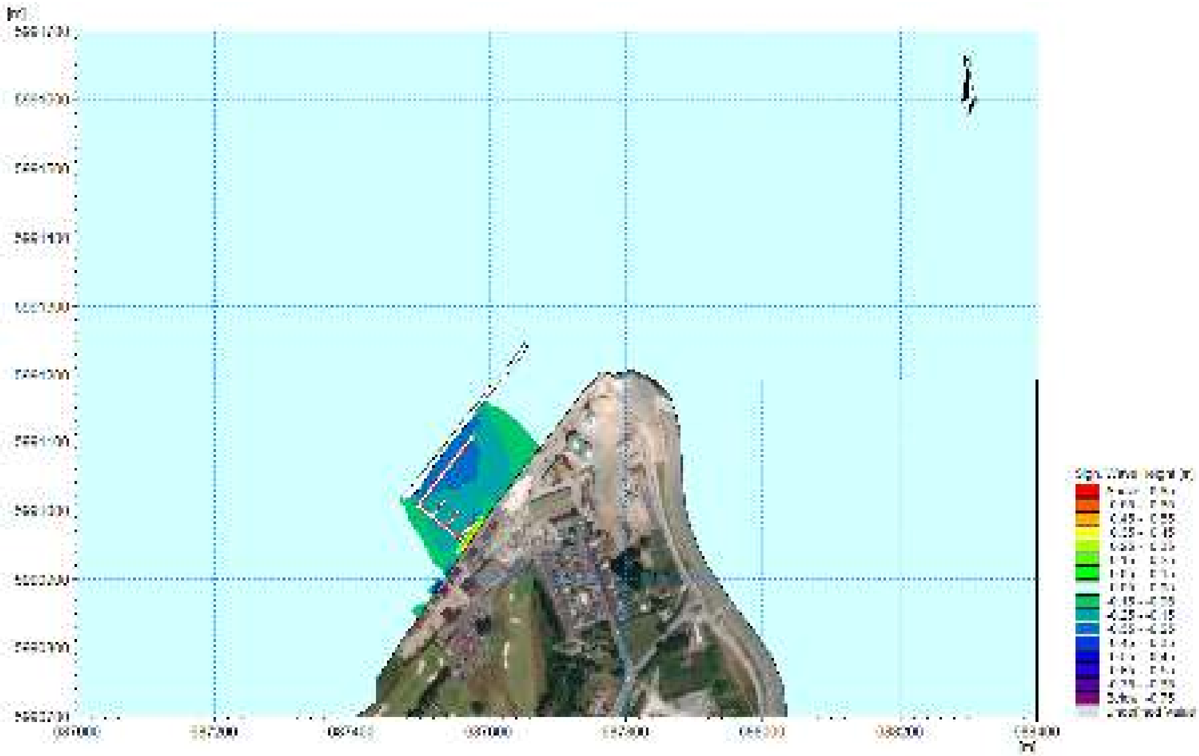

Figure 12.43 Difference in significant wave heights as a result of the proposed development during a 1 in 50 year return period storm from 300°N at HAT.

12.8.3.3 Potential changes to the existing littoral current regime

Figure 12.44 to Figure 12.47 12.47 illustrate the littoral tidal current velocities and directions at Greenore following the construction of the proposed development during typical spring mid-flood, high water, mid-ebb and low water tidal conditions respectively.

The differences in littoral current velocities as a result of the proposed development during the same tidal phases are illustrated in Figure 12.48 12.48 to Figure 12.51. As would be expected, these differences are relatively analogous to those described in Section 12.8.3.1 in that:

- That the maximum predicted change to the mid-flood or ebb current speeds *within* the confines of Greenore Port is generally less than ±0.65m/s.
- During periods of high or low tide, changes *within* the confines of Greenore Port do not generally exceed ±0.35m/s.
- These highly localised changes can be attributed to the repaired breakwater and dredged seabed levels.
- Changes to the current velocities *beyond* the confines of Greenore do not typically exceed ±0.35m/s and are limited to within a *c.* 200m vicinity of Greenore Port.
- The greatest changes to the tidal regime are experienced during the mid-ebb phase of the tidal regime.

Based on this assessment, the littoral current regime is predicted to remain substantially unchanged following the construction of the proposed development and no notable changes to the littoral current regime were detected beyond the immediate vicinity of Greenore Port (i.e., beyond +200m).

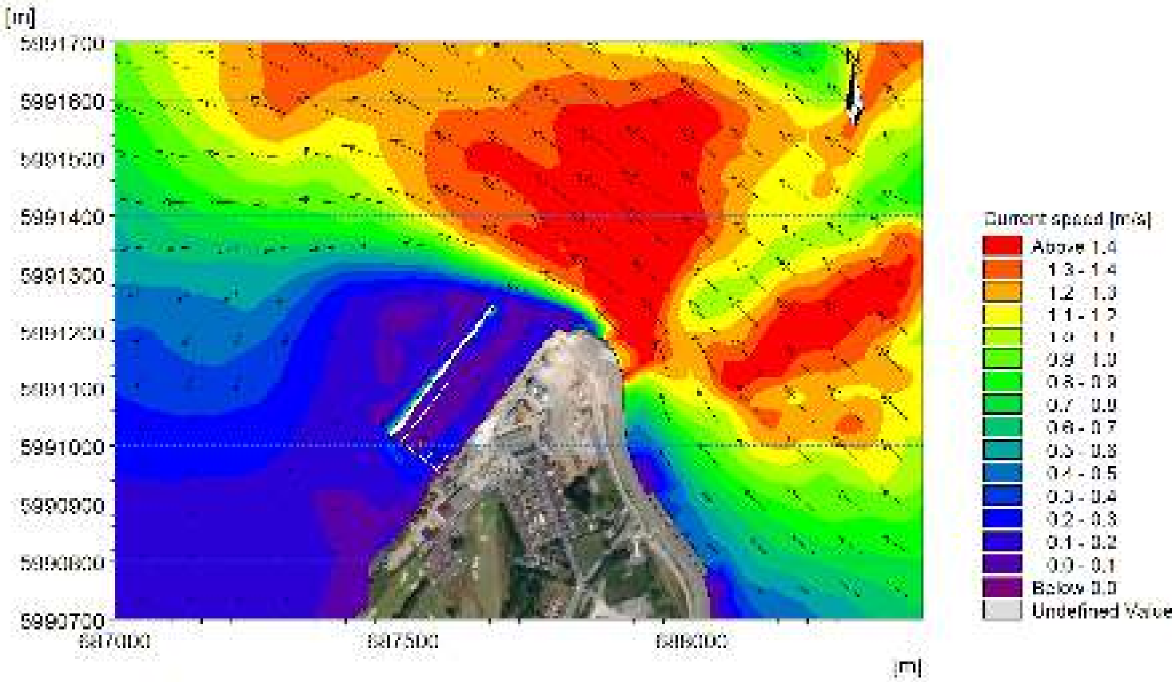

Figure 12.44 Typical littoral current velocities and direction at Greenore Port during spring mid-flood tidal conditions – Proposed scenario.

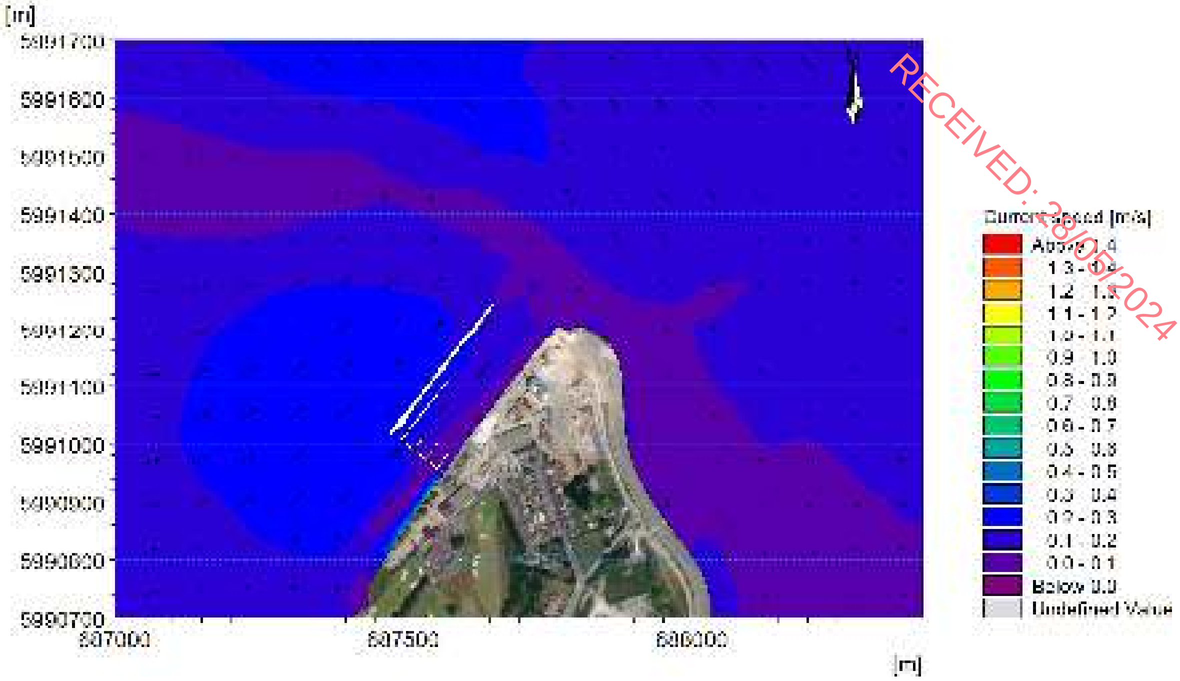

Figure 12.45 Typical littoral current velocities and direction at Greenore Port during spring high tidal conditions – Proposed scenario.

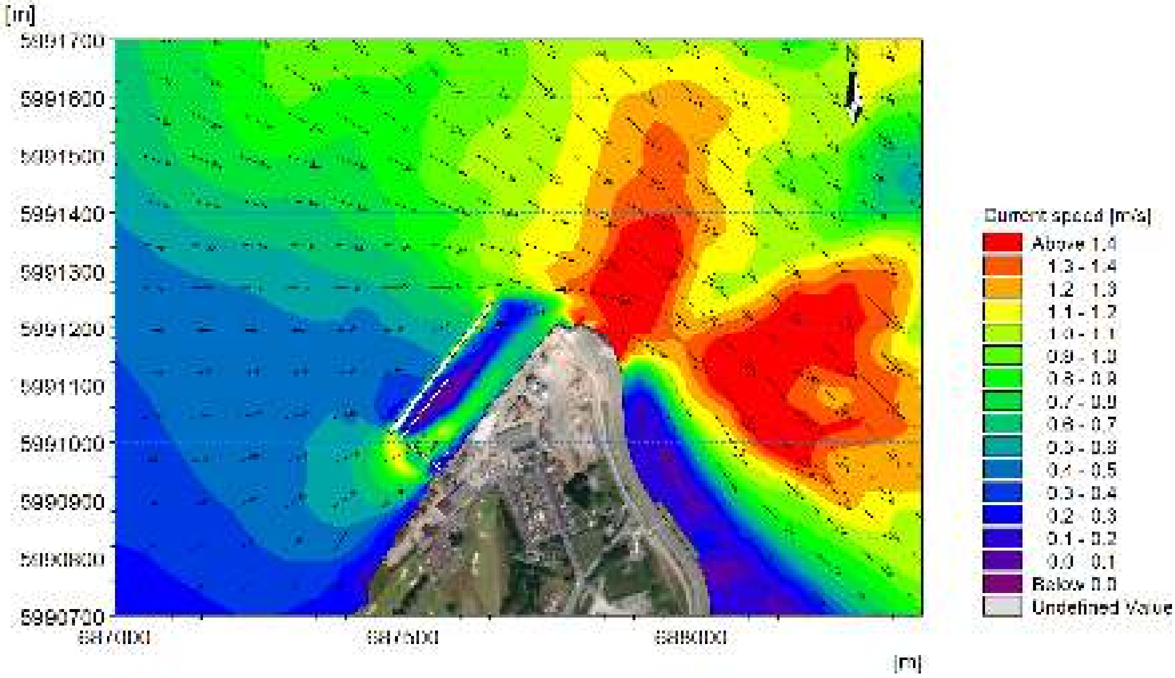

Figure 12.46 Typical littoral current velocities and direction at Greenore Port during spring mid-ebb tidal conditions – Proposed scenario.

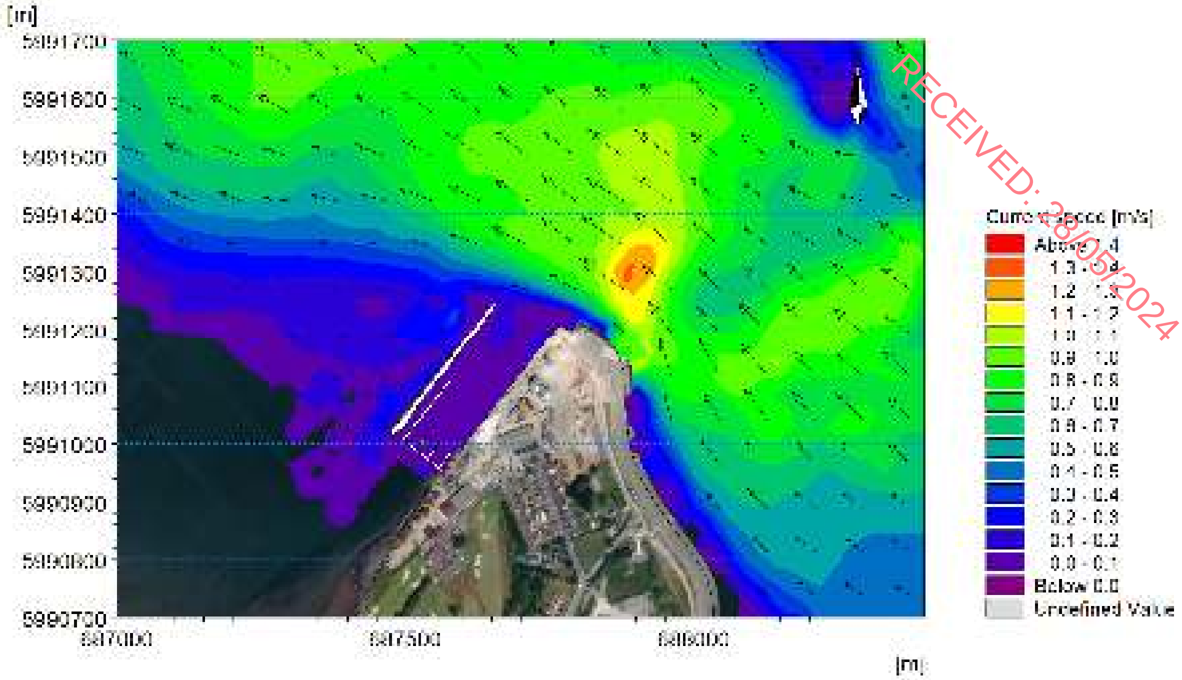

Figure 12.47 Typical littoral current velocities and direction at Greenore Port during spring low tidal conditions – Proposed scenario.

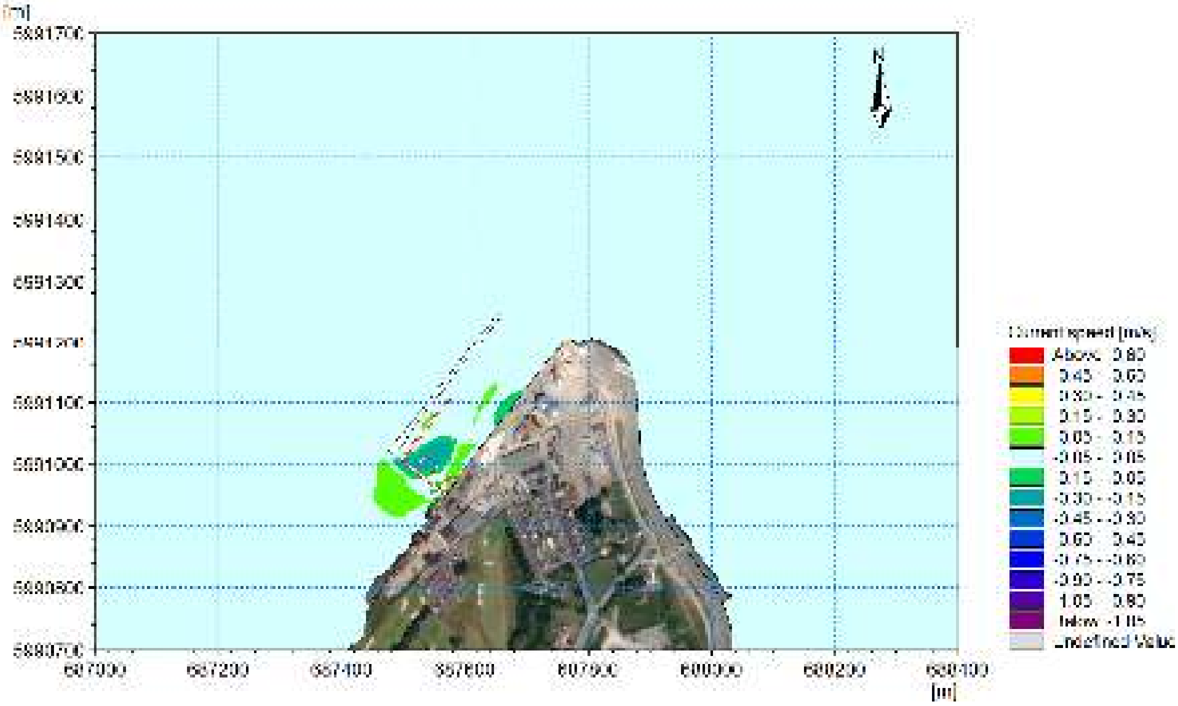

Figure 12.48 Difference in littoral current speeds during mid-flood as a result of the proposed development.

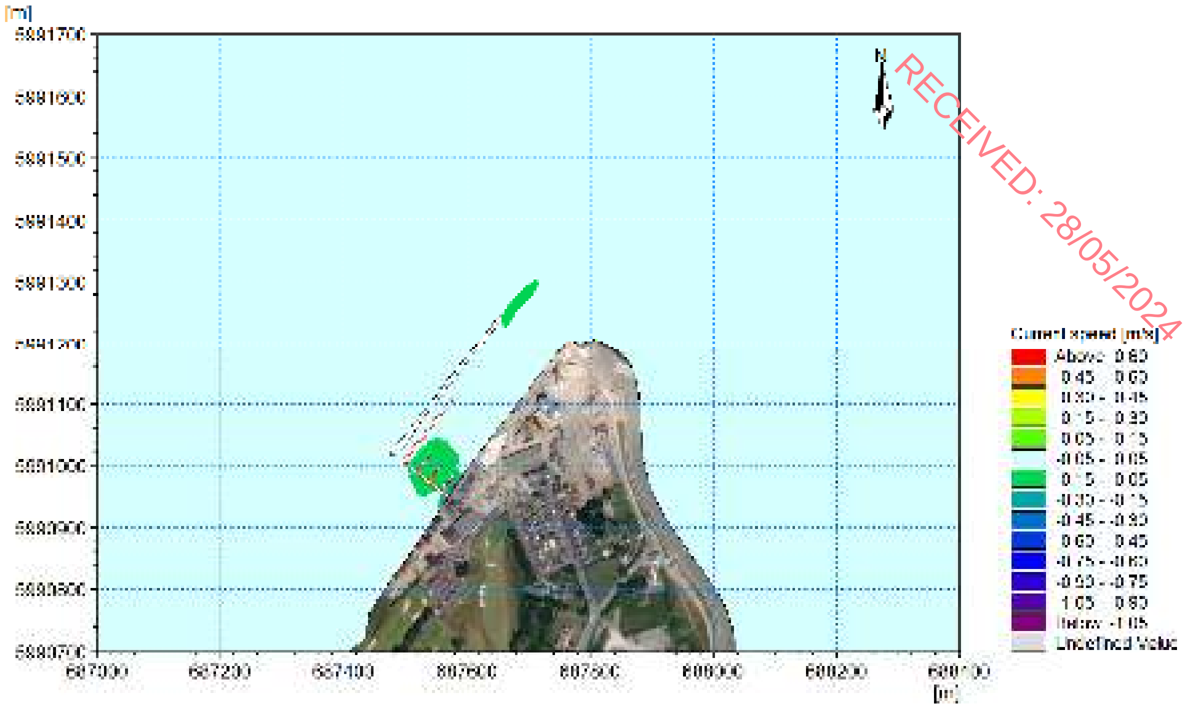

Figure 12.49 Difference in littoral current speeds during high water as a result of the proposed development.

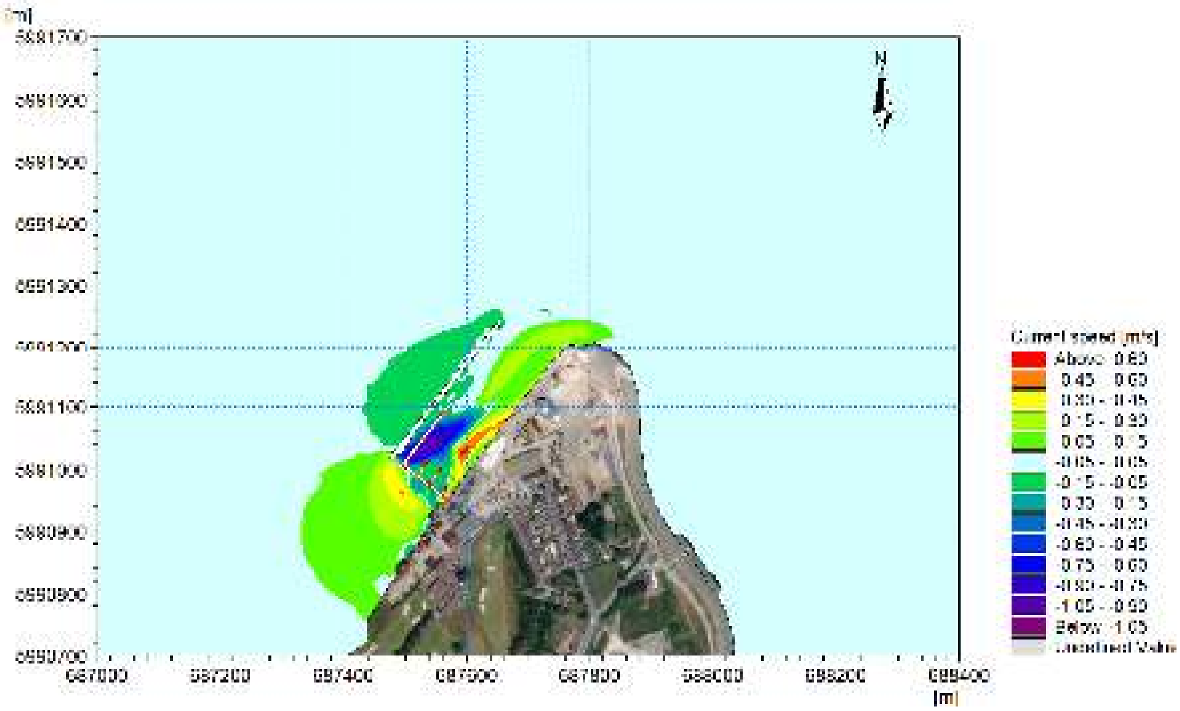

Figure 12.50 Difference in littoral current speeds during mid-ebb as a result of the proposed development.

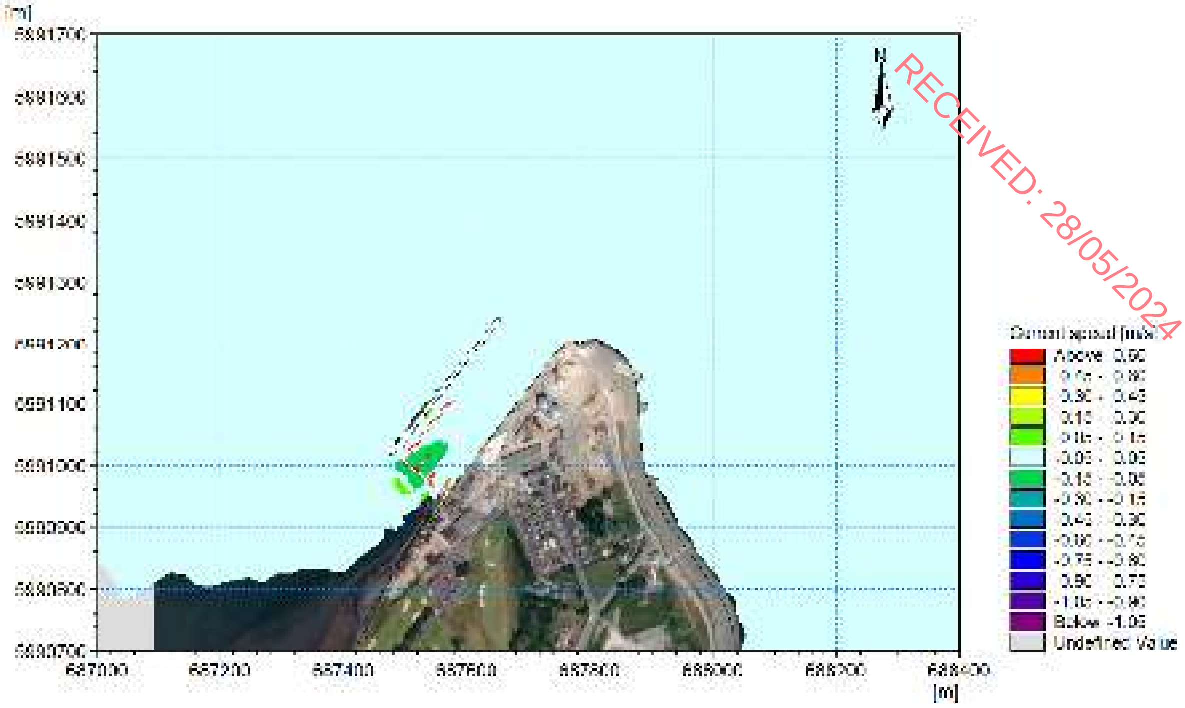

Figure 12.51 Difference in littoral current speeds during low water as a result of the proposed development.

12.8.3.4 Potential changes to the existing sediment transport

Sediment on the seabed is transported when it is exposed to large enough forces, or shear stresses, by the water movements. These movements can be caused by the current or by the wave orbital velocities or a combination of both. The relevant parameters that govern sediment transport within a coastal environment are therefore based on the following coastal processes:

1. Wave conditions at the site and the possible variations over a site.
2. Current conditions as well as the variations of current over an area.
3. Water-level conditions, i.e., tide, storm surge and wave set-up.
4. Bathymetry variations in an area.
5. The sediment characteristics over an area.
6. The sources and sinks of sediment, such as rivers or tidal inlets.

It has been demonstrated above that the proposed development will have no significant impact on these processes and it can be concluded therefore that the proposed O&M Facilities development will not result in a significant impact on the sediment transport regime at Greenore or the wider Carlingford Lough area.

12.8.4 Cumulative Effects

Potential cumulative impacts may arise from the proposed development at Greenore Port when combined with other existing and/or approved projects. In accordance with the European Commission Guidance on the preparation of the Environmental Impact Assessment Report (2017) and EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022), existing and/or approved projects with the potential for cumulative impacts have been identified as described in Chapter 1.

A review of these projects was undertaken and concluded that there are no developments within the surrounding area that may interact with the proposed development in terms of coastal processes owing to the very localised impact on tides, waves and sediment transport (including sediment dispersion).

Aside from cumulative impacts with approved projects, it is recognised that there are sixteen licensed aquaculture sites within a 1.5km zone of influence from the proposed development. As demonstrated by Sections 12.8, the proposed development is not expected to result in a significant impact on coastal processes within the vicinity of any of these licensed aquaculture sites. The potential for impact on these sites is further discussed in the Biodiversity (Chapter no. 11).

12.8.5 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 12.7 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Increase in suspended sediments	Negative	Not Significant	Local	Unlikely	Short-term	Direct
Deposition of suspended sediments	Negative	Not Significant	Local	Unlikely	Short-term	Direct

Table below summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 12.8 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Change to tidal regime	Negative	Not Significant	Local	Unlikely	Long-term	Direct
Change to wave climate	Negative	Not Significant	Local	Unlikely	Long-term	Direct
Change to littoral current	Negative	Not Significant	Local	Unlikely	Long-term	Direct
Change to sediment transport regime	Negative	Not Significant	Local	Unlikely	Long-term	Direct

12.9 Mitigation

12.9.1 Incorporated Design Mitigation

There were no design mitigations arising from the assessment of coastal processes.

12.9.2 Demolition Phase Mitigation

No demolition works are proposed as part of the maritime development.

12.9.3 Construction Phase Mitigation

Whilst the potential impact to existing coastal processes as a result of proposed construction phase activities is considered not significant, in-line with best practice the following mitigation measures will still apply to the proposed dredging campaign:

- A documented Accident Prevention Procedure will be put in place before commencement.
- A documented Emergency Response Procedure will be put in place before commencement.

The above mitigation measures will ensure the likelihood of construction phase works that could result in a potential risk to receiving water environment remains unlikely.

12.9.4 Operational Phase Mitigation

Given the insignificant impact on existing coastal processes, no mitigation measures are considered necessary during the operational phase of the proposed development.

12.10 Residual Impact Assessment

The implementation of the mitigation measures outlined in Section 12.9 will ensure that the potential risk to coastal processes will be negligible thus reducing the significance of environmental impact to imperceptible.

12.10.1 Demolition Phase

No demolition works are proposed as part of the maritime development.

12.10.2 Construction and Operational Phases

In circumstances where the mitigation measures are fully implemented during the construction and operational phases as outlined in Section 12.9 the impact of the O&M facility on the coastal processes at Greenore will consist of a small-scale, temporary increase in suspended sediment concentrations during dredge operations.

The proposed O&M facility is therefore not expected to have a significant effect on coastal processes or result in a perceptible increase in erosional pressures on adjacent coastlines beyond the vicinity of Greenore Port.

12.10.3 Summary of Post-mitigation Effects

The following Table summarises the identified likely significant residual effects during the construction phase of the proposed development following the application of mitigation measures.

Given the insignificant impact on existing coastal processes, no mitigation measures are considered necessary during the operational phase of the proposed development.

Table 12.9 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Increase in suspended sediments	Negative	Not Significant	Local	Unlikely	Short-term	Direct
Deposition of suspended sediments	Negative	Not Significant	Local	Unlikely	Short-term	Direct

12.10.4 Cumulative Residual Effects

There are no developments within the surrounding area that may interact with the proposed development in terms of coastal processes owing to the very localised impact on tides, waves and sediment transport (including sediment dispersion).

Aside from cumulative impacts with approved projects, it is recognised that there are sixteen licensed aquaculture sites within a 1.5km zone of influence from the proposed development. As demonstrated by Section 12.8, the proposed development is not expected to result in a significant impact on coastal processes within the vicinity of any of these licensed aquaculture sites. The potential for impact on these sites is further discussed in the Biodiversity (Chapter no. 11).

12.11 Risk of Major Accidents or Disasters

There is no Risk of Major Accidents or Disasters related to coastal processes and the proposed development.

12.12 Worst Case Scenario

In a worst-case scenario, if the mitigation measures described in section 12.9 are not applied, the impact to coastal processes as a result of an increase in suspended sediments and the resultant deposition of suspended sediments is not considered significant.

Nevertheless, the proposed construction phase mitigation measures are in line with best practice and will ensure the likelihood of potential impacts to the receiving environment remains unlikely.

12.13 Interactions

Given the close vicinity of multiple licensed aquaculture sites within 1.5km of the proposed development, dredging operations have the potential to interact with aquaculture sites. This potential impact is described and assessed in Chapter 11 (Biodiversity).

12.14 Monitoring

Given the lack of potential impacts to coastal processes as a result of the proposed development, no monitoring measures have been proposed.

12.15 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures. No Operational Phase mitigation or monitoring measures are proposed in context of Coastal Processes.

Table 122-12.10 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Quality	Significance
Accidents relating to dredging works	The contractor will be required to produce suitable Accident Prevent Procedures for dredging works	The contractor will review and main records relating to accidents and incidents.
Emergencies relating to dredging works	The contractor will be required to produce suitable Emergency Response Procedures for dredging works	

12.16 Conclusion

The assessment of coastal processes was based on an extensive numerical modelling programme using RPS' in-house suite of MIKE coastal process modelling software developed by the Danish Hydraulic Institute (DHI). Baseline models were calibrated and verified against a range of project specific hydrographic data and subsequently used to assess the construction and operational impacts of the proposed development.

The assessment concluded that:

- Dredging operations required for the proposed development will not result in any significant impact on either water quality in terms of suspended sediments, or the nearby environmentally designated areas in terms of sediment deposition with mitigation measures in place.
- The tidal regime is predicted to remain substantially unchanged as a result of the proposed development. The risk of impact to the existing tidal regime is therefore determined to be neutral and no mitigation is required.
- The assessment of potential changes to the inshore wave climate found that the proposed wave climate generally reduced owing to the possible restoration of the existing breakwater structure to -4.0m CD and the predominant wave conditions at the site. Whilst there was a very localised increase in significant wave heights of c. 0.25m along a very localised section of

the coastline within Greenore Port, this change was considered negligible. This localised change is not expected to increase erosional pressures given that this section of the coastline is comprised of hard infrastructure complete with coastal defences.

- Given that there are no significant changes to key coastal processes that govern sediment transport, i.e., tides, waves and littoral current, it can be concluded that the proposed development will result in no discernible change to the existing sediment transport regime at Greenore or the wider Carlingford Lough area.

The proposed development is not expected to act in combination with other nearby developments to result in any significant impacts to baseline coastal process conditions.

In circumstances where the mitigation measures are fully implemented during the construction and phases (i.e., restrictions to dredging operations), the impact of the proposed development on the coastal processes at Greenore will consist of small-scale, low magnitude changes in the tidal regime and wave climate. On the basis that the appropriate mitigation measures are fully implemented during the construction phase, the impact of the proposed development on coastal processes will be imperceptible.

12.17 References and Sources

1. Brooks, et al., (2018). Guidance on Best Practice for Marine and Coastal Marine Processes Baseline Survey and Monitoring Requirements to inform EIA of Major Development Projects. Natural Resources Wales.
2. CP 3:Chapter V-2:1972. Code of basic data for the design of buildings. Loading - Wind loads.
3. EN 1991-1-4 (2005) (English): Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions [Authority: The European Union Per Regulation 305/2011, Directive 98/34/EC, Directive 2004/18/EC.
4. Environment Agency. (2018). Coastal Design Sea Levels - Coastal Flood Boundary Extreme Sea Levels.
5. Gavin & Doherty Geosolutions (2024). Greenore Port Geotechnical Interpretive Report.
6. Pye, et al., (2017). Advice to Inform Development of Guidance on Marine, Coastal and Estuarine Marine Processes Numerical Modelling Assessments Natural Resources Wales.
7. Six West Ltd (2023). Groyne survey.
8. Six West Ltd (2023).Bathymetry data/drawing no. MG230307.
9. Six West Ltd (2023).Topography data/drawing no. MG230104_Rev1_Overview.

CHAPTER 13

NOISE & VIBRATION

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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13 Noise & Vibration

13.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on noise and vibration.

It should be read in conjunction with project description (Chapter 2) and the Material Assets: Traffic and Transport chapter (Chapter 6).

13.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Alistair Maclaurin of AWN Consulting Ltd.

Alistair Maclaurin (Senior Acoustic Consultant) holds a BSc in Creative Music and Sound Technology and a Diploma in Acoustics and Noise Control. He is a member of the Institute of Acoustics. Alistair has worked in the field of acoustics since 2012. He has been the lead noise consultant across various sites on major infrastructure projects such as Crossrail and Thames Tideway Tunnel, specialising in construction noise assessment and control. Additionally, he has undertaken various other environmental noise assessments for infrastructure developments and planning reports across the UK and Ireland.

13.3 Proposed Development

A full description of the proposed development is set out in Chapter 2 of this EIAR. The following is a summary of the proposed works.

A full description of the proposed development is provided in **Chapter 2** of this EIAR. The following is a summary of the proposed works:

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. Where rock is encountered (estimate max of 1,000m^3), it will be reused on site.

Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 of the development.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA). The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine room wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary,, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

1. **'Terrestrial Port Area'**, (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.
2. **'Nearshore Environment'** (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
3. **'Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
4. **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

The following is a general location plan of the plots identified above.

Figure 13.1 Development Areas

13.3.1 Aspects Relevant to this Assessment

When considering a development of this nature, the potential noise and vibration impact on the surroundings and on the development itself must be considered for each of two distinct stages:

- demolition & construction phase, and;
- operational phase.

During the Demolition and construction stage, the main focus in relation to noise and vibration impacts will be from demolition, piling, dredging and other more typical construction activities. These activities have the potential to emit the highest levels of noise or vibration at receptor locations. The construction phase impacts will be temporary to short-term in duration.

The primary potential sources of noise and vibration during the operational phase of the proposed development are as a result of road traffic related noise increases; static and mobile plant noise as part of the warehouse units and port; and the additional marine vessel movements that will occur at the development. All operational sources are assessed as long-term.

Note that whilst the Proposed Development will be constructed over two distinct phases, given that the construction phases are not scheduled to overlap there will be no increases of construction impacts due to a combination of the phases.

13.4 Methodology

This chapter has been prepared having regard to the following guidelines;

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- BS 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228–1) (British Standard Institute, 2014a);
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (hereafter referred to as BS 5228 – 2) (British Standard Institute, 2014b);
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (hereafter referred to as BS 7385–2). (British Standard Institute, 1993);
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (hereafter referred to as BS 6472–1) (British Standard Institute, 2008);
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (hereafter referred to as BS 4142) (British Standard Institute, 2019);
- BS 8233: Guidance on sound insulation and noise reduction for buildings (hereafter referred to as BS8233) (British Standard Institute, 2014)Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (hereafter referred to as DMRB Noise and Vibration) (UK Highways Agency (UKHA), 2020);
- S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018 (hereafter referred to as the Noise Regulations);
- S.I. No. 241/2006 - European Communities Noise Emission by Equipment for Use Outdoors (Amendment) Regulations 2006;
- ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (hereafter referred to as ISO 9613 – 2) (International Organization for Standardization, 1996);
- ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (hereafter referred to as ISO 1996 – 1) (International Organization for Standardization, 2016);

- ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels (hereafter referred to as ISO 1996 – 2) (International Organization for Standardization, 2017), and;
- The UK Department of Transport Calculation of Road Traffic Noise (hereafter referred to as the CRTN) (UK Department of Transport 1988)
- Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA 2014) (hereafter referred to as NG4);
- Guidelines for Environmental Noise Impact Assessment IEMA) (2014)

The assessment will be undertaken using the following methodology:

- A review of the local area to identify the closest sensitive locations have been undertaken;
- Baseline noise monitoring has been undertaken in the vicinity of the proposed development site in order to characterise the existing noise environment;
- A review of the most applicable standards and guidelines has been reviewed in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- Predictive calculations relating to construction phase activities have been undertaken at the nearest sensitive locations to the development site;
- Predictive calculations have been performed to assess the potential impacts associated with the operation of the development at the most sensitive locations surrounding the proposed development, and;
- A schedule of mitigation measures has been incorporated where required, to reduce, where necessary, the identified potential outward impacts relating to noise and vibration from the proposed development.

13.4.1 Relevant Legislation & Guidance

13.4.1.1 Construction Noise

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. It is industry standard that British Standard Institute guidance is relied upon.

British Standard BS 5228 – 1: 2009+A1:2014

For residential properties, reference is made to BS 5228-1:2009+A1:2014 'ABC' method is referenced here for the purposes of setting appropriate construction noise thresholds for the development. This is the most widely accepted standard for this purpose in Ireland.

The ABC approach designates a residential noise-sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a potential significant noise impact is associated with the construction activities, depending on context.

Table 13.1 Example Threshold Of Significant Effect at Dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value in decibels (dB)		
	Category A [A]	Category B [B]	Category C [C]
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Evenings and weekends	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D) 19:00–23:00 weekdays, 13:00–23:00 Saturdays and 07:00–23:00 Sundays

Commercial Receptors

BS 5228-1:2009+A1 gives several examples of acceptable limits for construction or demolition noise, the most simplistic being based upon the exceedance of fixed noise limits. For example paragraph E.2 states:

> *"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut."*

Paragraph E.2 goes on to state:

> *"Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:*
>
> *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
>
> *75 decibels (dBA) in urban areas near main roads in heavy industrial areas".*

For non-residential locations it is considered appropriate to adopt the 75dB(A) criterion during the day.

Proposed Threshold Noise Levels

Figure 13.2 provides an overview of the closest receptor groups surrounding the proposed site that will experience the greatest impact from the construction works.

Taking into account the baseline noise environment monitored around the development site (see Section 13.6), and using the criteria discussed above, the following Construction Noise Threshold (CNT) levels are proposed for the nearby receptors to this development in Table 13.2.

Table 13.2 Construction Noise Thresholds for NSLs

Noise Sensitive Location	Description	Category	CNT, Daytime. dB $L_{Aeq,12hr}$
R1	Greenore Golf Club (commercial)	Commercial	75
R2	Residential properties located off Anglesey Terrace and Euston St, including 3 properties at the northern end of Anglesey Terrace and Euston Street adjoining the southern boundary of the terrestrial port area and port office area of the site; and properties on Euston Terrace backing onto the Residential site.	Category A	65
R3	Residential properties located off the R175 and Euston St. These properties are located approximately 120m to the south of the development and 50m west of the 'residential site' / future carpark on Shore Road.	Category A	65
R4	Residential properties located off Euston St and Shore Rd located adjacent to the 'residential site' / future carpark and approximately 60m south east from the primary area of the development.	Category A	65
R5	Greenore Coast Guard Station (commercial)	Commercial	75

There are receptors further from the development site, however, the work areas will typically be 300m or greater from these areas and, hence, these receptors can be scoped out of the assessment as the attenuation due to distance will be sufficient to reduce the impacts at these locations to not significant.

Figure 13.2 Identified Receptor Locations

Interpretation of the CNT

In order to assist with interpretation of CNTs, Table 13.3 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of *DMRB: Noise and Vibration*.

Table 13.3 Likely Impact due to Construction Noise

Construction Noise Level	Guidelines for Noise Impact Assessment Significance (DMRB)	EPA Mapped Effects	Determination
Below or equal to baseline noise level	Negligible	Below or equal to baseline noise level	Depending on CNT, duration & baseline noise level
Above baseline noise level and below or equal to CNT	Minor	Above baseline noise level and below or equal to CNT	
Above CNT and below or equal to CNT +5dB Note 2	Moderate	Above CNT and below or equal to CNT +5 dB	
Above CNT +5 and below or equal to CNT +15dB	Major	Above CNT +5 to +15 dB	
Above +15dB		Above CNT +15 dB	

Note 1: CNLs at the upper end of this range will result in higher potential impacts, therefore this range is categorised as slight to moderate, acknowledging that values approaching the CNT are greater than slight. In accordance with DMRB, noise levels below the CNT are deemed 'Not Significant'.

Note 2: The DMRB does not distinguish beyond a 'Major' impact. For the purposes of distinguishing between a Very Significant and Profound Impact, CNLs exceeding the CNT by +20dB are categorised as Profound.

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and determine the likely impacts during the construction stages.

Construction Traffic

Vehicular movement to and from the construction site for the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced: *DMRB Noise and Vibration* 2020 and the *EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB document. Table 13.4 offers guidance as to the likely impact associated with any particular change in traffic noise level (Source DMRB, 2020).

Table 13.4 Likely Impact Associated with Change in Traffic Noise Level

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

13.4.1.2 Construction Vibration

Building Damage

BS 7385 - 2 (BSI 1993) gives guidance regarding acceptable vibration in order to avoid damage to buildings. BS 5228 – 2 (BSI 2014b) reproduces these same guidance values.

These standards differentiate between transient and continuous vibration. Surface construction activities are transient because they occur for a limited period of time at a given location. Both documents recommend that, for soundly constructed residential property and similar light framed structures that are generally in good repair, a threshold for minor or cosmetic damage (i.e. non-structural damage) should be taken as a PPV (in frequency range of predominant pulse) of 15mm/s at 4 Hertz (Hz) increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5mm/s PPV the risk of damage tends to zero. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in BS 5228 – 2 (BSI 2014b) Table B.2 might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges. Historically important buildings that are difficult to repair might require special consideration on a case-by-case basis, but buildings of historical importance should not be assumed to be more sensitive unless they are structurally unsound.

If a building is in an unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other groundborne disturbance. The vibration limit range for protected and historical buildings are equal to or up to 50% of those for light framed buildings, depending on their structural integrity. Where no structural defects are noted, the same limit to those for light framed buildings apply. For other structures and buildings that are determined to be potentially vulnerable to vibration due to significant structural defects, further stringent criteria have been applied for transient vibration. It is assumed that known buildings and structures of this kind, will be subject to condition surveys well in advance of the works, and any defects identified repaired. The results of conditions surveys will determine whether a building or structure is classed as "vulnerable". Table 13.5 sets out the limits as they apply to vibration frequencies at 4Hz where the most conservative limits are required. At higher frequencies, the relevant limit values for transient vibration within Table B.2 and Figure B.1 of BS5228-2 (BSI 2014b) will apply, with similar reductions applied for continuous vibration and those for protected structures. For line 2 of Figure B.1. at frequencies below 4Hz, a maximum displacement of 0.6mm (zero to peak) should not be exceeded. Taking the above into consideration the vibration criteria for building response is set out in Table 13.5. Table 13.5 Transient vibration guidance values for avoidance of cosmetic building damage.

Table 13.5 Building Damage Criteira for Construction Vibration

Vibration Limits for Buildings (PPV) at the closest part of building to the source of vibration, at a frequency of 4Hz		
Building Type	Transient Vibration	Continuous Vibration
Reinforced or framed structures. Industrial and heavy commercial buildings	50mm/s	25mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15mm/s	7.5mm/s
Protected and Historic Buildings *Note 1	6mm/s – 15mm/s	3mm/s – 7mm/s
Identified Potentially Vulnerable Structures and Buildings with Low Vibration Threshold	3mm/s	

Note 1: The relevant threshold value to be determined on a case-by-case basis. Where sufficient structural information is unavailable at the time of assessment, the lower values within the range will be used, depending on the specific vibration frequency.

Human Response Criteria

Humans are sensitive to vibration stimuli, and perception of vibration at high magnitudes may cause concern to building occupants. BS 5228 – 2 notes that vibration typically becomes perceptible at around 0.15 mm/s to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. During surface construction works associated with breaking of ground, piling, and excavation, depending on the methodologies involved have the potential to be perceptible to building occupants and have the potential to cause significant effects.

Higher levels of vibration are however typically tolerated for single events or events of temporary duration, particularly during construction projects and when the origin of vibration is known. For example, piling can typically be tolerated at vibration levels up to 2.5 mm/s during the daytime and the evening if those affected are aware of the time-frame and origin of the vibration, and if they have been informed about the limit values relating to the structural integrity of neighbouring properties. Table 13.6 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS 5228 – 2 and reference to the Association of Noise Consultants (ANC) Measurement and Assessment of Groundborne Noise and Vibration (ANC, 2020).

Table 13.6 Human Response to Vibration Significance Ratings

Criteria	Impact Magnitude	Significance Rating
≥10 mm/s PPV	Very High	Very Significant
≥1 mm/s PPV	High	Moderate to Significant
≥0.3 mm/s PPV	Medium	Slight to Moderate
≥0.14 mm/s PPV	Low	Not significant to Slight
Less than 0.14 mm/s PPV	Very Low	Imperceptible to Not significant

Notes from BS5228-2

A) The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.

B) A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.

C) Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472 (BS1 2008), and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

13.4.1.3 Operational Phase – Additional Traffic on Public Roads

In order to consider the potential noise impact associated with the proposed development introducing additional traffic onto the existing road networks, it is appropriate to consider the increase in traffic noise level that arises as a result of vehicular movements associated with the development.

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 13.7 offers guidance as to the likely impact associated with any particular change in traffic noise level (Source DMRB, 2020).

Table 13.7 Likely Impact Associated with Change in Traffic Noise Level

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Long-term)	EPA Significance of Effect
0.0 – 2.9	Barely Perceptible	Negligible	Imperceptible, Not significant Note 1
3 – 4.9	Perceptible	Minor	Slight, Moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very significant

Note 1: Change in noise levels at the upper end of this range will approach perceptibility, therefore this range is categorised as Imperceptible to Not significant.

13.4.1.4 Operational Phase – Industrial Noise (Mechanical Plant and Services)

EPA – NG4

The EPA Noise Guidance 4 document is typically used to provide operational noise emission limits (ELVs) at EPA licensed sites across Ireland. The document has been used to provide guidance on noise level emissions for the proposed development in the context of similar operating facilities. An assessment of noise under the EPA NG4 guidance requires a noise survey of baseline conditions and then derives appropriate criteria for noise due to the operation of the site. The criteria apply at the façades of the noise-sensitive locations.

The first part of selecting the noise criteria is to carry out a 'quiet area' screening on the location of the site. To be considered a 'quiet area', the following three criteria are tested:

- The site must be located **at least 3km from an urban area with a population of more than 1,000 people**: in this instance the site is located less than 3 km from Carlingford which has a population of over 1,000.
- The site must be **at least 3 km away from any local industry**: the proposed devopment is located adjoining an existing active port and there are a number of other industries existing within 3km therefore this criterion is not met.
- The site must be **at least 5km away from any National Primary Route**: the N1 road is approximately 15 km west of the site.

In this instance, two of the above criteria are not met and therefore the site is not considered to be in a 'quiet area'.

Having confirmed that the site is not in a 'quiet area', the next part of the derivation of Noise criteria according to NG4 is to test whether the site meets the criteria for an 'area of low background noise'.

For a noise-sensitive location in the vicinity of the site to be considered an 'area of low background noise', the noise levels measured at that location during the environmental noise survey need to satisfy all three the following criteria:

- Arithmetic Average of L_{A90} During Daytime Period ≤40 dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Evening Period ≤35 dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Night-time Period ≤30 dB L_{A90}.

Depending on whether each location is considered an 'area of low background noise', Table 13.8 below outlines the noise emission limit criteria detailed in the NG4 document. The noise levels measured during the baseline noise surveys are presented in Section 13.6 of this chapter. It's noted that in every 24 hour period at least one of the criteria for areas of low background noise is exceeded, hence, this area is not considered to be of low background noise.

Table 13.8 NG4 Approach for Determining Appropriate Noise Criteria

Scenario	Daytime Noise Criterion, dB $L_{Ar,T}$ (07:00 to 19:00hrs)	Evening Noise Criterion, dB $L_{Ar,T}$ (19:00 to 23:00hrs)	Night Noise Criterion, dB L_{Aeq} (23:00 to 07:00hrs)
Areas of Low Background Noise	45 dB	40 dB	35 dB
All Other Areas	55 dB	50 dB	45 dB

As the Proposed Development would operate continuously (i.e. on a '24/7' basis), the night-time noise criterion is critical to the assessment. As these nearest noise-sensitive locations are not identified as areas of low background noise as per the NG4 guidance, a 45 dB $L_{Aeq,T}$ night time criterion applies.

Assessment of Significance

The 'Guidelines for Environmental Noise Impact Assessment' produced by the Institute of Environmental Management and Assessment (IEMA) (2014) have been referenced in order to categorise the potential effect of changes in the ambient noise levels during the operational phases of the proposed development.

The guidelines state that for any assessment, the potential significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. Due to varying factors which effect human response to environmental noise (prevailing environment, noise characteristics, time periods, duration and level etc.) assigning a subjective response must take account of these factors.

The scale adopted in this assessment is shown in Table 13.9 below is based on an example scale within the IEMA guidelines. The corresponding significance of effect from in the EPA's EIA Report Guidelines (2022) is also presented.

Table 13.9 Noise Effect Scale

Noise Level Change dB(A)	Subjective Response	Impact Guidelines for Noise Impact Assessment Significance (IEMA)	Effect Guidelines on the Information to be contained in EIARs (EPA)
0	No change	None	Imperceptible
0.1 – 2.9	Barely perceptible	Minor	Not Significant
3.0 – 4.9	Noticeable	Moderate	Slight, Moderate
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial	Significant
10.0 or more	More than a doubling or halving of loudness	Major	Profound

It is considered that the criteria specified in the above table provide a good indication as to the likely significance of changes on noise levels and have been used to assess the impact of operational noise.

BS 8233:2014: Guidance on sound insulation and noise reduction for buildings

To determine the potential operational noise impact at the closest residential dwellings, guidance has been drawn from BS 8233:2014. It is appropriate to derive external assessment criteria based on the internal criteria noted in the Table 13.10. This is done by factoring in the degree of noise reduction afforded by a partially open window. This is nominally deemed to be 15 dB as defined within the BS8233 guidance.

Table 13.10 Indoor ambient noise levels for dwellings from BS 8233:2014

Activity	Location	Day 07:00 to 23:00hrs dB $L_{Aeq,16hour}$	Night 23:00 to 07:00hrs dB $L_{Aeq,8hour}$
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

Based on the guidance outlined the BS 8233 standard, the following external noise levels would be considered reasonable in order to achieve suitable internal noise levels within the nearest residential properties:

- Daytime (07:00 to 23:00 hrs) 50 dB $L_{Aeq,16hour}$
- Night (23:00 to 07:00 hrs) 45 dB $L_{Aeq,8hour}$

13.5 Difficulties Encountered

There were no difficulties encountered when compiling this assessment.

13.6 Baseline Environment

13.6.1 Baseline Survey

Baseline noise monitoring has been undertaken across the development site on from 23rd to 30th August 2023 to determine the range of noise levels at varying locations across the development site and to establish the existing noise climate the nearest existing noise sensitive locations.

The survey was conducted in general accordance with ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

13.6.1.1 Measurement Parameters

The noise survey results are presented in terms of the following parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa.

13.6.1.2 Survey Equipment

The surveys were undertaken using a RION NL-52 sound level meter with the serial number 164427. The equipment was check calibrated before and after the survey period.

13.6.1.3 Weather Conditions

Weather conditions were calm and dry during the survey and did not adversely affect noise measurements.

13.6.1.4 Measurement Locations

Attended noise monitoring was undertaken at three locations around the development site. The locations are described below and illustrated in Figure 13.3.

UT1 Noise monitoring was undertaken along the southern boundary of the development site to characterise the noise levels incident on the closest receptors to the proposed development.

AT1 Attended noise monitoring was undertaken proximate to the Greenore Golf Club to characterise noise levels in that vicinity.

AT2 Attended noise monitoring was undertaken at the rear of properties on Euston St to characterise the noise environment in the local vicinity to the receptor.

AT3 Attended noise monitoring was undertaken along Euston St to characterise the noise levels along the east coastline of the development location and nearest receptors.

Figure 13.3 Baseline Noise Survey Locations

13.6.1.5 Measurement Results

The results of the noise monitoring completed at the various locations are presented in the following sections. In general, it was noted that the noise environment consisted of operational noise from the port (e.g. ferry/boat movements, vehicular movements on site with associated reverse alarms etc.), local road traffic noise, occasional noise from the golf course and typical environmental noise from the slight breeze that was present.

Table 13.11 Noise Survey Results at Location AT1

Date	Time	Measured Noise Levels, dB		
		$L_{Aeq,T}$	L_{Amax}	$L_{A90,T}$
30/08/2023	11:23	53	77	47
	12:34	53	71	46
	13:41	49	77	42

Table 13.12 Noise Survey Results at Location AT2

Date	Time	Measured Noise Levels, dB		
		$L_{Aeq,T}$	L_{Amax}	$L_{A90,T}$
30/08/2023	11:47	51	73	42
	12:56	47	68	42
	14:07	50	70	43

Table 13.13 Noise Survey Results at Location AT3

Date	Time	Measured Noise Levels, dB		
		$L_{Aeq,T}$	L_{Amax}	$L_{A90,T}$
30/08/2023	12:10	59	77	44
	13:18	59	79	43
	14:30	62	83	48

Table 13.14 Noise Survey Results at Location UT1

Date	Period	Measured Noise Levels, dB		
		$L_{Aeq,T}$	L_{Amax}	$L_{A90,T}$
23/08/2023	Day (07:00 – 19:00)	51	85	46
	Eve (19:00 – 23:00)	47	76	38
	Night (23:00 – 07:00)	42	82	32
24/08/2023	Day (07:00 – 19:00)	59	92	48
	Eve (19:00 – 23:00)	46	83	38
	Night (23:00 – 07:00)	39	85	32
25/08/2023	Day (07:00 – 19:00)	53	83	45
	Eve (19:00 – 23:00)	49	76	41
	Night (23:00 – 07:00)	49	96	42
26/08/2023	Day (07:00 – 19:00)	50	79	42
	Eve (19:00 – 23:00)	56	79	49
	Night (23:00 – 07:00)	52	100	38

Date	Period	Measured Noise Levels, dB		
		$L_{Aeq,T}$	L_{Amax}	$L_{A90,T}$
27/08/2023	Day (07:00 – 19:00)	50	78	38
	Eve (19:00 – 23:00)	56	77	49
	Night (23:00 – 07:00)	46	95	32
28/08/2023	Day (07:00 – 19:00)	50	78	41
	Eve (19:00 – 23:00)	44	81	33
	Night (23:00 – 07:00)	34	79	26
29/08/2023	Day (07:00 – 19:00)	61	92	47
	Eve (19:00 – 23:00)	48	116	42
	Night (23:00 – 07:00)	42	89	35
30/08/2023	Day (07:00 – 19:00)	52	116	44

It is noted that noise levels during the night period at UT1 varied significantly depending on the operations taking place at the port. Continuous equivalent noise levels ranged between 34 and 52 dB $L_{Aeq,8hr}$ and background noise levels ranged from 26 to 42 dB $L_{A90,8hr}$.

13.7 The 'Do Nothing' Scenario

In the Do Nothing scenario it is expected that the noise environment will remain as per the baseline which will include the operational port noise in it's existing state (this includes 24/7 operation of the facilities with ship movements to and from the port). It's noted that there are two permitted developments that planned for implementation in the absence of the proposed development.

- Extension and modification of existing Warehouse, LCC Planning Ref 20268, ABP Ref 307862; and
- New Warehouse, LCC Planning Ref Planning ref 20543, ABP Ref 310184.

13.8 Potential Significant Effects

13.8.1 Construction and Demolition Phase

13.8.1.1 Noise

In terms of the potential noise and vibration impacts indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in BS 5228-1:2009+A1:2014. This standard sets out sound power / sound pressure levels for plant items normally encountered on construction sites, which in turn enables the prediction of noise levels.

It is proposed that the development will be constructed in 2 key phases. It's noted that the phases will not be undertaken simultaneously. Various activities will take place for each phase, they are outlined below:

Phase 1:

- Dredging
- Quay wall
- Pontoon
- Building A
- Demolition of “Barbara’s House”
- Communications Mast
- Ancillary site and development works and landscaping

Phase 2:

- Pontoon (part)
- Demolition Open Hydro
- Building B and C
- Substation
- Fuel Storage
- Access control/fencing
- Port Entrance upgrades
    - Demolition of ‘Sea Farer’s Room’ (part of port office building)
    - Construction
- Surface Carpark and pedestrian access
- Demolition of ESB Substation/Switch room
- Ancillary site and development works and landscaping

The key stages and activities with potential to result in noise impacts are discussed below.

Demolition – Phase 1 & 2

During the demolition stage it is expected that breaking and crushing will be required in order to remove existing structures from the port. For this specific activity a total construction noise level of 92 dB L_{Aeq} at 10m has been used as referenced from BS 5228-1:2009 Table C.1:1. This noise level will inform calculations of demolition noise at receptor locations.

Piling for Proposed Buildings – Phase 1 & 2

The proposed methodology for piling indicates that there is the potential for driven piles depending on ground conditions. For this activity a construction noise level of 91 dB L_{Aeq} at 10m has been used as referenced from BS 5228-1:2009 Table D.4:29. This noise level will inform calculations of demolition noise at receptor locations.

Quay Wall / Pontoon Piling– Phase 1 & 2

The proposed methodology for piling for the quay wall indicates that piling will be undertaken. For this activity a construction noise level of 88 dB L_{Aeq} at 10m has been used as referenced from BS 5228-1:2009 Table C.3:8. This noise level will inform calculations of quay wall piling at noise at receptor locations.

Construction of Proposed Buildings, Quay Wall and Pontoon & Gangway Installation – Phase 1 & 2

For construction work areas with lower noise levels such as those associated with superstructure works including site compounds (for storage, offices and material handling, generators etc.), smaller items of mobile plant (excavators, cranes, dozers), landscaping and concreting works with lower noise emissions, a total construction noise level of 80 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would include, for example two items of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area.

Port Entrance Upgrades – Phase 2

The port entrance upgrades will use typical items of plant such as excavators, rollers and dumpers. For this area a total construction noise level of 80 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would include, for example two items of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area.

Dredging – Phase 1

For dredging works a backhoe long reach excavator will be utilised, working from pontoons. Reference is made to BS5228 Table C.4:63 where a suitable noise level for an excavator is given as 77 dB at 10m.

Construction Compounds – Phase 1 & 2

The construction compounds will be utilised as delivery and storage spaces for construction vehicles and materials. They will be designed in such a way that noise and vibration impacts are minimised at nearby receptors, mainly by way of installation of barriers between receptors and compound, but also, where practicable, by locating internal routes and working areas far as possible from the most sensitive receptors. Mitigation measures will be implemented so that the criteria defined Section 13.4.1.1 are achieved. Measures that can be implemented are discussed in Section 13.9.1.

Indicative Construction Noise Levels

Indicative noise calculations have been undertaken which assume that plant items are operating for 66% of the time. It must be stated that for most of the time, plant and equipment will be a greater distance from the nearest NSLs than those used within the calculations and the “on-time” of plant and equipment will be less than those assumed over a normal working day (i.e. the use of piling rigs or breakers for demolition will be in use for shorter periods than those assumed over a normal working day) and consequently will have lower noise levels. The assessment presented is therefore representative of a best estimate conservative scenario representing construction activities. Table 13.15 presents the calculated noise levels at receptor locations.

Table 13.15 Predicted Construction Noise Levels

Receptor	CNT	Predicted Construction Noise Level, dB $L_{Aeq,T}$					
		Demolition (Phase 1 & 2)	Piling for Buildings (Phase 1 & 2)	Quay Wall / Pontoon Piling (Phase 1 & 2)	Construction of Proposed Buildings, Quay Wall and Pontoon & Gangway Installation (Phase 1 & 2)	Port Entrance Upgrades (Phase 2)	Dredging (Phase 1)
R1	75	**87**	**81**	67	72	52	56
R2	65	**84**	**77**	65	**66**	**75**	54
R3	65	**73**	**69**	61	54	55	50
R4	65	**79**	64	57	52	54	46
R5	75	63	62	55	50	51	44

Reference to Table 13.15 indicates that construction noise levels have the potential to exceed the adopted CNT of 65 dB $L_{Aeq,\ 12hr}$ at R1 to R4 during demolition works and during the piling works for the buildings. During the construction of the proposed buildings and the port entrance upgrades there is a predicted exceedance of the CNT at R2. Drediging works are proposed to occur during the night periods and exceed the thresholds at receptors R1 – R3. These receptors are likely to experience a *negative*, *significant*, and *temporary* effect. The resultant impacts at the remaining receptors for the remainder of the phases are *negative* and range from *not significant* to *moderate*, and *temporary*. Consequently, mitigation measures will be required to reduce noise levels from these activities.

13.8.1.2 Construction Traffic

A *Traffic and Transport Assessment* relating to the proposed development has been prepared by TrafficWise for the proposed development and is included under separate cover. Information from this report and Chapter 6 Material Assets: Traffic and Transport has been used to determine the predicted change in noise levels in the vicinity of the local roads to the development during the construction stage.

In terms of potential noise impact, traffic volumes would need to increase by 25% or greater along the designated network to result in a negligible (1 dB) increase in traffic noise level. It's understood that all construction movements will be along Shore Road, hence this has been assessed to determine the potential worst case affected road.

In this instance baseline Annual Average Daily Traffic (AADT) figures have been compared with the flow generated during the construction stage in Table 13.16. The increase in traffic level is less than25% along the access road and hence the increase in noise due to construction traffic will be less than 1 dB which results in a *negative, short-term and imperceptible effect*.

Table 13.16 Change in Noise Levels due to Construction Traffic

Reference	Baseline Traffic AADT		Baseline + Construction Traffic AADT		Resultant Change in Noise Level (dB)	Impact
	LGV	HGV	LGV	HGV		
Shore Road	444	529	502	589	< 1	Imperceptible

13.8.1.3 Vibration

Piling

Potential for vibration impacts during the construction phase programme are likely to be limited to rock breaking and piling activities. In terms of piling, this activity is expected to occur at greater than 30m distance to the nearest sensitive property. Expected vibration levels during piling assuming driven piles have been determined through reference to published empirical data. The British Standard BS 5228 – Part 2: Vibration, publishes the measured magnitude of driven piles into granular fill over compact sand (Table D.9, Ref. No. C31) as 2.45mm/s at a distance of 25m.

Considering the additional distance to the receptors and the softer ground type (sandy gravel and loose sand) vibration emissions from this activity will likely be lower than those quoted above. For building occupants there is the potential that vibration levels will be at a level that could cause disturbance, however, TII guidance document *Guidelines for the Treatment of Noise and Vibration in National Road Schemes 2004* indicates that vibration due to construction phase piling is typically tolerated at vibration levels up to 2.5mm/s once the origin of the source is known Hence, it is considered that with prior warning the vibration levels will be tolerable for local residents.

The vibration levels associated with this activity will be well below the limits set out in Section 13.4.1.2 to avoid any cosmetic damage to the closest buildings.

During Phase 1 the impact due to driven piling in terms of human response at receptor R1 is predicted to be *temporary, negative and significant* in the absence of mitigation. The remaining receptors will experience an *imperceptible to slight negative* impact.

During Phase 2 the impact due to driven piling in terms of human response at receptor R2 is predicted to be *temporary, negative and significant* in the absence of mitigation. The remaining receptors will experience an *imperceptible to slight negative* impact.

The impacts due to driven piling in terms of building response during all phases are predicted to be *temporary, negative and not significant* in the absence of mitigation.

It's noted that driven piling is the worst case option when considering vibration, there is the potential for the piling to be undertaken with bored piles which are not impulsive in nature and produce lower levels of vibration, in which case the impact would be *not significant*.

Breaking

During breaking, there is potential for vibration to be generated through the ground. Empirical data for this activity is not provided in the BS 5228-2:2009+A1:2014 (BSI 2014b) standard, however the likely level of vibration from this activity is expected to be significantly below the vibration criteria for building damage on experience from other sites. AWN Consulting Ltd (the Author of the Noise and Vibration chapter) have previously conducted vibration measurements under controlled conditions, during trial construction works, on a sample site where breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator; and
- 6 tonne hydraulic breaker on large Liebherr tracked excavator.

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 PPV (mm/s) to 0.25 PPV (mm/s) at distances of 10m to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.4 PPV (mm/s) to 0.24 PPV (mm/s) at distances of 10m to 50m respectively.

Whilst these measurements relate to a breaking of concrete, the range of values recorded provides some context in relation to typical ranges of vibration generated by construction breaking activity. Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in Section 13.4.1.2.

Additionally it is understood that rock dredging may occur on site. This activity has previously been measured on site at the closest receptors (R2, approximately 100m from the works). During these activities the highest measured value was 0.4 mm/s PPV which is considered to be only just perceptible and below the threshold of significance, this is to be expected given the large distance between the source and the receiver.

The impacts due to breaking are predicted to be *temporary, negative and not significant to slight*.

13.8.2 Operational Phase

13.8.2.1 Operational Plant Noise

During the operational phase of the proposed development there will be a number of items of plant in operation on site in addition to a number of CTV movements to and from the site. A 3D computer-based acoustic prediction model has been prepared in order to quantify the noise level associated with the proposed buildings. Given that existing operations at the port are already accounted for in the baseline surveys, the predicted the noise levels associated with any new or modified plant items, are compared against existing ambient and background noise levels to determine the potential noise effects.

<u>Soft Noise Predictor</u>

Proprietary noise calculation software has been used for the purposes of this modelling exercise. The selected software, SoftNoise 'Predictor', calculates noise levels in accordance with ISO 9613: Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation, 1996.

'Predictor' is a proprietary noise calculation package for computing noise levels in the vicinity of noise sources. 'Predictor' calculates noise levels in different ways depending on the selected prediction standard. In general, however, the resultant noise level is calculated taking into account a range of factors affecting the propagation of sound.

ISO9613-2: 1996

ISO9613-2:1996 calculates the noise level based on each of the factors discussed previously. However, the effect of meteorological conditions is significantly simplified by calculating the average downwind sound pressure level, L_{AT}(DW), for the following conditions:

- wind direction at an angle of ±45° to the direction connecting the centre of the dominant sound source and the centre of the specified receiver region with the wind blowing from source to receiver, and;
- wind speed between approximately 1ms-1 and 5ms-1, measured at a height of 3m to 11m above the ground.

The equations and calculations also hold for average propagation under a well-developed moderate ground based temperature inversion, such as commonly occurs on clear calm nights.

The basic formula for calculating L_{AT}(DW) from any point source at any receiver location is given by:

$$L_{fT}(DW) = L_W + D_c - A \qquad \textit{Eqn. A}$$

Where:

L_{fT}(DW) is an octave band centre frequency component of L_{AT}(DW) in dB relative to 2 x 10-5 Pa;

L_W is the octave band sound power of the point source;

D_c is the directivity correction for the point source;

A is the octave band attenuation that occurs during propagation, namely attenuation due to geometric divergence, atmospheric absorption, ground effect, barriers and miscellaneous other effects.

The estimated accuracy associated with this methodology is shown in Table 13.17 below:

Table 13.17 Estimated Accuracy for Broadband Noise of L_{AT}(DW)

Height, h*	Distance, d†	
	0 < d < 100m	100m < d < 1,000m
0<h<5m	±3dB	±3dB
5m<h<30m	±1dB	±3dB

* h is the mean height of the source and receiver. † d is the mean distance between the source and receiver.

N.B. These estimates have been made from situations where there are no effects due to reflections or attenuation due to screening.

Sound Power Levels

The following items of plant, locations and associated sound power levels have been provided for the purposes of this assessment.

Table 13.18 Sound Power Levels Utilised in Noise Model

Item	Number	Percentage on Time	Reference	Sound Power Level dB L_{WA}
Forklift	12 movements per hour	N/A	Imagine EU Database	101
CTV	9 movements per hour	N/A	Imagine EU Database	99
Crane	2	20%	BS5228	95
Pump	1	20%	BS5228	96

The assessment has assumed the following:

- All reverse alarms are broadband or turned off for the duration of the night period.
- Forklifts and cranes are powered by diesel motors
- Warehouse doors are only open when vehicles enter or exit the warehouse
- One forklift movement every 5 minutes
- All CTV vehicles will leave the port simultaneously (worst case scenario)

Assessment in Comparison with NG4 Methodology

The output of the model generated predicted noise levels at the closest selected noise-sensitive locations (NSLs are shown in Figure 13.2). Note that the night period has been assessed as it is the most sensitive period and operational works will take place 24/7. The results of the noise model are presented in Table 13.19.

Table 13.19 Comparison of predicted operational noise levels vs. adopted noise criteria

Location	Period	Predicted dB $L_{Aeq,T}$	NG4 – Night-time Limit dB $L_{Aeq,15min}$	Complies?
NSL1	Night	29	45	✓
NSL2		37		✓
NSL3		36		✓
NSL4		34		✓
NSL5		32		✓

Reference to Table 13.19 confirms the predicted noise levels fall significantly below the adopted EPA NG4 noise limits for night-time periods. Noise contours are also presented for the site and immediate surroundings in Figure 13.4 in order to demonstrate the noise impact of the proposed development. The results are presented for a calculated height of 4m above ground representing first floor height of the surrounding buildings.

Figure 13.4 Contours of Predicted Operational Noise

Review of Potential Increases in Noise Level

Table 13.20 presents the predicted changes in noise level associated with the development at the nearest noise sensitive locations to the site. The worst case scenario that is presented assumes that all CTVs leave the port between 05:00 and 07:00hrs, and that forklift and cranage activities occur simultaneously to these departures, and that all vehicles and plant are powered by diesel engines. The baseline ambient noise measurements have been analysed to determine the average noise level occurring during these periods for the purpose of comparison between existing and future noise levels. Again, the night period is presented due to it being the most sensitive period with typically the lowest noise level, and hence, the most likely period to experience a change in noise level.

Table 13.20 Review of Predicted Changes in Ambient Noise Levels

Receptor	Predicted dB $L_{Aeq, 15mins}$	Existing Noise Level dB L_{Aeq} (05:00 – 07:00)	Total Noise Level dB	Change (dB)	Impact
NSL2	37	38 to 47	41 to 47	+0.4 to +2.4	Imperceptible to Not Significant

The results of the assessment indicate that the change in ambient noise levels will range from +0.4 to a potential +2.4 dB with impacts ranging from *Imperceptible to Not Significant*. There will likely be an increase above the background noise levels during the quietest periods, however, it will remain within a similar range of background noise levels that are experienced during current operations at the port.

The highest change in noise level occurs between the predicted worst case scenario and an existing scenario when the port is operating minimally. It is understood that operations at the port are currently undertaken 24/7 and hence the local noise environment is considered to vary depending on the operations being undertaken at the port, and hence the local noise environment will fluctuate with existing operations at the port.

The predicted noise level of 37 dB $L_{Aeq,T}$ is not a high noise level in absolute terms, particularly given the context of the local environment. Further reductions in the operational noise are likely given the availability of lower operational noise levels for modern plant (e.g. electric powered plant). Consequently, it is relevant here to assess the potential impact on sleep disturbance for nearby receptors. As discussed in Section 12.4.1.4 an external noise level of 45 dB $L_{Aeq,T}$ will still allow for occupants of a dwelling to have their windows to be open and to still meet the guidance criteria for internal noise levels of 30 dB $L_{Aeq,T}$.

The predicted value of 37 dB L_{Aeq} would result in an internal noise level of 22 dB $L_{Aeq,T}$ with windows open at the closest receptors during the worst-case assessment, which is well below the guidance noise levels.

Giving consideration to the existing character of the noise environment, the low level of absolute noise calculated and the prediction of internal noise levels, it is considered the impact due to the operation of the port will be *negative, slight and long-term.*

13.8.2.2 Change in Noise Level Due to Road Traffic

The traffic data contained in the *Traffic and Transport Assessment* undertaken by Trafficwise, and submitted with this application, indicates that a maximum increase of AADT on any road is predicted to be an increase of 23.2% on the R175 Shore Road. Given that an increase of traffic flow by approximately 25% would be required to increase noise levels by 1 dB, in this instance the change in traffic flows would result in a negligible increase of less than 1 dB. The noise impact of traffic volumes accessing the surrounding network is determined to be *neutral, long term, imperceptible*.

Table 13.21 Change in Noise Levels due to Operational Traffic

Reference	Do Nothing 2032 AADT	Do Something 2032 AADT	Resultant Change in Noise Level (dB)	Impact
Shore Road	2386	2940	< 1	Imperceptible

It's noted that the proposed car park located off Shore Road is approximately 30m from the rear face of the dwellings on Euston St (R2). Typical noise levels 5m beyond the boundary of a car park over a are in the order of 50 dB $L_{Aeq,T}$. This noise level is the result of a calculation informed by previously measured data at an alternative site. The noise levels at receptors are predicted to be 43 dB at the receptor location which is lower than both the external day and night periods extrapolated from

BS8233 guidance and NG4, hence the impact is considered to be *negative, not significant and long-term.*

13.8.2.3 Vibration

No vibration generating activities are predicted as part of the operation of the facility.

13.8.3 Cumulative Effects

13.8.3.1 Construction Phase

In terms of construction noise typically cumulative impacts with the potential to cause significance would only occur when sites are within 100m of a receptor, this is due to the high level of attenuation that occurs over such a distance (approximately 48 dB of attenuation).

The list of projects and plans included in Appendix 1-1 of this EIAR has been considered. A number of minor developments have been granted permission within the surrounding area, these are typically associated with extensions or alterations to single buildings. Given the scope of the proposed development it is expected that construction noise levels will be dominated by the proposed development site. There may be periods where impulsive works are undertaken at the below developments, which may lead to a brief negative increase in construction noise levels in the area, however when assessed cumulatively it would be expected that only a 3 dB increase may occur at nearby receptors during the worst case works.

It's noted that the developments are of such a distance that cumulative vibration impacts will not occur.

Identified developments with the potential for cumulative noise impacts include:

- Lisa and Sean Crudden (Ref: LCC 231);
- Tara and Declan Boyle (Ref: LCC 22614);
- Andrew Bothwell (Ref: LCC 211331);
- Brendan Rafferty (Ref: LCC 211223);
- Valerie Halpenny (Ref: LCC 19202);
- Damien Wynne and Martina McNally (Ref: LCC 2360256);
- Cooley Peninsula Men's Shed (Ref: LCC 23125);
- Hanlon Transport Ltd (Ref: LCC 20362).

13.8.3.2 Operational Phase

As with the construction phase, operational noise levels will also decrease significantly due to distance. In this case the nearest proposed developments with the potential to cause operational noise are located several kilometres from the proposed development, and hence, there will be no cumulative operational noise impacts.

13.8.4 Summary

The following Table 13.22 and Table 13.23 summarise the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 13.22 Summary of Construction Phase Noise Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Demolition	Negative	Slight to Significant	Closest receptors at R1 to R4	Likely	Temporary	Direct / Worst-Case
Piling for Port Buildings	Negative	Slight to Significant	Closest receptors at R1 to R3	Likely	Temporary	Direct / Worst-Case
Quay Wall / Pontoon Piling	Negative	Slight to Moderate	Closest receptors at R1 to R3	Likely	Temporary	Direct / Worst-Case
Construction of Proposed Buildings, Quay Wall and Pontoon & Gangway Installation	Negative	Slight to Significant	Closest receptors at R2	Likely	Temporary	Direct / Worst-Case
Port Entrance Upgrades	Negative	Slight to Very Significant	Closest receptors at R2	Likely	Temporary	Direct / Worst-Case
Dredging (Day)	Negative	Not Significant	All	Likely	Temporary	Direct / Worst-Case
Dredging (Night)	Negative	Significant	R1 – R3	Likely	Temporary	Direct / Worst-Case
Construction Traffic	Negative	Imperceptible	All receptors	Likely	Short-term	Direct

Table 13.23 Summary of Construction Phase Vibration Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Demolition	Negative	Not Significant to Slight	Closest receptors at R1, R2 and R4	Likely	Temporary	Direct
Piling for Port Buildings	Negative	Significant	Closest receptors at R1 to R2	Likely	Temporary	Direct

The following Table 13.24 summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 13.24 Summary of Operational Phase Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Operational Noise Sources	Negative	Slight	All Receptors	Likely	Long-term	Direct
Operational Traffic Noise	Negative	Imperceptible	All Receptors	Likely	Long-term	Direct

13.9 Mitigation

13.9.1 Construction Phase Mitigation

The following recommendations must be considered in conjunction with the detailed guidance set out in the BS 5228-1: 2009+A1: 2014: and BS 5228-2: 2009+A1: 2014.

BS 5228 includes guidance on various aspects of construction site noise & vibration mitigation, including, but not limited to:

- Hours of work;
- Liaison with neighbours;
- Selection of quiet plant;
- Control of noise sources;
- Screening; and
- Noise & vibration monitoring.

These issues are discussed in the following paragraphs. Noise control measures that should be considered include the selection of suitable plant, enclosures and screens around noise sources, consideration of the hours of work and ongoing monitoring.

Hours of Work

Construction works, except for dredging and pile driving works, will generally be limited to the hours 0700 – 2000 Monday to Friday and 0700 – 1600 hours on Saturday.

Some works associated with the pontoon construction and quay wall have to be undertaken at low tide and their construction hours will be linked to tides. Therefore, tidal dependent works may occur outside of these hours.

Pile driving works will be limited to 0800-1800 Monday to Friday and 0800 - 1600 hours on Saturday. It is not envisaged that works will take place on public holidays.

Dredging, due to the nature of the activity, is undertaken on a 24 hour basis. Dredging activities will occur for approximately 8-10 weeks.

If works are required outside of these hours, in exceptional circumstances, the planning authority will be notified in advance.

Liaison with Interested Parties

The contractor will appoint a liaison officer to ensure that any issues from the local community are dealt with promptly and efficiently during construction. These details will be included in the contractor's CEMP.

Selection of Quiet Plant

Careful consideration must be given to the noise emission levels of plant items when they are being considered for use on the site.

Control of Noise Sources

If the use of low noise plant or replacing a noisy item of plant are not viable or practicable options, consideration should 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, often 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.

BS5228 states that *"as far as reasonably practicable sources of significant noise should be enclosed".* In applying this guidance, constraints such as mobility, ventilation, access and safety must be taken into account. Items suitable for enclosure include pumps and generators. Demountable enclosures that could be moved around site as necessary may also be used to screen operatives using hand tools such as angle grinders.

BS5228 makes a number of recommendations in relation to "use and siting of equipment". These are relevant and hence are reproduced below. These recommendations should be implemented on the site.

> *"Plant should always be used in accordance with manufacturers' instructions. Care should be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading should also be carried out away from such areas.*
>
> *Circumstances can arise when night-time working is unavoidable. Bearing in mind the special constraints under which such work has to be carried out, steps should be taken to minimise disturbance to occupants of nearby premises.*
>
> *Machines such as cranes that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. Machines should not be left running unnecessarily, as this can be noisy and waste energy.*
>
> *Plant known to emit noise strongly in one direction should, when possible, be orientated so that the noise is directed away from noise-sensitive areas. Attendant operators of the plant can also benefit from this acoustical phenomenon by sheltering, when possible, in the area with reduced noise levels.*
>
> *Acoustic covers to engines should be kept closed when the engines are in use and idling. The use of compressors that have effective acoustic enclosures and are designed to operate when their access panels are closed is recommended.*

Materials should be lowered whenever practicable and should not be dropped. The surfaces on to which the materials are being moved could be covered by resilient material."

Also note the following outline guidance in relation to specific considerations which may be deployed as required by the contractor..

- 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 should be switched off when not in use and not left idling.
- For piling plant, noise reduction can be achieved by enclosing the driving system in an acoustic shroud. For steady continuous noise, such as that generated by diesel engines, it may be 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 ensuring any leaks in the air lines are sealed. Erect localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
- For all materials handling ensure that materials are not dropped from excessive heights and drop chutes/dump trucks are lined with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and may be moved around site as necessary.
- All items of plant should 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.

<u>Screening</u>

Site hoarding along the boundary between the construction site and the residential receptors that will provide a degree of barrier screening. Any screening will incorporate existing boundary walls on the site (i.e. where a suitable 2 – 2.4m boundary wall exists there is no need to install hoarding in that specific location). Further benefits may be achieved through the use of additional smaller localized screens on the site itself.

The use of screens can be effective in reducing the noise level at a receiver location and should be employed as a complementary measure to all other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen and its position relative to both the source and receiver. The height and length of any screen should, where practicable, be such that there is no direct line of sight between the source and the receiver.

BS 5228 states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the screen should be such that there are no gap or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the barrier rather than the transmission through the barrier itself.

13.9.2 Operational Phase Mitigation

The assessment indicates that operational noise will not cause a significant impact (see Section 13.10.2) hence specific mitigation is not required,

As part of the detailed design of the development, selection of quiet plant items and, where necessary, appropriately selected remedial measures (e.g. enclosures, silencers etc.) will be specified in order that the adopted plant noise criteria is achieved at the façades of noise sensitive properties.

13.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

13.10.1 Construction Phase

13.10.1.1 Noise

Table 13.25 presents the predicted daytime noise levels from an indicative construction period on site at the nearest off-site receptors, assuming mitigation measures outlined in Section 13.9 are implemented. Note the calculations assume that construction noise sources for the site are running for 66% of the time and standard 2.4m hoarding/screening is in place where practicable.

Table 13.25 Predicted Construction Noise Levels

Receptor	CNT	Predicted Construction Noise Level, dB $L_{Aeq,T}$ at Various Distances					
		Demolition	Piling for Port Buildings	Quay Wall / Pontoon Piling	Construction of Proposed Buildings, Quay Wall and Pontoon & Gangway Installation	Port Entrance Upgrades	Dredging
R1	75	**77**	**76**	67	67	47	56
R2	65	**74**	**72**	65	61	**70**	54
R3	65	63	64	61	49	50	49
R4	65	**69**	59	57	47	49	45
R5	75	53	57	55	45	46	44

The predictions indicate that some significant impacts will still occur post mitigation, however, it should be noted that this occurs only when construction works are closest to the receptor locations. Mitigation has reduced the number of receptor locations and activities with a significant impact. Additionally, for a large portion of the time the noise levels will likely be lower than those predicted. Notwithstanding, any periods of significance will be brief to temporary in nature. The resultant impacts will be negative, they will range from not significant to significant dependant on the location of the work and the receptor, and the impacts will be brief to temporary.

Table 13.26 and Table 13.28 summarise the identified likely residual effects during the construction phase of the proposed development following the application of mitigation measures.

Table 13.26 Summary of Construction Phase Noise Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Demolition	Negative	Slight to Significant	Closest receptors at R1, R2 and R4	Likely	Temporary	Direct / Worst-Case
Piling for Port Buildings	Negative	Slight to Significant	Closest receptors at R1 to R2	Likely	Temporary	Direct / Worst-Case
Quay Wall / Breakwater Pontoon Piling	Negative	Slight to Moderate	Closest receptors at R1 to R3	Likely	Temporary	Direct / Worst-Case
Construction of Proposed Buildings, Quay Wall and Pontoon & Gangway Installation	Negative	Slight to Moderate	Closest receptors at R2	Likely	Temporary	Direct / Worst-Case
Port Entrance Upgrades	Negative	Slight to Significant	Closest receptors at R2	Likely	Temporary	Direct / Worst-Case
Dredging (Day)	Negative	Not Significant	All	Likely	Temporary	Direct / Worst-Case
Dredging (Night)	Negative	Significant	R1 – R3	Likely	Temporary	Direct / Worst-Case
Construction Traffic	Negative	Imperceptible	All receptors	Likely	Short-term	Direct

13.10.1.2 Vibration

For building occupants there is the potential that vibration levels will be at a level that could cause disturbance, however, TII guidance document *Guidelines for the Treatment of Noise and Vibration in National Road Schemes 2004* indicates that piling can typically be tolerated at vibration levels up to 2.5mm/s once the origin of the source is known. Hence, it is considered that with prior warning the vibration levels will be tolerable for local residents with impacts reduced from significant to moderate.

The impact is considered to be *negative, moderate and brief to temporary.*

Table 13.27 Summary of Construction Phase Vibration Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Demolition	Negative	Not Significant to Slight	Closest receptors at R1 to R2	Likely	Temporary	Direct
Piling for Port Buildings	Negative	Moderate	Closest receptors at R1 to R2	Likely	Temporary	Direct

13.10.2 Operational Phase

13.10.2.1 Noise

Assessment indicates that specific mitigation is not required. Residual effects are negative, slight and long-term for operational noise sources and negative, imperceptible and long-term for operational traffic.

Table 13.28 Summary of Operational Phase Likely Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Outward Operational Noise	Negative	Slight	All Receptors	Likely	Long-term	Direct
Operational Traffic Noise	Negative	Imperceptible	All Receptors	Likely	Long-term	Direct

13.10.2.2 Vibration

There are no vibration generating activities proposed as part of the operation of the port.

13.10.3 Cumulative Residual Effects

Given the distance to other permitted developments it is not considered likely that there will be a cumulative impact.

13.11 Interactions

There are interactions between the noise and vibration assessment and Material Assets: Traffic And Transport assessment in Chapter 6. With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site. In this assessment, the impact of the interactions between traffic and noise are considered to be imperceptible due to the low level changes in traffic flows associated with the proposed development.

13.12 Monitoring

The contractor will be required to ensure construction activities operate within the noise limits set out within this assessment.

Any noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

There is no monitoring recommended for the operational phase of the development as impacts due to noise and vibration are predicted to be not significant.

13.13 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 13.29 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Construction and Demolition Noise	Selection of quiet plant; control of noise sources; screening, controlling; hours of work; liaison with the public.	As per BS5228

The following Table summarises the Operational Phase mitigation and monitoring measures.

Table 13.30 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Outward Plant Noise	Selection of quiet plant, installation of silencers etc, adherence to criteria.	N/A

13.14 Conclusion

AWN Consulting have undertaken an assessment of the potential noise and vibration impacts as a result of the proposed development. A range of mitigation measures have been specified for the construction stages, with no specific mitigation required for the operational stage. With mitigation applied the construction impacts will be reduced although will remain temporarily significant during periods when work is undertaken near to the closest receptors. During the operational stage the mitigation measures will reduce impacts so that they are slight to not significant.

13.15 References and Sources

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise);
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (BSI 2014b);
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration. (BSI 1993);
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (BSI 2008);
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (hereafter referred to as BS 8233) (BSI 2014c);
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (hereafter referred to as BS 4142) (BSI 2019);
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (UKHA 2020);
- S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018 (hereafter referred to as the Noise Regulations);
- S.I. No. 241/2006 - European Communities Noise Emission by Equipment for Use Outdoors (Amendment) Regulations 2006;
- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (ISO 1996);
- ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment (ISO 2016);
- ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels (ISO 2017), and;
- The UK Department of Transport Calculation of Road Traffic Noise (UK Department of Transport 1988)
- Guidelines for Environmental Noise Impact Assessment IEMA) (2014)

CHAPTER 14
AIR QUALITY

VOLUME II
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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14 Air Quality

14.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development at Greenore Port, Greenore, Co. Louth. A full description of the proposed development is set out in Chapter 2 of this EIAR.

14.2 Expertise & Qualifications

This chapter was completed by Aisling Cashell, an Environmental Consultant in the air quality section of AWN Consulting Ltd. She holds a BA and an MAI in Civil, Structural and Environmental Engineering from Trinity College Dublin. She is a member of Engineers Ireland. She has been specialising in the area of air quality, climate and sustainability for 1 year and has prepared air quality and climate assessments for inclusion within EIARs for residential and commercial developments such as Twenties Lane (Planning Application Ref: 22713), Cherrywood T13 (Planning Application Ref: DZ23A/0028), Corballis Donabate LRD (Planning Application Ref: LRD0017/S3), The Paddocks (Planning Application Ref: 2360349), and Dublin Airport Authority.

This chapter was also prepared and reviewed Dr. Jovanna Arndt, a Senior Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She has been specialising in the area of air quality and climate over 7 years and has prepared air quality and climate assessments for inclusion within EIARs for residential developments such as Twenties Lane (Planning Application Ref: 22713), Cherrywood T13 (Planning Application Ref: DZ23A/0028), Corballis Donabate LRD (Planning Application Ref: LRD0017/S3), commercial and industrial developments by Dublin Airport Authority, Zoetis, Ipsen, Merck Millipore, Greener Ideas Limited and Abbvie, as well as renewable energy developments such as Codling Wind Park and the Cúil Na Móna Anaerobic Digestion Facility. She also specialises in assessing air quality impacts using air dispersion modelling of transportation schemes such as BusConnects Dublin, major Highways England Road schemes and major rail infrastructure in the form of High Speed 2 (HS2 in the UK). She has prepared air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Microsoft, Greener Ideas Limited, Merck Millipore, Lilly Limerick, Chemifloc, Takeda, Kingspan and Kilshane Energy. She has also provided Air Quality Action Plan (AQAP) and Air Quality Management Area (AQMA) support to several UK councils and assessed the air quality impacts of potential Clean Air Zones in the UK.

14.3 Proposed Development

A full description of the proposed development is set out in Chapter 2 of this EIAR. The following is a summary of the proposed works.

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

1. 'Terrestrial Port Area', (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.
2. 'Nearshore Environment' (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
3. 'Residential Site' (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
4. 'Port Office Entrance' (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

Figure 14.1 shows a general location plan of the plots identified.

Figure 14.1 General Location Plan of the Scheme

14.4 Methodology

14.4.1 Relevant Legislation & Guidance

Alongside the legislation, policy, and guidance outlined in Chapter 1, the following relevant legislation, policy, and guidance has informed the preparation of this Chapter:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Advice Note on Preparing Environmental Impact Statements - Draft (EPA, 2015);
- Guidance on the Assessment of Dust from Demolition and Construction Version 2.2 (Institute of Air Quality Management (IAQM), 2024);
- Transport Infrastructure Ireland (TII) Guidance Air Quality Assessment of Specified Infrastructure Projects: PE-ENV-01106 (TII, 2022).

14.4.1.1 Development Plans

The Louth County Development Plan 2021 - 2027 (Louth County Council, 2023) outlines specific objectives in relation to air quality in Chapter 11: Environment, Natural Resources and The Coast. Policy Objective PO12 is directly related to air quality:

<u>PO12 Air Quality Policy Objective</u>

"To promote the preservation of best ambient air quality compatible with sustainable development in accordance with the *EU Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC)* and ensure that all air emissions associated with new developments are within Environmental Quality Standards as out in the *Air Quality Standards Regulations 2011 (SI No. 180 of 2011)*, or any updated/superseding documents. "

14.4.2 Criteria for Rating of Impacts

14.4.2.1 Ambient Air Quality Standards

National and European statutory bodies, the Department of the Environment, Heritage and Local Government in Ireland (DEHLG, 2004) and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants to reduce the risk to health from poor air quality. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed based on compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022, which incorporate European Commission Directive 2008/50/EC, which has set limit values for numerous pollutants with the limit values for NO_2, PM_{10}, and $PM_{2.5}$ being relevant to this assessment. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC) and includes ambient limit values relating to $PM_{2.5}$. The applicable limit values for NO_2, PM_{10}, and $PM_{2.5}$ are set out in Table 14.1.

Table 14.1 Ambient Air Quality Standards & TA Luft

Pollutant	Regulation[Note1]	Limit Type	Value
Dust Deposition	TA Luft (German VDI, 2002)	Annual average limit for nuisance dust	350 mg/m^2/day
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3 PM_{10}
		Annual limit for protection of human health	40 µg/m^3 PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	20 µg/m^3 $PM_{2.5}$

Note 1 EU 2008/50/EC Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026, the IT4 targets by 2030 and the final targets by 2040 (WHO, 2006) (shown in Table 14.2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also acknowledges that *"meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2"*. Ireland will revise its air quality legislation in line with the proposed EU revisions to the CAFE Directive, which will set interim 2030 air quality standards and align the EU more closely with the WHO targets.

Table 14.2 WHO Air Quality Guidelines (WHO, 2006)

Pollutant	Regulation	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	WHO Air Quality Guidelines	24-hour limit for protection of human health	50 µg/m³ NO_2	50 µg/m³ NO_2	25 µg/m³ NO_2
		Annual limit for protection of human health	30 µg/m³ NO_2	20 µg/m³ NO_2	10 µg/m³ NO_2
PM (as PM_{10})		24-hour limit for protection of human health	75 µg/m³ PM_{10}	50 µg/m³ PM_{10}	45 µg/m³ PM_{10}
		Annual limit for protection of human health	30 µg/m³ PM_{10}	20 µg/m³ PM_{10}	15 µg/m³ PM_{10}
PM (as $PM_{2.5}$)		24-hour limit for protection of human health	37.5 µg/m³ $PM_{2.5}$	25 µg/m³ $PM_{2.5}$	15 µg/m³ $PM_{2.5}$
		Annual limit for protection of human health	15 µg/m³ $PM_{2.5}$	10 µg/m³ $PM_{2.5}$	5 µg/m³ $PM_{2.5}$

14.4.2.2 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust, which are less than 10 microns, and the EU ambient air quality standards outlined in Table 14.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled *'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)'* (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the Proposed Development.

14.4.3 Construction Phase Methodology

The greatest potential impact on air quality during the construction phase of the Proposed Development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 250m of a construction site, the majority of the deposition occurs within the first 50 m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction.

The nearest representative weather station collating detailed weather records is Dublin Airport meteorological station, which is located 68 km south of the proposed development. A review of Dublin Airport meteorological data indicates that the prevailing wind direction is south-westerly to southerly and wind speeds are generally moderate in nature (see Section 14.6.1 and Figure 14.2 for detail). In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30 year average data for Dublin Airport meteorological station indicates that on average 200 days per year have rainfall over 0.2 mm (Met Éireann, 2023). Therefore, it can be determined that 55% of the time dust generation will be reduced.

The Institute of Air Quality Management in the UK (IAQM) guidance document 'Guidance on the Assessment of Dust from Demolition and Construction' (2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site-specific mitigation required. The use of UK guidance is recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects: PE-ENV-01106* (TII, 2022).

The major dust generating activities are divided into four types within the IAQM guidance (2024) to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into Large, Medium or Small scale depending on the nature of the activities involved. The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Construction phase traffic also has the potential to impact air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects: PE-ENV-01106* (TII, 2022), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

The construction stage traffic will not increase by 1,000 AADT or 200 HDV AADT and, therefore, does not meet the above scoping criteria. In addition, there are no proposed changes to the traffic speeds or road alignment. As a result, a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality.

14.4.4 Operational Phase Methodology

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the Proposed Development. The TII scoping criteria detailed in Section 14.4.3 was used to determine if any road links are affected by the Proposed Development and require inclusion in a detailed air dispersion modelling assessment. Due to the nature of the Proposed Development, there will be minimal vehicles accessing the site during the operational phase. The Proposed Development will not increase traffic by 1,000 AADT or 200 HDV AADT. In addition, there are no proposed changes to the traffic speeds or road alignment. Therefore, no road links impacted by the Proposed Development satisfy the screening criteria (see Section 14.4.3) and a quantitative assessment of the impact of traffic emissions on ambient air quality is not necessary as there is no potential for significant impacts to local air quality.

14.5 Difficulties Encountered

There were no difficulties encountered when compiling this assessment.

14.6 Baseline Environment

14.6.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Dublin Airport meteorological station, which is located 68 km south of the proposed development. Dublin Airport meteorological data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 14.2). For data collated during five representative years (2018 - 2022), the predominant wind direction is westerly to south-westerly with a mean wind speed of 5.4 m/s over the 30-year period 1991 - 2020 (Met Éireann, 2023).

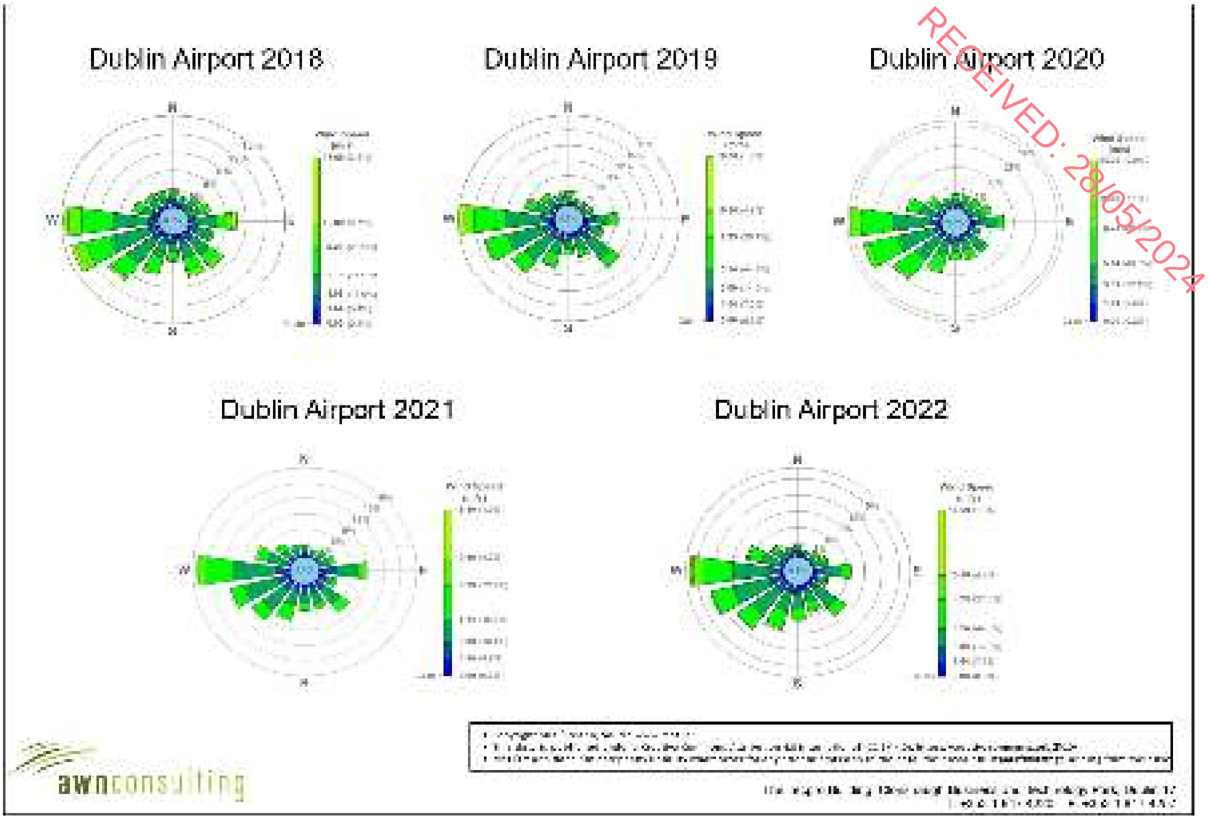

Figure 14.2 Dublin Airport Windroses 2018 - 2022 (Source: Met Éireann, 2023)

14.6.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2022*" (EPA, 2023). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2023).

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2023). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone D (EPA, 2023).

The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

In 2020 the EPA reported (EPA, 2023) that Ireland was compliant with EU legal air quality limits at all locations; however, this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA Air Quality in Ireland 2020 report details the effect that the Covid-19 restrictions had on air monitoring stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. The report also notes that CSO figures show that while traffic volumes are still slightly below 2019 levels, they have significantly increased since 2020 levels. 2020 concentrations are, therefore, predicted to be an exceptional year and not consistent with long-term trends. For this reason, the 2020 data has been included in the baseline section for representative purposes only and previous long-term data has been used to determine baseline levels of pollutants in the vicinity of the proposed development.

14.6.2.1 NO_2

Long-term NO_2 monitoring was carried out at five Zone C and Zone D rural background and suburban background locations of Kilkit, Emo Court, Castlebar, Edenderry, and Dundalk for the period 2018 - 2022, (EPA, 2023). Annual mean concentrations of NO_2 range from 3 - 14 µg/m^3 over the five-year period (**Table 14.3**). Long term average concentrations are below the annual average limit of 40 µg/m^3.

Based on the above information, a conservative estimate of the current background NO_2 concentration in the region of the proposed development is 6.8 µg/m^3.

Table 14.3 Trends in Zone A Air Quality - Nitrogen Dioxide (NO_2)

Station	Averaging Period Note 1	Year				
		2018	2019	2020	2021	2022
Kilkit	Annual Mean NO_2 (µg/m^3)	3	5	2	2	2
	Max 1-hr NO_2 (µg/m^3)	37	59	13	11	19
Emo Court	Annual Mean NO_2 (µg/m^3)	3	4	3	4	3
	Max 1-hr NO_2 (µg/m^3)	91	56	179	64	179
Castlebar	Annual Mean NO_2 (µg/m^3)	8	8	6	6	8
	Max 1-hr NO_2 (µg/m^3)	92	86	85	73	85
Edenderry	Annual Mean NO_2 (µg/m^3)	-	-	-	9	7
	Max 1-hr NO_2 (µg/m^3)	-	-	-	43	84
Dundalk	Annual Mean NO_2 (µg/m^3)	14	12	10	11	10
	Max 1-hr NO_2 (µg/m^3)	91	144	204	165	262

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022). 1-hour limit value - 200 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

14.6.2.2 PM_{10}

Continuous PM_{10} monitoring was carried out at six Zone C and Zone D rural background and suburban background locations of Cobh Cork Harbour, Kilkit, Claremorris, Askeaton, Dundalk and Rahoon Road from 2018 - 2022. Annual mean concentrations range from 7 - 15 µg/m^3 over the five year period (Table 14.4). Hence, long term concentrations are significantly below the annual limit value of 40 µg/m^3. In addition, there were at most 2 exceedances (in Dundalk) of the 24-hour limit value of 50 µg/m^3 in 2019, albeit 35 exceedances are permitted per year (EPA, 2023). Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the development is 11.2 µg/m^3.

Table 14.4 Trends in Zone A Air Quality - PM_{10}

Station	Averaging Period Note 1	Year				
		2018	2019	2020	2021	2022
Cobh Cork Harbour	Annual Mean PM_{10} (µg/m³)	15	13	13	13	14
	24-hr Mean > 50 µg/m³ (days)	0	0	0	1	1
Kilkit	Annual Mean PM_{10} (µg/m³)	9	7	-	-	9
	24-hr Mean > 50 µg/m³ (days)	0	1	-	-	0
Claremorris	Annual Mean PM_{10} (µg/m³)	12	11	10	8.12	7.90
	24-hr Mean > 50 µg/m³ (days)	0	0	0	0	0
Askeaton	Annual Mean PM_{10} (µg/m³)	-	-	7	9	9
	24-hr Mean > 50 µg/m³ (days)	-	-	0	0	0
Dundalk	Annual Mean PM_{10} (µg/m³)	15	14	13	12	12
	24-hr Mean > 50 µg/m³ (days)	0	2	2	0	2
Rahoon Road	Annual Mean PM_{10} (µg/m³)	15	13	-	11	13
	24-hr Mean > 50 µg/m³ (days)	0	0	-	1	0

Note1 Annual average limit value - 40 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022). Daily limit value - 50 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

14.6.2.3 $PM_{2.5}$

Average $PM_{2.5}$ levels in Cobh Cork Harbour, Claremorris, Askeaton and Drogheda over the period 2018 - 2022 ranged from 6 - 8 µg/m³ (Table 14.5). Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 7 µg/m³.

Table 14.5 Trends In Zone A Air Quality - $PM_{2.5}$

Station	Averaging Period Note 1	Year				
		2018	2019	2020	2021	2022
Cobh Cork Harbour	Annual Mean $PM_{2.5}$ (µg/m³)	10.0	8.0	8.0	7.4	7.6
Claremorris	Annual Mean $PM_{2.5}$ (µg/m³)	6.0	4.0	5.1	8.2	6.1
Askeaton	Annual Mean $PM_{2.5}$ (µg/m³)	-	-	4.4	5.7	5.5
Drogheda	Annual Mean $PM_{2.5}$ (µg/m³)	-	-	-	6.1	6.9

Note 1 Annual average limit value - 40 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022). Daily limit value - 50 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

Based on the above information the air quality in rural background and suburban background areas is generally good, with concentrations of the key pollutants generally well below the relevant limit values. However, the EPA have indicated that road transport emissions are contributing to increased levels of NO_2. There is the potential for breaches in the annual NO_2 limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM_{10} and $PM_{2.5}$). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2023).

14.6.3 Likely Future Receiving Environment

The ambient air quality at the development area will remain as per the baseline and will change in accordance with trends within the wider area (including influences from new developments on the site and in the surrounding area, changes in road traffic, etc.). Improvements in air quality can be expected in the future, due to the reduction in vehicle emissions driven by the 2023 Climate Action Plan (DECC, 2023), commitments to public transport developments and a 30% fleet share of electric vehicles. The 2023 Clean Air Strategy for Ireland commits Ireland to achieving final 2021 WHO Air Quality Guidelines by 2040, in line with the proposed EU revisions to the CAFE Directive. Future developments and existing industrial installations will need to comply with these more stringent future air quality standards, which will also result in improvements to air quality.

In a future baseline without the development, no construction works will take place and any impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. Impacts from changes in traffic volumes and associated air emissions will also not occur.

The proposed development will involve the demolition of the existing Open Hydro building. This is permitted under Reg Ref 19807 for storing port commodities such as agricultural food, fertiliser, salt and rock. The imported goods are stored on site before being moved off site to other warehousing / customers as opposed to being transported off site directly from the ship. This material storage, of agricultural foods in particular, generates dust soiling which will cease on demolition of the open hydro building and the goods will once again be transported off site. The proposed development will therefore positively impact the likely future receiving environment.

14.6.4 Sensitivity of the Receiving Environment

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2024) prior to assessing the impact of dust from a proposed development the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time, schools and hospitals.

In terms of receptor sensitivity to dust soiling, there are a number of high sensitivity residential properties in close proximity to the site boundary (see Figure 14.4). There are 17 sensitivity residential receptors within 20m of the development boundary. Therefore, the sensitivity of the area to dust soiling impacts is considered **high** based on the IAQM criteria outlined in Table 14.6.

Table 14.6 Sensitivity of the Area to Dust Soiling Effects on People and Property (IAQM, 2024)

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	**High**	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 14 µg/m^3 and there are 17 high sensitivity receptors within 20m of the proposed development boundary (see Figure 14.4). Based on the IAQM criteria outlined in Table 14.7, the worst-case sensitivity of the area to human health is considered **low**.

Table 14.7 Sensitivity of the Area to Dust Related Human Health Impacts (IAQM, 2024)

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	**Low**	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

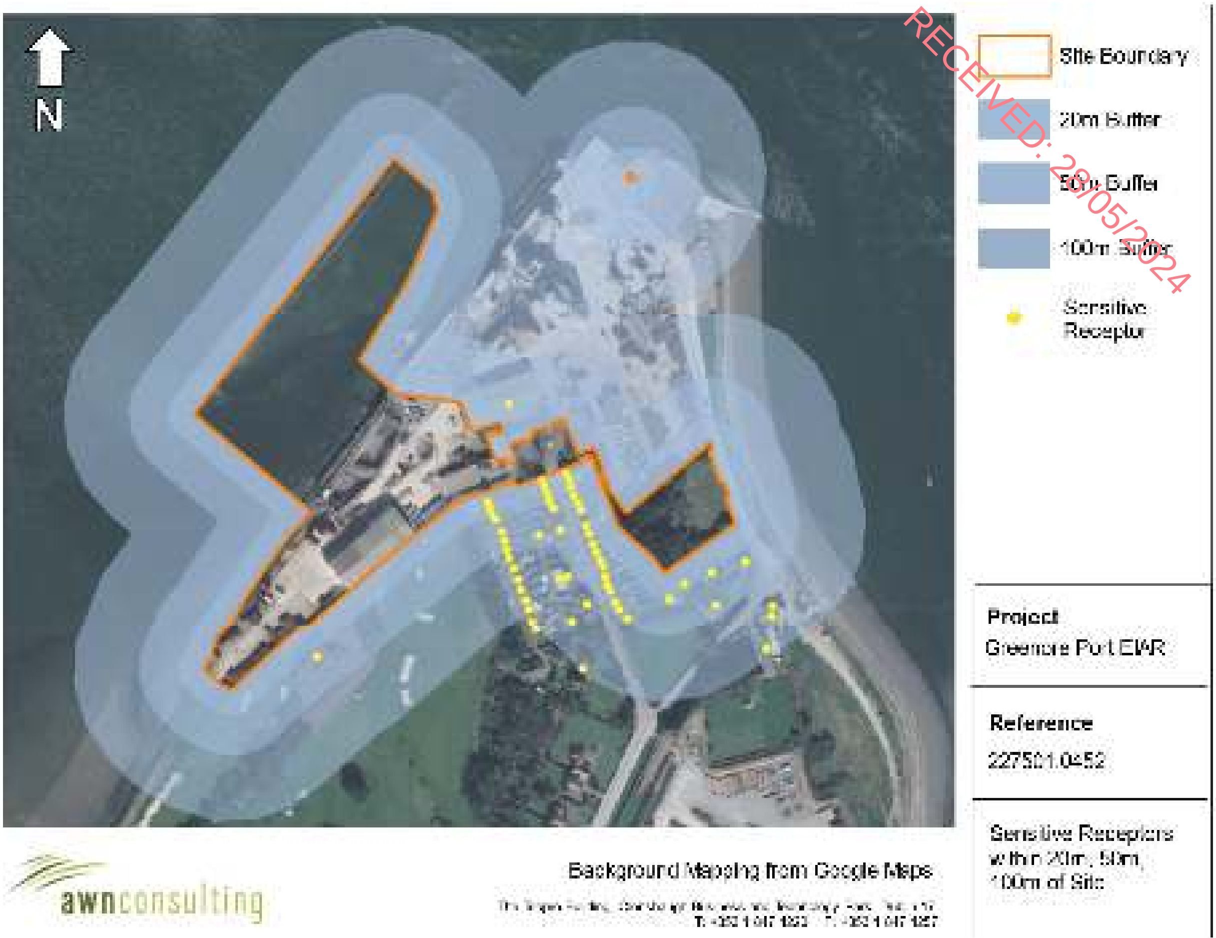

Figure 14.3 Sensitive Receptors within 20 m, 50m and 100m of Site Boundary

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50m from the site and 50m from site access roads, up to 500m from the entrance of a large site. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present.

The closest designated sites are the Carlingford Shore SAC, Carlingford Shore SAC and Carlingford Lough pNHA which are within 50m of the site. High sensitivity ecological receptors are sites with European or National designation with particularly dust sensitive species present (see Figure 14.4). Based on the IAQM criteria outlined in Table 14.8, the worst-case sensitivity of the area for ecology is considered **medium.**

Table 14.8 Sensitivity of the Area to Dust Related Ecological Impacts (IAQM, 2024)

Receptor Sensitivity	Distance from Source (m)	
	<20	<50
High	**Medium**	Medium
Medium	Medium	Low
Low	Low	Low

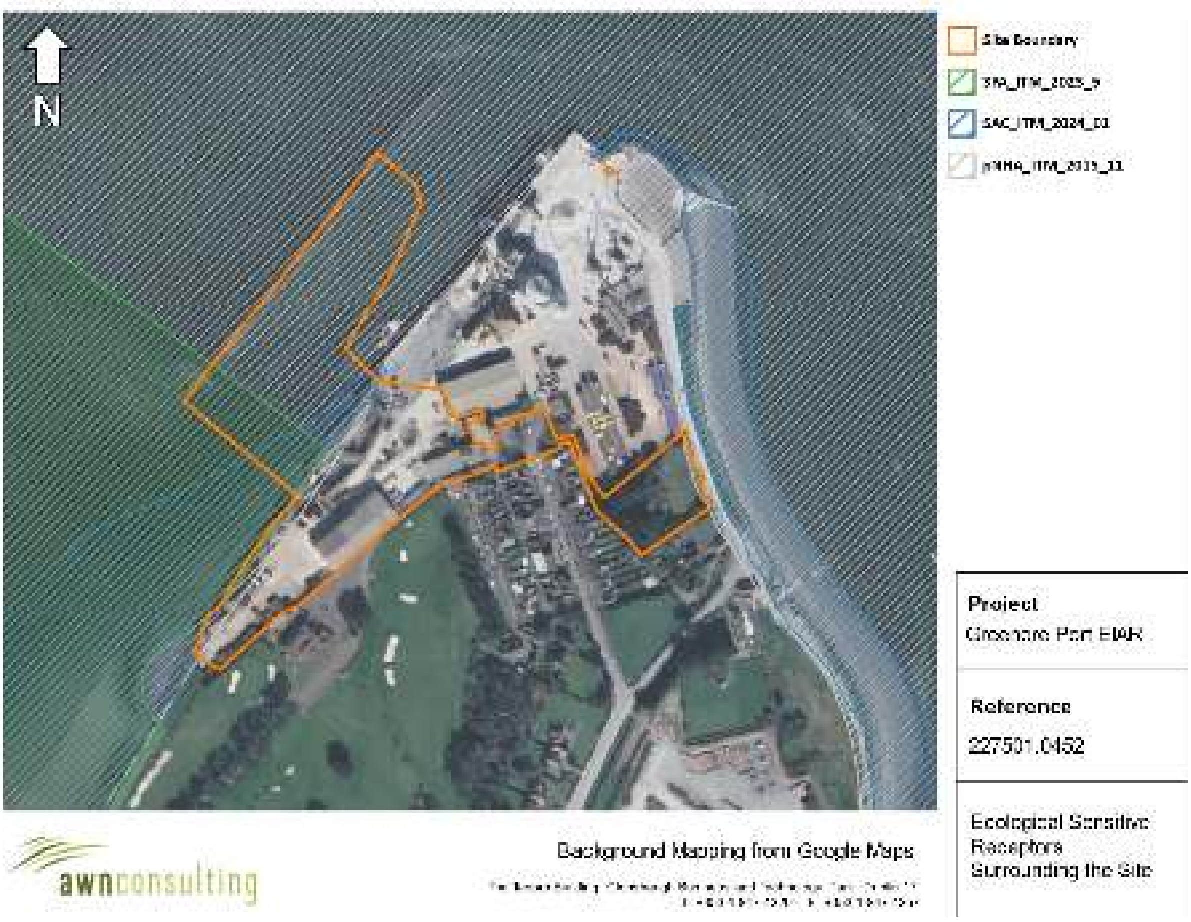

Figure 14.4 Ecological Sensitive Receptors surrounding the Site Boundary

14.7 The 'Do Nothing' Scenario

Under the Do-Nothing scenario the proposed development will not be constructed. In this scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area. In the absence of the proposed development the following Greenore Port permitted developments are planned for construction and operation:

- Extension and modification of existing Warehouse, LCC Planning Ref 20268, ABP Ref 307862; and
- New Warehouse, LCC Planning Ref Planning ref 20543, ABP Ref 310184.

14.8 Potential Significant Effects

14.8.1 Demolition and Construction Phase

The potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (see Section 14.6.4) to determine the level of dust mitigation required during the proposed works. As per Section 14.4.3, the major dust generating activities are divided into demolition, earthworks, construction and trackout within the IAQM guidance to reflect their different potential impacts.

14.8.1.1 Air Quality

Demolition

There is demolition associated with the proposed development, comprising of the demolition of the existing Open Hydro Warehouse, residential dwelling, Substation and switchroom and part of existing port office. Dust emission magnitude from demolition can be classified as small, medium, or large based on the definitions from the IAQM guidance as transcribed below:

- **Large** Total building volume >75,000 m^3 potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12 m above ground level;
- **Medium** Total building volume 12,000 m^3 – 75,000 m^3 potentially dusty construction material, demolition activities 6-12 m above ground level; and
- **Small** Total building volume <12,000 m^3 construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months.

The dust emission magnitude for the proposed demolition activities can be classified as small as the total building volume will be less than 12,000 m^3. The sensitivity of the area, as determined in Section 14.6.4, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 14.9, this results in an overall low risk of dust soiling impacts and dust-related ecological impacts and a negligible risk of dust-related human health impacts.

Table 14.9 Risk of Dust Impacts: Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	**Low Risk**
Medium	Medium Risk	Medium Risk	**Low Risk**
Low	Low Risk	Low Risk	**Negligible**

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large** Total site area > 110,000m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), > 10 heavy earth moving vehicles active at any one time, formation of bunds 3-6m in height;
- **Medium** Total site area 18,000m^2 - 110,000m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 - 8m in height;
- **Small** Total site area < 18,000m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4m in height.

The dust emission magnitude for the proposed earthwork activities can be classified as medium as the total site area is between 18,000 and 110,000m^2.

The sensitivity of the area, as determined in Section 14.6.4, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 14.10, this results in a medium risk of dust soiling impacts, a medium risk for ecological impacts and a low risk of human health impacts.

Table 14.10 Risk of Dust Impacts: Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	**Medium Risk**	Low Risk
Medium	Medium Risk	**Medium Risk**	Low Risk
Low	Low Risk	**Low Risk**	Negligible

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large** Total building volume > 75,000m^3, on-site concrete batching, sandblasting;
- **Medium** Total building volume 12,000m^3 - 75,000m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching;
- **Small** Total building volume < 12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

As per Chapter 02 Development Description Table 2-5 the construction of the proposed development will take place over two phases:

- Phase 1 will involve the construction of Building A and associated carpark, re-commissioning of 'Open Hydro' carpark spaces' (60); full extent of capital dredging, 70m quay wall at Berth 3, pontoon to cater for four crew transfer vessels, and the replacement of the communications mast. Associated site and development works, including drainage, lighting and landscaping related to the above elements will be completed in this phase. Demolition of dwelling house at Shore Road and provision of contractor's compound / carpark with pedestrian access through port lands to the O+M site.
- Phase 2 will involve the demolition of existing former Open Hydro building and ESB substation and construction of Buildings B and C, new access road including landscaping and parking areas, substation, Public / private realm upgrade at port entrance, pontoon enlarged to accommodate 10 crew transfer vessels, surface carpark and pedestrian access. Associated site and development works, including pavement upgrade quayside of Buildings A, B and C, drainage, lighting and landscaping related to the above elements will be completed in this phase.

The dust emission magnitude for the proposed construction activities can be classified as large as the total building volume will likely be more than 75,000m^3, based on Phase 2 as this will result in the largest volume of structures constructed. As outlined in Table 14.11, this results in a high risk of dust soiling impacts, a medium risk of ecological impacts and a low risk of human health impacts.

Table 14.11 Risk of Dust Impacts: Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	**High Risk**	Medium Risk	Low Risk
Medium	**Medium Risk**	Medium Risk	Low Risk
Low	**Low Risk**	Low Risk	Negligible

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large** > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;
- **Medium** 20 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100m;
- **Small** < 20 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 5 0m.

The dust emission magnitude for the proposed trackout can be classified as small, as at worst-case peak periods there will likely be less than 20 outward HGV movements per day. As outlined in Table

14.12, this results in a low risk of dust soiling impacts, a negligible risk of human health impacts and a low risk of ecological impacts.

Table 14.12 Risk of Dust Impacts: Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	**Low Risk**
Medium	Medium Risk	Medium Risk	**Low Risk**
Low	Low Risk	Low Risk	**Negligible**

Summary of Dust Emission Risks

The risk of dust impacts as a result of the Proposed Development are summarised in Table 14.13 for each activity. The magnitude of risk determined is used to prescribe the level of site-specific mitigation required for each activity to prevent significant impacts occurring.

There is at most a high risk of dust soiling, at most a medium risk of ecological impacts, and at most a low risk of human health impacts associated with the proposed works. Best practice dust mitigation measures will be implemented to ensure there are no significant impacts at nearby sensitive receptors. In the absence of mitigation, the effects of construction dust are predicted to be ***direct, short-term, negative*** and ***slight***.

Table 14.13 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling Risk	Low Risk	Medium Risk	High Risk	Low Risk
Human Health Risk	Negligible	Low Risk	Low Risk	Negligible
Ecological Risk	Low Risk	Medium Risk	Medium Risk	Low Risk

14.8.1.2 Traffic

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase, particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the Proposed Development satisfy the TII scoping assessment criteria in Section 14.4.3. It can, therefore, be determined that the construction stage traffic will have a ***direct, short-term, negative*** and ***imperceptible*** effect on air quality.

14.8.1.3 Human Health

Dust emissions from the construction phase of the proposed development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Section 14.6.4, the surrounding area is of low sensitivity to dust-related human health impacts. In addition, there is at most a low risk of dust-related human health impacts as a result of the proposed construction works. In the absence of mitigation there is the potential for a ***direct***, ***short-term, negative*** and ***imperceptible*** affect to human health as a result of construction dust emissions.

14.8.2 Operational Phase

14.8.2.1 Traffic

The Proposed Development will not change traffic volumes by 1,000 AADT or 200 HDV AADT. In addition, there are no proposed changes to the traffic speeds or road alignment. Therefore, no road links impacted by the Proposed Development satisfy the screening criteria (see Section 14.4.3). There is the potential for maintenance vehicles accessing the site to result in emissions of NO_2, PM_{10} and $PM_{2.5}$. However, due to the infrequent nature of maintenance activities and the low number of vehicles involved emissions are not predicted to be significant. A detailed air quality assessment was scoped out for the operational stage of the development as per the TII screening criteria. Operational stage effects to air quality are predicted to be ***direct, long-term, negative*** and ***imperceptible***.

14.8.2.2 Human Health

A traffic related air emissions have the potential to impact air quality which can affect human health. Detailed air dispersion modelling assessment of traffic emissions was conducted and it was determined that emissions of air pollutants are predicted to be significantly below the ambient air quality standards which are based on the protection of human health. Therefore, it can be determined that the effect to human health during the operational stage is ***long-term, direct, localised, negative*** and ***imperceptible***.

14.8.3 Cumulative Effects

14.8.3.1 Construction Phase

According to the IAQM guidance (2024) should the construction phase of the proposed development coincide with the construction phase of any other developments within 500m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. Developments that potentially could overlap during the construction phase (within 500m) are included in Appendix 1-1 Cumulative Impacts—Projects and Plans. A review of relevant, large scale, recent (within the previous 5 years) planning applications within 500m of the site was conducted in order to identify sites with the potential for cumulative impacts. There were 9 no. sites identified within 500m of the proposed development which may have coinciding construction phases, albeit minor in scope, with that of the proposed development. These include:

- Lisa and Sean Crudden (Ref: LCC 231);
- Tara and Declan Boyle (Ref: LCC 22614);
- Andrew Bothwell (Ref: LCC 211331);
- Brendan Rafferty (Ref: LCC 211223);
- Valerie Halpenny (Ref: LCC 19202);
- Damien Wynne and Martina McNally (Ref: LCC 2360256);
- Cooley Peninsula Men's Shed (Ref: LCC 23125);
- Irish Coast Guard (Ref: LCC 22274); and
- Hanlon Transport Ltd (Ref: LCC 20362).

All other planning applications detailed in Appendix 1-1 , are greater than 500m from the proposed development and have no significant potential for cumulative construction phase impacts.

The proposed development has been assessed as having a medium risk of dust soiling impacts during the construction phase. A number of mitigation measures have been proposed and outlined in Section 14.9.1 to ensure significant dust impacts do not occur. Provided these measures are in place for the duration of the construction phase significant cumulative construction dust impacts are not predicted. Cumulative effects on air quality are predicted to be ***direct, short-term, negative*** and ***not significant*** which is overall ***not significant*** in EIA terms.

14.8.3.2 Operational Phase

The traffic data supplied for the operational phase assessment included data for cumulative development within the area. The traffic was reviewed and a detailed air quality assessment of vehicle exhaust emissions was scoped out due to the low-level changes in traffic as a result of the proposed development (see Section 14.4.4). The effect on air quality during the operational phase of the proposed development, including the cumulative effect, will be ***direct, long-term, negative*** and ***imperceptible,*** which is overall ***not significant*** in EIA terms.

14.9 Mitigation

14.9.1 Construction Phase Mitigation

The proposed development has been assessed as having a medium risk of dust soiling impacts and a low risk of dust related human health impacts in the construction phase as a result of earthworks, demolitions, construction and trackout activities (see Section 14.8.1). Therefore, the following dust mitigation measures shall be implemented during the construction phase of the proposed development. These measures are appropriate for sites with a medium risk of dust impacts and aim to ensure that no significant nuisance occurs at nearby sensitive receptors. The mitigation measures draw on best practice guidance from Ireland (DCC, 2018), the UK (IAQM (2024), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared for the site. The measures are divided into different categories for different activities.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details.

Site Management

- A feedback register will be kept on site detailing all correspondence received in connection with dust or air quality concerns, together with details of any actions carried out.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.

- Avoid site runoff of water or mud through the use of bunds.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, back bucket, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Traffic Management Plan to manage the sustainable delivery of goods and materials.
- Implement a Traffic Management Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- No bonfires or burning of waste materials.

Measure Specific to Demolition

- Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- During the demolition process, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are identified and put in place where possible.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- A site speed restriction of 15 kph will be applied as an effective control measure for dust for on-site vehicles.
- Avoid dry sweeping of large areas.
- Ensure truck bodies entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.

Monitoring

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust and record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for construction dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

14.9.2 Operational Phase Mitigation

There is no mitigation required for the operational phase of the development as effects on air quality are predicted to be ***direct, long-term, negative*** and ***imperceptible***.

14.10 Residual Impact Assessment

The residual effects are the final predicted or intended effects which occur after the proposed mitigation measures have been implemented. It will not always be possible or practical to mitigate all adverse effects.

14.10.1 Construction Phase

A series of mitigation measures have been prepared to minimise dust emissions during construction activities, including demolition. Provided the dust minimisation measures outlined in the plan are adhered to, the predicted residual air quality effects during the construction phase are ***direct, short-term, negative,*** and ***not significant***.

Best practice mitigation measures are proposed for the construction phase of the proposed development, which will focus on the proactive control of dust and other air pollutants, to minimise generation of emissions at source. The mitigation measures that will be put in place during construction will ensure that the impact complies with all EU ambient air quality legislative limit values, which are based on the protection of human health (see Table 14.1). Therefore, the predicted residual, dust-related, human health effect of the construction phase of the proposed development is ***direct, short-term, negative,*** and ***not significant***.

14.10.2 Operational Phase

The operational stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the TII scoping assessment criteria in Section 14.4.4. Therefore, the operational phase effect on air quality and human health as a result of increased traffic is ***direct, long-term, negative*** and ***imperceptible,*** which is overall ***not significant*** in EIA terms.

14.10.3 Summary of Post-mitigation Effects

The following table summarises the identified likely residual significant effects during the construction and demolition phase of the proposed development post mitigation.

Table 14.14 Summary of Construction Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Impact of construction dust from demolition, earthworks, construction and trackout in terms of dust soiling, human health and ecosystems	Negative	Not significant	Study area as per Section 14.6.4	Likely	Short-term	Direct
Impact of construction phase traffic on air quality	Negative	Imperceptible	Detailed assessment and study area scoped out as per Section 14.4.3	Likely	Short-term	Direct

The following table summarises the identified likely residual significant effects during the operational phase of the proposed development post mitigation.

Table 14.15 Summary of Operational Phase Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Impact of operational phase traffic on air quality	Negative	Imperceptible	Detailed assessment and study area scoped out as per Section 14.4.4	Likely	Long-term	Direct

14.11 Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to air quality associated with the proposed development due to the nature and scale of the development. As per Chapter 02 Development Description, Section 2.2.2.9, a fuel store with a capacity of ≥200,000 litres will be provided in a dedicated area that will be maintained and managed by Greenore Port. Appropriate mitigation measures have been developed to avoid accidental impact.

14.12 Worst Case Scenario

Worst case estimates have been used as part of this assessment. As a result, Section 14.10 details the worst case impact for the proposed development.

14.13 Interactions

14.13.1 Population and Human Health

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between Population and Human Health (Chapter 4) and Air Quality (Chapter 14). An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted effect is ***direct, short-term***, ***negative*** and ***not significant*** with respect to population and human health during construction and ***direct, long-term***, ***negative*** and ***imperceptible*** during operation phase.

14.13.2 Lands, Soils and Geology

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between Air Quality (Chapter 14) and Land and Soils (Chapter 9) in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between Air Quality and Land and Soils. In this assessment, the effect of the interactions between land and soils and air quality are considered to be ***long-term, imperceptible*** and ***neutral.***

14.13.3 Biodiversity

As set out in Land & Soils (Chapter 9) and Water and Hydrology (Chapter 10), dust generation can occur during extended dry weather periods as a result of construction traffic. Dust suppression measures (e.g. dampening down) will be implemented as necessary during dry periods and vehicle wheel washes will be installed, for example. The works involve stripping of topsoil and excavations, which will remove some vegetation such as trees and scrub. It will also generate dust and potentially impact on the air quality in the locality. However, the generation of dust will be temporary during construction phase and is not anticipated to have a significant impact on biodiversity. In this assessment, the effect of the interactions between biodiversity and air quality are considered to be ***long-term, imperceptible*** and ***neutral.***

14.13.4 Traffic and Transportation

Interactions between Air Quality and Traffic (Chapter 6 Material Assets –Traffic and Transport) can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the effect of the interactions between traffic and air quality are considered to be ***direct, long-term***, ***negative*** and ***imperceptible.***

14.13.5 Climate

Air Quality and Climate (Chapter 15) have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate chapter (Chapter 15). There is no impact on climate due to air quality however the sources of impacts on air quality and climate are strongly linked. In this assessment, the effect of the interactions between climate and air quality are considered to be ***long-term, imperceptible*** and ***neutral.***

14.14 Monitoring

14.14.1 Construction Phase

Monitoring of construction dust deposition (including dust from demolitions) at nearby sensitive receptors will be carried out to ensure mitigation measures are working satisfactorily. This will be done using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119..

The following monitoring measures are required-

Site Management

- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. Dry and windy conditions are favourable to dust suspension therefore mitigations must be implemented if undertaking dust generating activities during these weather conditions.
- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust and record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary.
- Monitoring of construction dust deposition (including dust from demolitions) at nearby sensitive receptors will be carried out to ensure mitigation measures are working satisfactorily. This will be done using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/m^2/day during the minimum monitoring period of between 28 - 32 days. If construction dust deposition rates exceed 350 mg/m^2/day, site procedures will be reviewed and improved to achieve a level below 350 mg/m^2/day.
- Increase the frequency of site inspections by the person accountable construction dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions

14.14.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as effects on air quality are predicted to be imperceptible.

14.15 Summary of Mitigation and Monitoring

The following table summarises the Construction Phase mitigation and monitoring measures.

Table 14.16 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Impact of construction dust from demolition, earthworks, construction and trackout in terms of dust soiling, human health and ecosystems	Dust control measures as per IAQM Guidance (IAQM, 2024) and Section 14.9.1	Monitoring of construction dust deposition as per Section 14.14.1

The following table summarises the Operational Phase mitigation and monitoring measures.

Table 14.17 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
No mitigation or monitoring required for the operational phase of the development as impacts to air quality are predicted to be imperceptible.		

14.16 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the proposed development with regards to air quality. These impacts have been considered for both the construction and operational phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures as set out in this chapter, the overall predicted effect of the proposed development is ***not significant***.

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CHAPTER 15
CLIMATE

VOLUME II
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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15.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development at Greenore Port, Greenore, Co. Louth. A full description of the proposed development is set out in Chapter 2 'Development Description' of this EIAR.

15.2 Expertise & Qualifications

This chapter was completed by Aisling Cashell, an Environmental Consultant in the air quality section of AWN Consulting Ltd. She holds a BA and an MAI in Civil, Structural and Environmental Engineering from Trinity College Dublin. She is a member of Engineers Ireland. She has been specialising in the area of air quality, climate and sustainability for 1 year and has prepared air quality and climate assessments for inclusion within EIARs for residential and commercial developments such as Twenties Lane (Planning Application Ref: 22713), Cherrywood T13 (Planning Application Ref: DZ23A/0028), Corballis Donabate LRD (Planning Application Ref: LRD0017/S3), The Paddocks (Planning Application Ref: 2360349), and Dublin Airport Authority.

This chapter was also prepared and reviewed Dr. Jovanna Arndt, a Senior Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She has been specialising in the area of air quality and climate over 7 years and has prepared air quality and climate assessments for inclusion within EIARs for residential developments such as Twenties Lane (Planning Application Ref: 22713), Cherrywood T13 (Planning Application Ref: DZ23A/0028), Corballis Donabate LRD (Planning Application Ref: LRD0017/S3), commercial and industrial developments by Dublin Airport Authority, Zoetis, Ipsen, Merck Millipore, Greener Ideas Limited and Abbvie, as well as renewable energy developments such as Codling Wind Park and the Cúil Na Móna Anaerobic Digestion Facility. She also specialises in assessing air quality impacts using air dispersion modelling of transportation schemes such as BusConnects Dublin, major Highways England Road schemes and major rail infrastructure in the form of High Speed 2 (HS2 in the UK). She has prepared air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Microsoft, Greener Ideas Limited, Merck Millipore, Lilly Limerick, Chemifloc, Takeda, Kingspan and Kilshane Energy. She has also provided Air Quality Action Plan (AQAP) and Air Quality Management Area (AQMA) support to several UK councils and assessed the air quality impacts of potential Clean Air Zones in the UK.

15.3 Proposed Development

A full description of the proposed development is set out in Chapter 2 of this EIAR. The following is a summary of the proposed works.

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

i. 'Terrestrial Port Area', (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.
ii. 'Nearshore Environment' (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
iii. 'Residential Site' (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
iv. 'Port Office Entrance' (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

Figure 15.1 shows a general location plan of the plots identified.

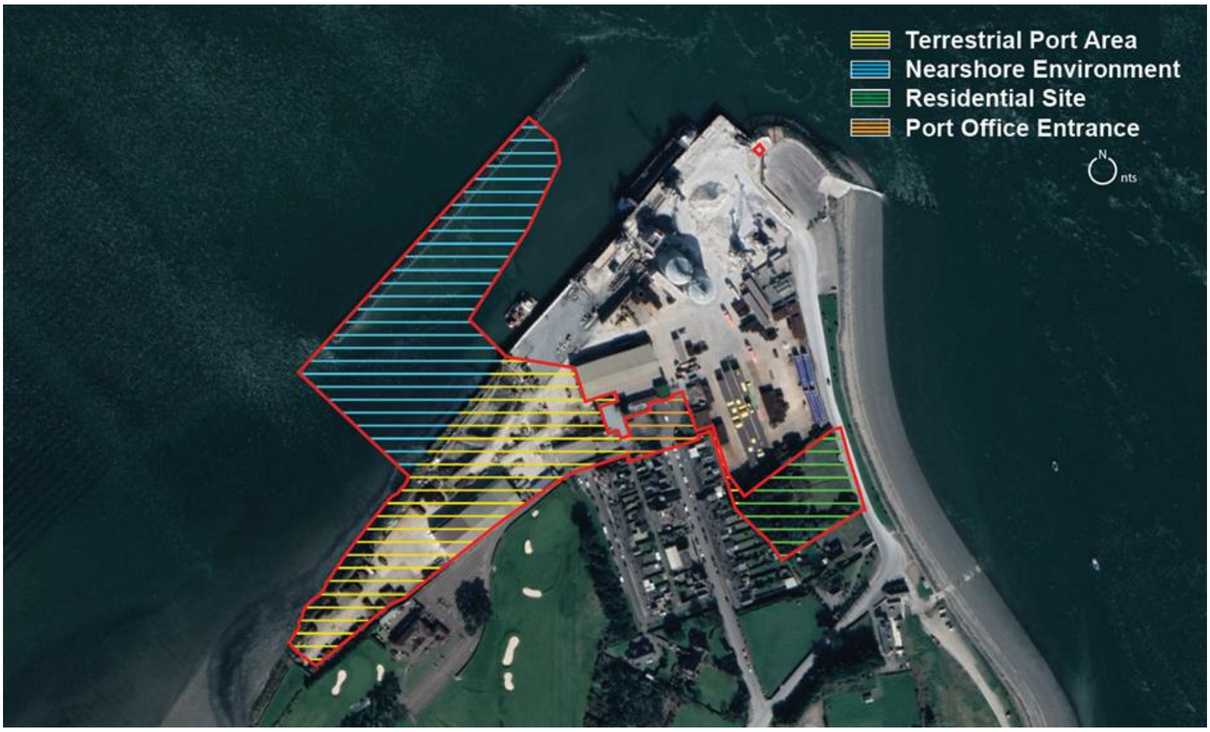

Figure 15.1 General Location Plan of the Scheme

15.3.1 Aspects Relevant to this Assessment

During the construction phase engine emissions from site vehicles and machinery have the potential to impact climate through the release of CO_2 and to a lesser extent, other greenhouse gases (GHGs). Embodied carbon of materials used in the construction of the development along with site activities will impact climate. Impacts to climate are assessed against Ireland's obligations under the EU 2030 GHG targets and sectoral emissions ceilings.

Engine emissions from vehicles accessing the site have the potential to impact climate during the operational phase of the development through the release of CO_2. Operational phase impacts will be long-term in duration. In addition, the vulnerability of the proposed development in relation to future climate change must be considered during the operational phase.

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude; and
- Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

15.4 Legislation, Policy and Guidance

15.4.1 Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland 'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050' (3.(1) of No. 46 of 2015).

This is referred to in the Act as the 'national transition objective'. The Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2021a) and a third update in December 2022 (Government of Ireland, 2022).

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019, followed by the publication of the Climate Action and Low Carbon Development (Amendment) Bill 2021 (hereafter referred to as the 2021 Climate Bill) in March 2021. The Climate Act was signed into Law on the 23rd July 2021, giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act (Government of Ireland, 2021b) is to provide for the approval of plans "*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*". The 2021 Climate Act will also "*provide for carbon budgets and a decarbonisation target range for certain sectors of the economy*". The 2021 Climate Act defines the carbon budget as "*the total amount of greenhouse gas emissions that are permitted during the budget period*".

In relation to carbon budgets, the 2021 Climate Action and Low Carbon Development (Amendment) Act states 'A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')'. The carbon budget is to be produced for 3 sequential budget periods, as shown in Table 15.1. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published in the 2024 Climate Action Plan (DECC, 2023a) and are shown in

Table 15.2. Industry have a 35% reduction requirement and a 2030 emission ceiling of 4 Mt CO_2e.

Table 15.1 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO_2e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 15.2 Sectoral Emission Ceilings 2030 (DECC, 2023a)

Sector	Baseline ($MtCO_2e$)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach.			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

15.4.2 Policy

In December 2022, CAP23 was published (Government of Ireland, 2022). This is the first CAP since the publication of the carbon budgets and sectoral emissions ceilings, and it aims to implement the required changes to achieve a 51% reduction in carbon emissions by 2030. The CAP has six vital high impact sectors where the biggest savings can be made: renewable energy, energy efficiency of buildings, transport, sustainable farming, sustainable business and change of land-use. CAP23 states that the decarbonisation of Ireland's manufacturing industry is key for Ireland's economy and future competitiveness. There is a target to reduce the embodied carbon in construction materials by 10% for materials produced and used in Ireland by 2025 and by at least 30% for materials produced and used in Ireland by 2030. CAP23 states that these reductions can be brought about by product substitution for construction materials and reduction of clinker content in cement. Cement and other high embodied carbon construction elements can be reduced by the adoption of the methods set out in the Construction Industry Federation 2021 report Modern Methods of Construction. The IDA Ireland will also seek to attract businesses to invest in decarbonisation technologies. to ensure economic growth can continue alongside a reduction in emissions,

In April 2023 the Government published a draft Long-term Strategy on Greenhouse Gas Emissions Reductions (DECC, 2023b). This strategy provides a long-term plan on how Ireland will transition towards net carbon zero by 2050, achieving the interim targets set out in the Climate Action Plan. The strategy will be updated on the basis of a second round of public consultation throughout 2023 with an updated strategy published after this is complete.

The Louth County Council *Climate Change Adaptation Strategy 2019-2024* (LCC, 2023) outlines a number of goals and plans to prepare for and adapt to climate change. There are six key action areas within the plan: Local Adaptation Governance and Business Operations, Infrastructure and Built Environment, Land Use and Development, Drainage and Flood Management, Natural Resources and Cultural Infrastructure and Community Health and Wellbeing. Some of the measures promoted within the Action Plan under the key areas involve building retrofits, energy master-planning, development of segregated cycle routes, development of flood resilient designs, promotion of the use of green infrastructure and water conservation initiatives. The implementation of these measures will enable the Louth County Council area to adapt to climate change and will assist in bringing Ireland closer to achieving its climate related targets in future years. New developments need to be cognisant of the Climate Adaptation Strategy and incorporate climate friendly designs and measures where possible.

15.4.3 Guidance

The assessment has made reference to national guidelines where available, in addition to international standards and guidelines relating to the assessment of climate impacts. These are summarised below:

- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA, 2022a);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) on the assessment of the effects of certain public and private projects on the environment (the EIA Directive);
- European Union (EU) Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law');
- 2030 Climate and Energy Policy Framework (European Commission 2014);
- 2030 EU Climate Target Plan (European Commission, 2021b);
- Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2021 Climate Act) (No. 32 of 2021) (Government of Ireland, 2021b);
- Climate Action Plan 2023 (hereafter referred to as the CAP 2023) (Government of Ireland, 2022);
- National Adaptation Framework (hereafter referred to as the NAF) (DECC, 2018);
- Louth County Council (LCC) Climate Change Adaptation Strategy 2019-2024 (LCC, 2023);
- Louth County Council (2021) Louth County Council Development Plan 2021-2027;
- Transport Infrastructure Ireland (TII) -ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a);
- Transport Infrastructure Ireland (TII) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII, 2022b);
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (UK Highways Agency, 2019);

- Institute of Environmental Management and Assessment (IEMA) Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition (IEMA, 2022);
- IEMA EIA Guide to: Climate Change Resilience and Adaptation (IEMA, 2020a); and
- IEMA Greenhouse Gas Management Hierarchy (IEMA, 2020b).

15.5 Methodology

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

15.5.1 Greenhouse Gas Assessment

As per the EU guidance document Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013) the climate baseline is first established with reference to EPA data on annual GHG emissions (see Section 15.7.1).

15.5.1.1 Construction Phase

PE-ENV-01104 (TII, 2022a) recommends the calculation of the construction stage embodied carbon using the TII Online Carbon Tool (TII, 2022b). Embodied carbon refers to the sum of the carbon needed to produce a good or service. It incorporates the energy needed in the mining or processing of raw materials, the manufacturing of products and the delivery of these products to site. The TII Online Carbon Tool (TII, 2022b) has been commissioned by TII to assess GHG emissions associated with road or rail projects using Ireland-specific emission factors and data. The carbon emissions are calculated by multiplying the emission factor by the quantity of the material that will be used over the entire construction/maintenance phase. The outputs are expressed in terms of tCO2e (tonnes of carbon dioxide equivalent). Given the nature of the proposed development use of the TII carbon tool is not ideal. However, the approach can be applied to other types of developments to provide a high level assessment prior to detailed design stage.

The TII Carbon Tool (TII, 2022b) uses emission factors from recognised sources including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013). The carbon emissions are calculated by multiplying the emission factor by the quantity of the material that will be used over the entire construction/maintenance phase. The outputs are expressed in terms of tCO_2e (tonnes of carbon dioxide equivalent).

Information on the material quantities, site activities, land clearance, waste product and construction traffic were provided by McCarthy Browne for input into the carbon tool. This information was used to determine an estimate of the GHG emissions associated with the development. Detailed information regarding the proposed construction materials was not available at the time of this assessment and will be specified at the detailed design stage. Best estimates have been used in this assessment to provide an estimate of the GHGs associated with the proposed development.

Embodied carbon is carbon dioxide emitted during the manufacture, transport and construction of building materials, together with site activities. As part of the proposed development, construction stage embodied GHG emissions have been calculated under the following headings within the TII Carbon Tool (TII, 2022b) where applicable:

- Pre-Construction;
- Embodied Carbon of Materials;
- Construction Activities;
- Construction Waste; and
- Maintenance.

Pre-construction includes land-use changes and site clearance activities which includes demolition works. There are some minor site clearance works associated with the proposed extension to the existing facility. However, these are minor due to the fact that the proposed development is an extension to an existing facility and the majority of the land is already suitably prepared for construction to commence. There are no significant land-use changes associated with this element of the development. The land-use change options within the carbon tool include changes from agricultural land, forest or peat. There will be some minor land-use change for the temporary contractor's car park during the construction phase. This land is currently grassland, once the construction works are complete the contractor's car park will be established into a permanent staff car park.

Transport GHG emissions associated with delivery of materials to site and removal of waste materials off site were included in the calculator. In addition, construction worker travel to site was also included within the calculations. The exact location of all facilities to be used is not known at this stage, therefore an approximate radius from the site was used for the purposes of this assessment. Where specific locations were known the exact transport distance was included within the calculations.

15.5.1.2 Operational Phase

Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The UK Highways Agency DMRB guidance document in relation to climate impact assessments LA 114 Climate (UK Highways Agency, 2019) contains the following scoping criteria to determine whether a detailed climate assessment is required for a proposed project during the operational stage. If any of the road links impacted by the proposed development meet or exceed the below criteria, then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

There are no road links that meet or exceed the criteria for further assessment during the operational phase of the proposed development. As a result, a detailed assessment of traffic related carbon dioxide (CO_2) emissions was not conducted.

15.5.1.3 Significance Criteria for GHGA

The Transport Infrastructure Ireland (TII) guidance document entitled PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a) outlines a recommended approach for determining the significance of both the construction and operational phases of a development. The approach is based on comparing the 'Do Something' scenario and the net project GHG emissions (i.e. Do Something – Do Minimum) to the relevant carbon budgets (DECC, 2023a). With the publication of the Climate Action Act in 2021, sectoral carbon budgets have been published for comparison with the Net CO_2 project GHG emissions from the proposed development. The industrial sector emitted approximately 7 $MtCO_2e$ in 2018 and has a ceiling of 4 Mt CO_2e in 2030 which is a 35% reduction over this period (see

Table 15.2).

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022a) is based on IEMA guidance (IEMA, 2022) which is consistent with the terminology contained within Figure 3.4 of the EPA's (2022) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports'.

The 2022 IEMA Guidance (IEMA, 2022) sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should, therefore, be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

TII (TII, 2022a) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022), TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

Significance is determined using the criteria outlined in Table 15.3 (derived from Table 6.7 of PE-ENV-01104 (TII, 2022a)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Table 15.3 GHGA Significance Criteria

Effects	Significance Level Description	Description
Significant Adverse	Major Adverse	• The project's GHG impacts are not mitigated; • The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; and • No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate Adverse	• The project's GHG impacts are partially mitigated; • The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and • Falls short of full contribution to Ireland's trajectory towards net zero.

Effects	Significance Level Description	Description
Not Significant	Minor Adverse	• The project's GHG impacts are mitigated through 'good practice' measures; • The project has complied with existing and emerging policy requirements; and • Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	• The project's GHG impacts are mitigated beyond design standards; • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero.
	Beneficial	• The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration; • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

15.5.2 Climate Change Risk Assessment

The assessment involves an analysis of the sensitivity and exposure of the proposed development to climate hazards which together provide a measure of vulnerability of the proposed development to hazards as a results of climate change.

PE-ENV-01104 (TII, 2022a) states that the CCRA is guided by the principles set out in the overarching best practice guidance documents:

- EU (2021) Technical guidance on the climate proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021); and
- The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (IEMA, 2020).

The baseline environment information provided in Section 15.7, future climate change modelling and input from other experts working on the proposed development (i.e. hydrologists) should be used to assess the likelihood of a climate risk.

First an initial screening CCRA based on the operational phase is carried out, according to the TII guidance PE-ENV-01104. This is carried out by determining the sensitivity of proposed development assets (i.e. receptors) and their exposure to climate change hazards.

The proposed development asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022a) provides the below list of asset categories and climate hazards to be considered. The asset categories will vary for development type and need to be determined on a development by development basis.

- **Asset Categories** Pavements; drainage; structures; utilities; landscaping; signs, light posts, buildings, and fences.
- **Climate Hazards** Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

The asset sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below. Asset sensitivity takes into account design mitigation measures.

- **High Sensitivity** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
- **Medium Sensitivity** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2.
- **Low Sensitivity** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis is undertaken. The exposure analysis involves determining the level of exposure of each climate hazard at the proposed development location. Exposure is assigned a level of High, Medium or Low as per the below criteria.

- **High Exposure** It is almost certain or likely this climate hazard will occur at the project location i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium Exposure** It is possible this climate hazard will occur at the project location i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low Exposure** It is unlikely or rare this climate hazard will occur at the project location i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability, as shown in Table 15.4.

15.5.2.1 Significance Criteria for CCRA

The assessment of vulnerability to climate change combines the outcomes of the sensitivity and exposure analysis with the aim of identifying the key vulnerabilities and potentially significant climate hazards which could impact the proposed development. The vulnerability assessment takes any proposed mitigation into account.

Vulnerability = Sensitivity x Exposure

Table 15.4 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale. A risk that is low or medium is classed as non-significant, while a high or extreme risk is classed as a significant risk.

TII guidance (TII, 2022a) and the EU technical guidance (European Commission, 2021) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. The impact from climate change on the proposed development can, therefore, considered to be not significant. The impact from climate change on the proposed development can therefore considered to be not significant.

Where residual medium or high vulnerabilities exist the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks. An assessment of construction phase CCRA impacts is only required according to the TII guidance (TII, 2022a) if a detailed CCRA is required.

Table 15.4 Vulnerability Matrix

		Exposure		
		High (3)	Medium (2)	Low (1)
Sensitivity	High (3)	9 – High	6 – High	3 – Medium
	Medium (2)	6 – High	4 – Medium	2 – Low
	Low (1)	3 – Medium	2 – Low	1 – Low

The screening CCRA, discussed in Section 15.9.2.2, did not identify any residual medium or high risks to the proposed development as a result of climate change. Therefore a detailed CCRA for the construction and operational phase were scoped out.

While a CCRA for the construction phase was not required, best practice mitigation against climate hazards is still recommended in Section 15.10.2.

15.6 Difficulties Encountered

There were no difficulties encountered when compiling this assessment.

15.7 Baseline Environment

PE-ENV-01104 (TII, 2022a) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline.

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe. This, in addition to Ireland's current failure to meet its EU binding targets under Regulation 2018/842 (European Union, 2018) results in changes in GHG emissions either beneficial or adverse being of more significance than previously considered prior to these declarations.

Climate impacts are assessed at a national level and in relation to national targets and sectoral emission ceilings. The study area for climate is the Republic of Ireland and the baseline is determined in relation to this study area.

15.7.1 Greenhouse Gas Emissions

Greenhouse Gas Emissions Data published in July 2023 (EPA, 2023) predicts that Ireland exceeded (without the use of flexibilities) its 2022 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 3.72 Mt CO_2e. When the available flexibilities are taken into account, the limit is exceeded by 1 MtCO_2e. The sectoral breakdown of 2022 GHG emissions is shown in Table 15.5. The sector with the highest emissions in 2022 was agriculture at 38.4% of the total, followed by transport at 19.1%. For 2022 total national emissions (excluding LULUCF) were estimated to be 60.76 Mt CO_2e as shown in Table 15.5 (EPA, 2023). This represents a 1.9% increase compared to the 2021 figures.

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII, 2022a) and IEMA Guidance (IEMA, 2022) the future baseline is a trajectory towards net zero by 2050, "*whether it [the project] contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

The future baseline will be determined by Ireland meeting its targets set out in the CAP23, and future CAPs, alongside binding 2030 EU targets. The European Union (EU) enacted 'Regulation (EU) 2018/842 on binding annual GHG emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013' (hereafter referred to as the Regulation) (European Union, 2018) to meet the commitments under the Paris Agreement. The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The Regulation was amended in April 2023 and Ireland must now limit its greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters Including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and thus includes GHG emissions from transport, residential and commercial buildings and agriculture.

Table 15.5 Total National GHG Emissions in 2022 Note 1

Sector	2021 Emissions (Mt CO_2e)	2022 Emissions (Mt CO_2e)	% Total 2022 (including LULUCF)	% Change from 2021 to 2022
Agriculture	23.626	23.337	34%	-2.1
Transport	10.978	11.634	17%	6.0
Energy Industries	10.262	10.076	15%	-1.8
Residential	6.992	6.105	9%	-12.7
Manufacturing Combustion	4.614	4.288	6%	-7.1
Industrial Processes	2.475	2.289	3%	-7.5
F-Gases	0.745	0.741	1%	-0.5
Commercial Services	0.765	0.767	1%	0.2
Public Services	0.672	0.659	1%	-1.9
Waste Note 2	0.726	0.867	1%	4.9
LULUFC	7.338	7.305	11%	-0.5
National Total excluding LULUFC	61.955	60.764	89%	-1.9
National Total including LULUFC	62.293	68.069	100%	-1.8

Note 1 Reproduced from Latest emissions data on the EPA website (EPA 2023)

Note 2 Waste includes emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste

15.7.2 Climate Change Vulnerability

Impacts as a result of climate change will evolve with a changing future baseline, changes have the potential to include increases in global temperatures and increases in the number of rainfall days per year. Therefore, it is expected that the baseline climate will evolve over time and consideration is needed with respect to this within the design of the proposed development.

Ireland has seen increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east including in the region where the proposed development will be located (EPA, 2021b). The EPA have compiled a list of potential adverse impacts as a result of climate change including the following which may be of relevance to the proposed development (EPA, 2021b):

- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species.

The EPA's *State of the Irish Environment Report (Chapter 2: Climate Change)* (EPA, 2020c) notes that projections show that full implementation of additional policies and measures, outlined in the 2019 Climate Action Plan, will result in a reduction in Ireland's total GHG emissions by up to 25 per cent by 2030 compared with 2020 levels. Climate change is not only a future issue in Ireland, as a warming of approximately 0.8°C since 1900 has already occurred. The EPA state that it is critically important for the public sector to show leadership and decarbonise all public transport across bus and rail networks to the lowest carbon alternatives. The report (EPA, 2020c) underlines that the next decade needs to be one of major developments and advances in relation to Ireland's response to climate change to achieve these targets and that Ireland must accelerate the rate at which it implements GHG emission reductions. The report states that mid-century mean annual temperatures in Ireland are projected to increase by between 1.0°C and 1.6°C (subject to the emissions trajectory). In addition, heat events are expected to increase by mid-century (EPA, 2020c). While individual storms are predicted to have more severe winds, the average wind speed has the potential to decrease (EPA, 2020c).

TII's Guidance document PE-ENV-01104 (TII, 2022a) states that for future climate change a moderate to high Representative Concentration Pathways (RCP) should be adopted. RPC4.5 is considered moderate while RPC8.5 is considered high. Representative Concentration Pathways (RCPs) describe different 21st century pathways of GHG emissions depending on the level of climate mitigation action undertaken.

Future climate predictions undertaken by the EPA have been published in '*Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach*' (EPA 2020d). The future climate was simulated under both Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. This study indicates that by the middle of this century (2041–2060). Mid-century mean annual temperatures are projected to increase by 1 to 1.2°C and 1.3 to 1.6°C for the RCP4.5 and RCP8.5 scenarios, respectively, with the largest increases in the east. Warming will be enhanced at the extremes (i.e. hot days and cold nights), with summer daytime and winter night-time temperatures projected to increase by 1 to 2.4°C. There will be a substantial decrease of approximately 50% which is projected for the number of frost and ice days. Summer heatwave events are expected to occur more frequently, with the largest increases in the south. In addition, precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events. Climate change also has the potential to impact future energy supply which will rely on renewables such as wind and hydroelectric power. Wind turbines need a specific range of wind speeds to operate within and droughts or low ground water levels may impact hydroelectric energy generating sites. More frequent storms have the potential to damage the communication networks requiring additional investment to create resilience within the network.

The EPA's *Critical Infrastructure Vulnerability to Climate Change* report (EPA, 2021b) assesses the future performance of Irelands critical infrastructure when climate is considered. With respect to road infrastructure, fluvial flooding and coastal inundation/coastal flooding are considered the key climate change risks with snowstorm and landslides being medium risks. Extreme winds and heatwaves/droughts are considered low risk to road infrastructure. One of the key outputs of the research was a framework that will provide quantitative risk-based decision support for climate change impacts and climate change adaptation analysis for infrastructure.

In terms of sea level rise, the Intergovernmental Panel on Climate Change (IPCC) *Special Report on the Ocean and Cryosphere in a Changing Climate* (IPCC, 2019) projects a worst case scenario of global mean sea level rise of 1.1 m by 2100 under RCP 8.5. Recent research in Ireland projects mean sea level rise of 0.45 m under RCP4.5 and 0.81 m under RCP8.5 (Paranunzio et. al, 2022).

15.8 The 'Do Nothing' Scenario

Under the Do Nothing Scenario no construction works associated with the overall development will take place and the identified impacts on climate will not occur. Impacts from increased traffic volumes from the proposed development will also not occur. The climate baseline will continue to develop in line with the identified trends (see Section 9.3). This scenario is considered neutral in relation to climate. In the absence of the proposed development the following Greenore Port permitted developments are planned for construction and operation:

- Extension and modification of existing Warehouse, LCC Planning Ref 20268, ABP Ref 307862; and
- New Warehouse, LCC Planning Ref Planning ref 20543, ABP Ref 310184.

15.9 Potential Significant Effects

15.9.1 Greenhouse Gas Assessment

There is the potential for greenhouse gas emissions to atmosphere during the construction and operational phases of the proposed development. As per the TII guidance (2022a), the significance of the effect of GHG emissions on climate is assessed for the total GHG emissions across all proposed development stages (Section 15.9.1.3).

15.9.1.1 Construction Phase

The total GHG emissions arising from the construction of the proposed development have been considered and are summarised in Table 15.6. The embodied carbon within the construction materials has been calculated. This calculation was based on the TII Online Carbon Tool (TII, 2022b), and the quantities provided by the design team. Complete detailed information regarding the proposed construction materials and exact methodologies was not available at the time of this assessment and will be specified at the detailed design stage. Best estimates have been used in this assessment to provide an estimate of the GHGs associated with the proposed development.

The predicted GHG emissions associated with the proposed development are presented in Table 15.6. The proposed development is estimated to result in total construction phase GHG emissions of 3,966 tonnes CO_2e for the material use and construction processes.

The assessment indicates that the key sources of GHG emissions are associated with construction phase is use of diesel by construction plant, accounting for 58% of emissions, followed by the embodied carbon from the materials used, accounting for 21% of emissions.

Table 15.6 Greenhouse Gas Assessment

Source	Elements Considered	GHG Emissions (tCO_2e)	% Of Total	Relevant Sector	Emissions Annualised Over Lifespan as % of Sector Budget
Embodied Carbon / Materials	Aggregates, concrete, road pavement materials (e.g. asphalt), steel	839	21%	Industry	0.001%
Material Transport	HGV (50 km trip distance assumed)	397	10%	Transport	0.0003%
Clearance and demolition	Site preparation and demolition	1.2	0.03%	Industry	0.000001%
Excavation	Rock, topsoil and other excavation	64	2%	Industry	0.0001%
Plant Use	Energy use (diesel) by plant during construction	2,305	58%	Electricity	0.003%
Construction Worker Travel to Site	Car trips	68	2%	Transport	0.00005%
Construction Waste Disposal	Aggregate and soil, concrete, brick, tile and ceramics, mixed construction and demolition, wood, mixed metals	48	1%	Waste	0.0002%
Construction Waste Transport	HGV (50 km trip distance assumed)	245	6%	Transport	0.0002%
Total		**3,966 tonnes CO_2e**			

The predicted GHG emissions (as shown in Table 15.6) can be averaged over the full construction phase and the lifespan of the proposed development to give the predicted annual emissions to allow for direct comparison with national annual emissions and targets.

In Table 15.7, GHG emissions have been compared against the carbon budget for the electricity, transport, industry and waste sectors in 2030 (DECC, 2023a), against Ireland's total GHG emissions in 2022 and against Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions based on 2005 levels (33 Mt CO_2eq) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

The estimated total construction phase GHG emissions, when annualised over the 50-year proposed development lifespan, are equivalent to 0.0003% of Ireland's total GHG emissions in 2022 and

0.0005% of Ireland's non-ETS 2030 emissions target. The estimated GHG emissions associated with energy use during the construction phase are equivalent to 0.003% of the 2030 Electricity budget, while the total GHG emissions associated with transport-related activities are 0.0005% of the 2030 Transport budget, construction waste GHG emissions are 0.0002% of the Waste budget and industry-related activities are 0.001% of the 2030 Industry budget (DECC, 2023a).

Table 15.7 Estimated GHG emissions relative to sectoral budgets and GHG baseline

Target/Sectoral Budget	(tCO_2e)	Annualised Development GHG Emissions	% of Relevant Target/Budget
Ireland's 2022 Total GHG Emissions (existing baseline)	60,746,000	Total GHG Emissions	0.0003%
Non-ETS 2030 Target	33,000,000	Total GHG Emissions	0.0005%
2030 Sectoral Budget (Industry Sector)	4,000,000	Total Industry Emissions	0.001%
2030 Sectoral Budget (Transport Sector)	6,000,000	Total Transport Emissions	0.0005%
2030 Sectoral Budget (Electricity Sector)	3,000,000	Total Electricity Emissions	0.003%
2030 Sectoral Budget (Waste Sector)	1,000,000	Total Waste Emissions	0.0002%

15.9.1.2 Operational Phase

There is the potential for increased traffic volumes to impact climate during the operational phase. However, traffic related impacts have been screened out of this assessment as per the criteria in Section 15.4.4.2. There are no additional sources of GHG emissions due to the operational phase of the proposed development.

15.9.1.3 GHGA Significance of Effects

The TII guidance states that the following two factors should be considered when determining significance:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

The level of mitigation described in Section 15.10 has therefore been taken into account when determining the significance of the proposed development's GHG emissions. The proposed development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible, the development will comply with the do-minimum standards set through regulation (NZEB and Part L 2021). Additionally, the proposed development is enabling and supporting infrastructure for offshore wind farms, and therefore renewable energy production.

According to the TII significance criteria described in Section 15.5.1.3 and Table 15.3, the significance of the GHG emissions during the construction and operational phase is ***minor adverse.***

In accordance with the EPA guidelines (EPA, 2022), the above significance equates to a significance of effect of GHG emissions during the construction and operational phase which is ***direct, long-term, negative*** and ***slight***, which is overall not significant.

15.9.2 Climate Change Risk Assessment

15.9.2.1 Construction Phase

A detailed CCRA of the construction phase has been scoped out, as discussed in Section 15.5.2.1. However, consideration has been given to the proposed development's vulnerability to the following climate change hazards with best practice mitigation measures proposed in Section 15.10:

- Flood Risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding;
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather;
- Reduced temperatures resulting in ice or snow;
- Geotechnical impacts; and
- Major Storm Damage – including wind damage.

15.9.2.2 Operational Phase

In order to determine the vulnerability of the proposed development to climate change the sensitivity and exposure of the development to various climate hazards must first be determined. The following climate hazards have been considered in the context of the proposed development: flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning, hail, landslides and fog. Wildfire and landslides were not considered relevant to the proposed development due to the project location and have been screened out of the assessment.

The sensitivity of the proposed development to the above climate hazards is assessed irrespective of the project location. Table 15.8 details the sensitivity of the proposed development on a scale of high (3), medium (2) and low (1). Once the sensitivity has been established the exposure of the proposed development to each of the climate hazards is determined, this is the likelihood of the climate hazard occurring at the project location and is also scored on a scale of high (3), medium (2) and low (1). The product of the sensitivity and exposure is then used to determine the overall vulnerability of the proposed development to each of the climate hazards as per Table 15.4. The results of the vulnerability assessment are detailed in Table 15.8 below.

Table 15.8 Climate Change Vulnerability Assessment

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (coastal, pluvial, fluvial)	1 (Low)	1 (Low)	1 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	2 (Medium)	2 (Low)
Drought	1 (Low)	2 (Medium)	2 (Low)
Extreme Wind	1 (Low)	2 (Medium)	2 (Low)
Lightning & Hail	1 (Low)	1 (Low)	1 (Low)
Fog	1 (Low)	1 (Low)	1 (Low)

The proposed development has a worst-case low vulnerability to the identified climate hazards. The Site-Specific Flood Risk Assessment (SSFRA) completed by McCarthy Browne indicates that the site is predominantly contained within Flood Zone C. The OMF facility buildings, offices and warehouse fit into Flood Zone B category and so will have a defence level designed for coastal flooding for a 1 in 200-year event. The external facility of operational yards and pontoons and quay space can be classified at Flood Zone A. The eastern border and south-western corner contain areas in Flood Zone B and Flood Zone A, as shown in Figure 15.2.

The main flooding risk for the proposed development is coastal/tidal flooding due to its proximity to Carlingford Lough. Coastal flooding results from high sea levels or waves causing overflow onto land. However, the development is unlikely to be affected by coastal flooding. Fluvial flooding, stemming from the southwest, is a potential risk but is also deemed unlikely. Poor maintenance of drainage systems can lead to pluvial flooding, but no past incidents were recorded, and maintenance is assumed under GPC maintenance programme. Groundwater flooding, caused by rising water tables, is not a concern for the development.

Adequate attenuation and drainage in accordance with relevant standards have been incorporated into the design of the development which allows for additional rainfall as a result of climate change thereby reducing the risk for the site. Finished Floor Levels (FFL) will be set above the road levels and surrounding garden levels to ensure any seepage of groundwater onto the development does not flood into the properties. The lowest FFL is set at 3.650m AOD. The risk of flooding is mitigated by providing SUDS for the development which can store water for the 1-in-100-year storm event plus a 30% allowance for climate change.

In summary, based on the findings of the SSFRA and the drainage incorporated into the design of the proposed development, the vulnerability of the proposed development to flooding is considered low.

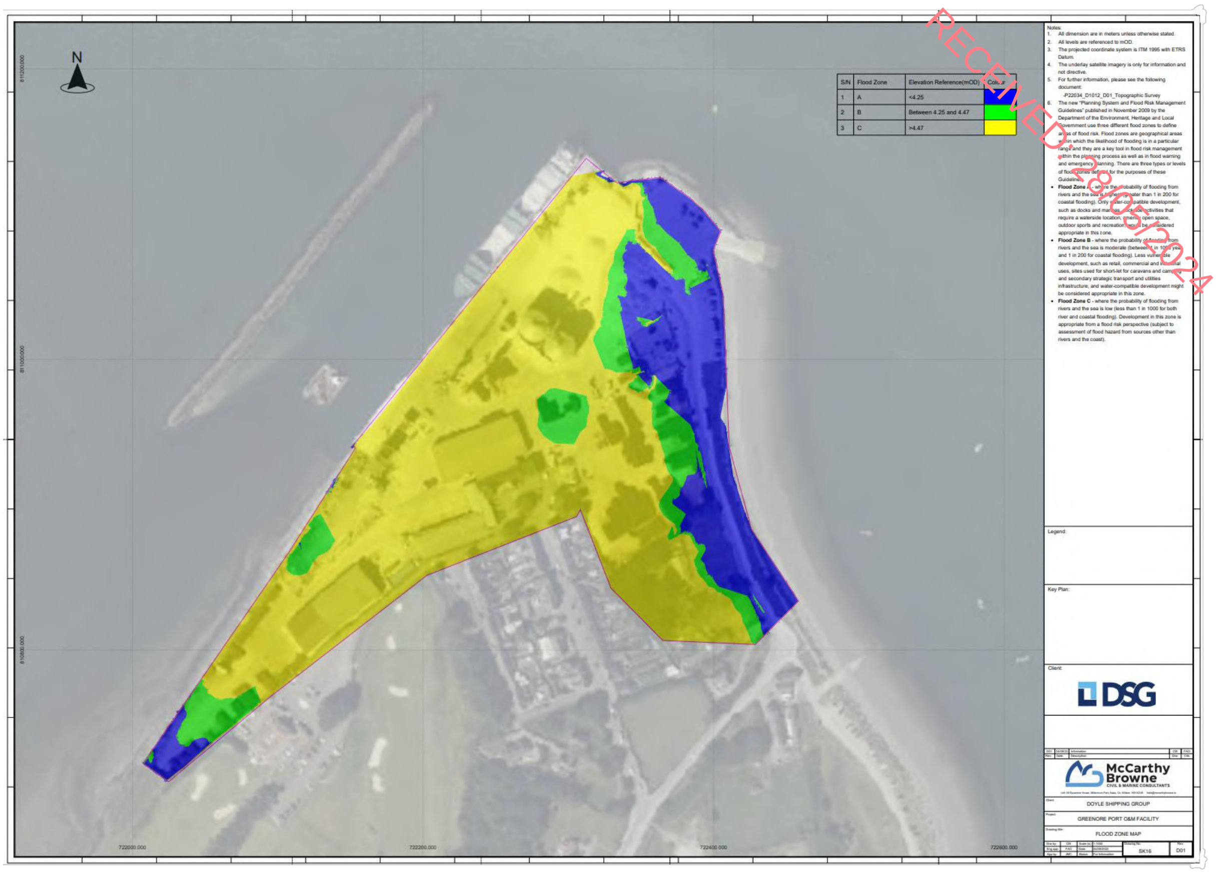

Figure 15.2 Flood Map Delineating Flood Zone A, B and C

In relation to extreme temperatures, both extreme heat and extreme cold, these have the potential to impact the building materials and some related infrastructure. However, the building materials selected at the detailed design stage will be of high quality and durability. Therefore, extreme temperatures are not considered a significant risk.

15.9.2.3 CCRA Significance of Effects

With design mitigation in place, there are no significant risks to the proposed development as a result of climate change. In accordance with the EPA Guidelines (EPA, 2022), the significance of effect of the impacts to the proposed development as a result of climate change during the construction phase is ***direct, short-term, negative*** and ***imperceptible*** and during the operational phase is ***direct, long-term, negative*** and ***imperceptible***.

15.9.3 Cumulative Effects

A list of planning applications in the vicinity of the proposed development is given in Appendix 1-1.

With respect to the requirement for a cumulative assessment PE-ENV-01104 (TII, 2022) states that *"for GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable."*

However, by presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. Therefore, the assessment approach is considered to be inherently cumulative.

15.10 Mitigation

15.10.1 Incorporated Design Mitigation

Specific measures have been incorporated into the design of the proposed development to reduce GHG emissions during the construction phase:

- Some excavated material, bricks, tiles and ceramics, metals and timber and will be diverted from waste processing by recycling or disposal in landfill, and will instead be reused on-site. This will reduce the associated CO_2 by approximately 32.6 tonnes.

A number of measures have been incorporated into the design of the development to mitigate the impact of GHG emissions during the operational phase. These are discussed in more detail in Section 15.10.3.

A number of measures have been incorporated into the design of the development to mitigate against the impacts of future climate change. For example, adequate attenuation and drainage have been incorporated into the design of the development to avoid potential flooding impacts as a result of increased rainfall events in future years. These measures have been considered when assessing the vulnerability of the proposed development to climate change (see Section 15.4.4.1).

15.10.2 Construction Phase Mitigation

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase. During the construction phase the following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.
- Waste materials will be re-used on site where possible and where re-use is not possible on-site they will be sent off-site for recycling, re-use or recovery.
- Sourcing materials locally where possible to reduce transport related CO_2 emissions.
- Materials with a reduced environmental impact will be incorporated into the construction design through re-use of materials or incorporation of recycled materials in place of conventional building materials. The following materials will be considered for the construction phase:
    - Ground Granulated Blast Furnace Slag (GGBS) & Pulverised Fuel Ash - used where feasible as replacements for Portland cement to increase sustainability and carbon footprint of civil and structural works; and
    - Steel - the carbon emissions emitted during the production of virgin steel can be higher than some other structural materials on a tonne by tonne basis, and therefore,

recycled steel will be used where possible. Additionally, where possible the steel reinforcement used will be supplied directly from stocks within the port or backloads from the reinforcement providers for the port development, thereby reducing CO_2 emissions associated with its transportation.

In terms of impact on the proposed development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements.

The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

15.10.3 Operational Phase Mitigation

The proposed development has been designed to reduce the impact on climate as a result of energy usage during operation. The Climate Action and Energy Statement prepared by Belton Consulting Engineers and submitted under separate cover with this planning application details a number of incorporated design mitigation measures that have been incorporated into the design of the development to reduce the impact on climate wherever possible. Such measures included in the proposed development to reduce the impact to climate from energy usage are:

- Achieve air permeability rate of 3 $m^3/m^2/hr$ @ 50Pa;
- Ensure every effort is made to reduce the risk pf thermal bridging by upgrading the façade to ensure continuity of insulation. This is to limit local thermal bridging as much as practically possible where an existing construction element to be retained shows risk of thermal bridging;
- Building fabric U-Value calculations will be completed to at least meet the requirements of TGD Part L in relation to thermal performance;
- Central ventilation systems with heat recovery will be used to retain as much heat as possible. Amenities will be designed for mechanical ventilation with occupancy sensing to minimize the time for overrun;
- The space heating and domestic hot water system will likely be provided by a central heat pumps system with optional back up/tie-in to future district heating system. The final system will be selected based on operating cost and efficiency mandated by TGD Part L. it is likely that VRF Air condition systems will be utilised to meet the space heating demand and NZEB requirements;
- The following NZEB technologies will be considered for this development:
    - Centralized air to water heat pumps
    - Photovoltaic system for on-site electricity use
    - District Heating
    - Combined heat and power (CHP) for thermal and electricity generation

The electrical design will require that all lighting be LED with occupancy sensing where required.

These identified measures will aid in reducing the impact to climate during the operational phase of the proposed development in line with the goals, relevant policies and objectives of the Louth County *Council Development Plan 2021-2027* (LCC, 2021) and *Climate Change Adaptation Strategy* (LCC, 2023), including climate mitigation measures. Further details on some of the incorporated design measures can be found in the Climate Action and Energy Statement prepared by Belton Consulting Engineers in respect of this planning application.

15.11 Residual Impact Assessment

15.11.1 Greenhouse Gas Assessment

The impact to climate as a result of a proposed development must be assessed as a whole for all phases. The proposed development will result in some impacts to climate through the release of GHGs. TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

The proposed development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible, the development will comply with the do-minimum standards set through regulation (NZEB and Part L 2021). Additionally, the proposed development is enabling and supporting infrastructure for offshore wind farms, and therefore renewable energy production.

As per the assessment criteria in Table 15.3 the impact of the proposed development in relation to GHG emissions is considered minor adverse. In accordance with the EPA guidelines (EPA, 2022), this equates to a significance of effect of GHG emissions during the construction and operational phase which is ***direct, long-term, negative*** and ***slight***, which is overall ***not significant***.

15.11.2 Climate Change Risk Assessment

In relation to climate change vulnerability, with mitigation in place, it has been assessed that the effect on the proposed development as a result of climate change during the construction phase is ***direct, short-term, negative*** and ***imperceptible*** and during the operational phase is ***direct, long-term, negative*** and ***imperceptible***

15.11.3 Summary of Post-mitigation Effects

The following table summarises the identified likely residual significant effects during the construction and demolition phase and operational phase of the proposed development post mitigation.

Table 15.9 Summary of Climate Effects Post Mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Impact of proposed development greenhouse gas emissions on climate	Negative	Not significant	Ireland's climate, specifically Ireland's CAP24 targets	Likely	Long-term	Direct
Impact of climate change hazards on proposed development during construction phase	Negative	Imperceptible	Proposed development	Likely	Short-term	Direct
Impact of climate change hazards on proposed development during operational phase	Negative	Imperceptible	Proposed development	Likely	Long-term	Direct

15.12 Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to climate associated with the proposed development due to the nature and scale of the development. As per Chapter 02 Development Description, Section 2.2.2.9, a fuel store with a capacity of ≥200,000 litres will be provided in a dedicated area that will be maintained and managed by Greenore Port. Appropriate mitigation measures have been developed to avoid accidental impact.

15.13 Worst Case Scenario

Worst case estimates have been used as part of this assessment. As a result, Section 15.11 details the worst case impact for the proposed development.

15.14 Interactions

15.14.1.1Hydrology

Climate has the potential to interact with a number of other environmental attributes. The impact of flood risk has been assessed and the surface water drainage network will be designed to cater for run-off from the building and the surrounding hardscaped areas. The overall impact of this interaction is considered ***negative*** and ***not significant*** in EIA terms.

15.14.1.2Waste Management

Interactions across many areas can be used to minimise the GHG emissions from both the construction and operational and operational phases. For instances, waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling or incineration. The overall impact of this interaction is considered ***negative*** and ***slight*** in EIA terms.

15.14.1.3Building Design

The risk to building design in terms of material vulnerability to climate change, specifically extreme heat and cold, has been considered. These aspects of climate interact with drainage design, operational power, landscaping and building design. The overall impact of this interaction is considered ***negative*** and ***not significant*** in EIA terms.

15.15 Monitoring

No monitoring is required for the development during the construction or operational phase.

15.16 Summary of Mitigation and Monitoring

The following Table summarises the Construction Phase mitigation and monitoring measures.

Table 15.10 Summary of Construction Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Impact of proposed development greenhouse gas emissions on climate.	Mitigation measures as per Sections 15.10.1 and 15.10.2.	No monitoring is required for the development during the construction phase.
Impact of climate change hazards on proposed development.	Mitigation measures, as per Section 15.10.2.	No monitoring is required for the development during the construction phase.

The following Table summarises the Operational Phase mitigation and monitoring measures.

Table 15.11 Summary of Operational Phase Mitigation and Monitoring

Likely Significant Effect	Mitigation	Monitoring
Impact of proposed development greenhouse gas emissions on climate.	Mitigation measures as per Sections 15.10.1 and 15.10.2.	No monitoring is required for the development during the operational phase.
Impact of climate change hazards on proposed development.	Mitigation measures, primarily relating to drainage, as per Section 15.10.3.	No monitoring is required for the development during the operational phase.

15.17 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the proposed development with regards to climate. These impacts have been considered for both the construction and operational phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures as set out in this chapter, the overall predicted effect of the proposed development is not significant in relation to GHG emissions and climate change risk.

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CHAPTER 16

CULTURAL HERITAGE: ARCHEOLOGICAL HERITAGE

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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16 Cultural Heritage: Archaeological Heritage

16.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on Archaeological Heritage.

It should be read in conjunction Chapter 2, Project Description; Chapter 17, Built Heritage, and EIAR Appendix 16.1, Cultural Heritage Assessment, submitted with the planning application.

16.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Niall Brady, BA MA PhD FSA, director of the Archaeological Diving Company Ltd (ADCO).

Niall Brady holds a BA in Archaeology and Geography (UCD 1983); an MA in Archaeology (UCD 1986); an MA in Medieval Studies (Cornell University 1994), and a PhD in Medieval Studies (Cornell University 1996). He is a Fellow of the Society of Antiquaries of London since 2006 and is an associate of Trinity College Dublin's Centre for Environmental History since 2019. Niall Brady has directed the Medieval Rural Settlement Project for the Discovery Programme, Ireland's centre for advanced archaeological research (2002-10), sits on several national and international archaeological committees, and is co-founding director of ADCO (1999-present). He has carried out a wide range of archaeological assessments on land and underwater and been involved in the preparation of EIARs for the following projects:

- Corrib Onshore Pipeline 2010
- Dublin Port Company's Alexandra Basin Redevelopment Project, 2014
- Dublin Port Company's MP2 Project, 2020

16.3 Proposed Development

A full description of the proposed development is set out in Chapter 2 of this EIAR. The following is a summary of the proposed works.

Greenore Port Unlimited Company intend to apply for a 10-year permission for development on a site at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

1. **'Terrestrial Port Area'**, (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.

2. **'Nearshore Environment'** (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
3. **'Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
4. **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

The following is a general location plan of the plots identified above.

Figure 16.1 Development Areas

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. Where rock is encountered (estimate max of 1,000m^3), it will be reused on site.

Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 of the development.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA). The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine shed wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary,, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions

16.3.1 Aspects Relevant to this Assessment

The marine works will include capital dredging, a piling programme to support a floating pontoon and construction of a new wall to Berth 3 over a 70m-length.

In the demolition works required on the landside, such works will retain the existing upstanding elements of the former engine room wall and will not impact on other historic buildings and boundary walls within the applicant's overall landholding.

16.4 Methodology

16.4.1 Relevant Legislation & Guidance

The principal legislative, guidance and policy context that operates across the land and marine environment in Ireland is governed archaeologically by the requirements of the National Monuments Act 1930-2004, which is being replaced by the Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023, and the Planning and Development Act 2000, As Amended, and is supported by policies governing archaeology and built heritage nationally and locally.

The assessment is conducted in line with the following legislative procedures and guidelines listed in Table 16-1.

Table 16.1 Legislation, policy and guidance documents relevant to Cultural Heritage (including Archaeological, Industrial & Architectural).

Legislation / Policy / Guidance	Reference	Geographic Coverage
The National Monuments Act 1930-2004	Govt. of Ireland, 1930 - 2004	Ireland, Republic of
Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023	Govt. of Ireland, 2023	Ireland, Republic of
Planning and Development Act 2000, As Amended	Govt. of Ireland, 2000- present	Ireland, Republic of
Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act	Govt. of Ireland, 1999	Ireland, Republic of
Marine Area Planning Act 2021	Govt. of Ireland, 2021	Ireland, Republic of
The Foreshore Act 1933 and 2014	Govt. of Ireland, 1933 updated 2014	Ireland, Republic of
Heritage Act, 1995	Govt. of Ireland, 1995	Ireland, Republic of
Architectural Heritage Protection Guidelines for Planning Authorities (2011)	Govt. of Ireland, 2011	Ireland, Republic of
European Convention on the Protection of the Archaeological Heritage (Valetta Convention)	EU, 1992	EU
The Convention for the Protection of the Architectural Heritage (the Grenada Convention)	EU, 1985	EU
Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI) Framework and Principles for the Protection of the Archaeological Heritage	DAHGI, 1999a	Ireland, Republic of
DAHGI Policy and Guidelines on Archaeological Excavation	DAHGI, 1999b	Ireland, Republic of
International Council on Monuments and Sites (ICOMOS) guidance, non-governmental international organisation dedicated to the conservation of the world's monuments and sites – several charters and related reference texts	ICOMOS, 2011	Global

16.4.2 Site Surveys/Investigations

The present assessment is based on desktop review of existing sources (Table 16.2) and non-disturbance visual recording based on site inspection underwater and on land.

Table 16.2 Principal sources to inform known Cultural Heritage (including Archaeological, Industrial & Architectural).

Data Source	Topic Focus
Historic Maps, Ordnance Survey and Admiralty Charts	Landscape and Seascape
Register of Monuments and Places (RMP), also known as the Sites and Monuments Record (SMR)	Terrestrial Archaeology
Louth CC Register of Protected Structures	Archaeology & Built Heritage
National Inventory of Architectural Heritage (NIAH)	Terrestrial Archaeology
Topographical Files, National Museum of Ireland	Terrestrial Archaeology
Historic Shipwreck Inventory maintained by the National Monuments Service (NMS) at the Department of Housing, Local Government and Heritage.	Shipwreck, recorded and known
Integrated Mapping for the Sustainable Development of Ireland's Marine Resource' (INFOMAR) project.	Shipwreck, known
Excavations database	Licensed archaeological interventions

Site work was carried out with a view to completing an *in situ* non-disturbance record of any features observed to a level that would enable an archaeologist who has not seen the site to comprehend its components, layout and sequences, based on a detailed record of selected elements of the site.

The site work was completed on 24 and 25 August 2023 as an underwater dive inspection within and extending beyond the development footprint for the new CTV berths; an intertidal inspection of those elements exposed at Low Water, and a walkover inspection of the wider port area, extending from Shore Road in the east to the western boundary of the port (Figure 16-2) (Appendix 16.1).

The in-water survey area measured 407m long (northeast-southwest) by 157m wide (northwest-southeast).

The underwater and intertidal elements were launched from a Dive Support Vessel and the dive work operated Surface Supplied Diving Equipment, with the archaeological diver towed across the site area to ensure maximum and complete coverage. Dive work was completed at Low Water, which resulted in shallow diving except for those elements that ran along the dredge slope created when deepening Berth 2. A metal detector was employed underwater to assist in the identification of material of significance.

The walkover inspection was conducted across the application site and wider port area and was limited to external consideration of buildings and structures.

Attention was paid to recording the seascape and landscape topography and any features of archaeological and cultural heritage interest. Record was made in writing and supported by photography. A handheld GPS unit was available to record the locations of any features of interest.

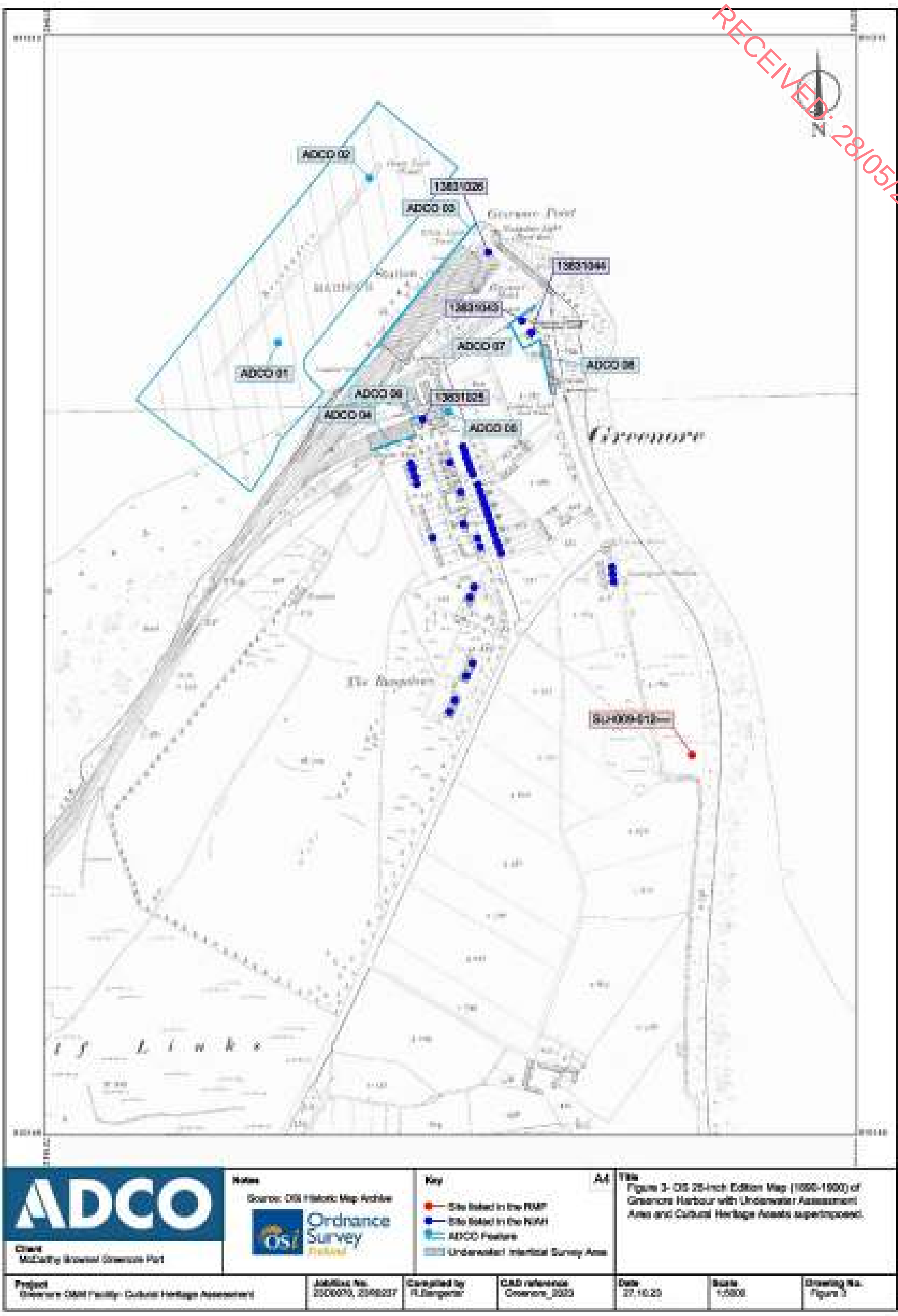

Figure 16.2 Detail from historic Ordnance Survey 25-inch sheet (1890-1900) with Underwater Archaeological Assessment area and Cultural Heritage assets overlaid

Source: ADCO survey report.

16.4.3 Consultation

A Section 247 pre-planning consultation meeting was held with Louth County Council on 20th May 2024 and did not raise any issues on this matter.

16.5 Difficulties Encountered

No difficulties were encountered in the course of the archaeological inspections. Sea state was calm and underwater visibility was good during the in-water survey. Full access across the landside elements of the development area was provided.

16.6 Baseline Environment

16.6.1 Historical background and cartographic sources

The port at Greenore is located on the south side of Carlingford Lough, a location well known for its rich cultural heritage close to the entrance to Carlingford Lough, and a pinch point at that entrance between Greencastle on the north shore and Greenore Point on the south. There are no recorded archaeological sites within the footprint of the development, but the wider landscape setting highlights Greenore as a location that can retain archaeological potential. The Port itself retains elements of its nineteenth-century narrative, when it was built as a new harbour with its own railhead.

The Ordnance Survey (OS) First Edition six-inch map of the 1840s shows only a small development at Greenore Point, comprising a Lighthouse and some cottages running down the eastern shore of the Point. Carlingford Lough leads inland to the important commercial centre of Newry and is challenging to navigate with many sand bars accumulating naturally along its course, which in part explains the presence of the lighthouse complex.

The decision to construct a new harbour at this location in the late 1800s was informed by a plan to engage directly with rail and ferry services to England.[1] Construction of the harbour to the north of the lighthouse was preceded by a study of the soundings taken across the Lough, with some limited dredging of the Carlingford Bar.

The new harbour was built on an area of undeveloped land with a sand/shingle shoreline. There is no indication on the historic OS map of relict shoreline features, such as fish traps, oyster beds, shipwrecks or other features of cultural heritage interest.

The Topographical Files in the National Museum of Ireland (NMI) include reference to a collection of prehistoric-period flint flakes that are provenanced to Greenore townland (reference NMI 1975:307-583). The collection includes flint scrapers, blades, bar forms, cores and awls as well as generic flakes; the sum representing a classic range of stone tools dating most probably to the Neolithic period. There is no clear indication of where they were collected from within the townland, so a specific provenance is not known, although the Sites and Monuments Record (SMR), also known as the Register of Monuments and Places (RMP), maintained by the National Monuments Service (NMS) has identified

[1] Canice O'Mahony, 'Iron rails and harbour walls. James Barton of Farndreg', *Journal of the County Louth Archaeological and Historical Society* 22.2 (1990), pp 134–149.

one location as a possible source area (RMP LH0090-012), some 500m southeast of and outside application site and wider port area (Figure 16-2). Inspection of the location in 2007 did not reveal any indication of lithics here.[2] The flint pieces are part of a collection made by Dr Liversage and was given to the Ulster Museum by the Queen's University Belfast, and from there to the NMI in Dublin. A note in the NMI records dated 2002 calls the Greenore provenance into question, suggesting that the material may be from Greencastle, Co. Donegal, rather than Greenore, since the rest of Liversage's material (NMI 1975:279-298) is from Donegal sites.

In terms of known archaeological sites, there are no recorded RMP sites within the development area, and the closest site is that of the supposed flint scatter referred to above, located outside the development site on the beach to the southeast (Figures 16-2).

There are some 43 recorded historic shipwreck events within Carlingford Lough, based on the Historic Shipwreck Inventory maintained by the NMS, but there are none associated directly with the Port. There is however a single recorded wreck associated with Greenore, and that is the vessel *Kilkeel*, which was lost in 1892 at Greenore. The event is described as a steamship that was in a derelict state when she was noted by the lighthouse keeper at Carlingford; the vessel was driven ashore but was got off. The position was not recorded.

16.6.2 Recorded monuments, protected structures, industrial heritage sites and other features

The existing tangible cultural heritage assets speak to the development of the port area during the nineteenth century, and in the present context are principally related to a small selection of buildings. The recorded sites and features identified in the desktop review are summarised in Table 16-3 and presented in Figure 16-2. Table 16.3 also lists a series of new observations made in the course of the present study (ADCO 01–ADCO 08) (described below in 16.6.3).[3] The sites considered in Chapter 16 deal specifically with the Port area. The architectural history and sites of the village of Greenore are described in Chapter 17.

[2] Rex Bangerter, 'Underwater archaeological assessment: Phase 2 development at Greenore Port, Carlingford Lough, Co. Louth. 07D0016, 07R0067', unpublished report of the Archaeological Diving Company Ltd, 2007, p. 6.

[3] Detailed descriptions of the archaeological sites and observations are presented Appendix 16.1.

Table 16.3 Cultural Heritage Assets within Greenore Port and in proximity to the O&M facility project area (including Archaeological, Industrial & Architectural). Note the architectural history and sites of the village of Greenore are described in Chapter 17.

Reference	Site type	Status	Impacts from O&M project	Rating
NIAH 13821043; RPS Lhs 009-043	Lighthouse	Standing	None	Regional
NIAH 1321044; RPS Lhs 009-044	Lighthouse Keeper's House	Standing	None	Regional
NIAH 13831026	Hotel	Largely demolished. One wall length standing	None	Regional
NIAH 13831025; RPS Lhs 009-001	Water Tower	Standing	None	Regional
ADCO 01	Seabed			Not rated
ADCO 02	Breakwater	Standing	None	Not rated because not on NIAH
ADCO 03	Quay	Buried	None	Not rated because not on NIAH
ADCO 04	Engine Shed	Largely demolished One wall length standing	None	Not rated because not on NIAH
ADCO 05	Building	Standing	None	Not rated because not on NIAH
ADCO 06	Building	Standing	None	Not rated because not on NIAH
ADCO 07	Boundary wall	Standing	None	Not rated because not on NIAH
ADCO 08	Boundary wall	Standing	None	Not rated because not on NIAH

The two earliest sites are those of Greenore Point Lighthouse and the associated Lighthouse Keeper's House, which were constructed *c.* 1830. They are entered into the National Inventory of Architectural Heritage (NIAH), references 13831043 and 13831044 respectively, and are registered protected structures (RPS Lhs 009-043 and Lhs 009-044 respectively). The lighthouse was designed by George Halpin Senior, who designed many of the lighthouses along Ireland's east coast at this time.

As recorded on the OS First Edition map (*c.* 1840), the lighthouse and its accommodation were built at the most northern tip of Greenore Point. Subsequent reclamation works extended the shoreline to the north and west and facilitated the construction of the new harbour. The harbour was built between 1869 and 1873, when Greenore became a railhead for the London and North Western Railway. The harbour and the railhead were designed by railway engineer James Barton, who is also associated with the construction of the Boyne Aquaduct. The railhead included a large hotel that was integrated into the railway station, the whole unit reaching over 130 m in length (NIAH 13831026) and running parallel with the quayside. Only a short length of walling survives. A second railhead lay just south of the hotel, and its water tower survives as a protected structure that is today re-used as offices for Greenore Port, NIAH 13831025 (RPS Lhs 009-001).

The harbour comprises a detached breakwater (ADCO 02) constructed some 105m off the quayside (ADCO 03) (Figure 16-2). Neither the breakwater nor the quay are protected structures. The breakwater (ADCO 02) extends for over 280m in length and was furnished with the 'Green Light' navigation aid (Figure 16-3). Also recorded as a 'groyne' in modern mapping, the breakwater protects the quay from northerly weather, and may originally have served to induce tidal scour along the quayside to facilitate berthing. Historic mapping records sectional profiles through the breakwater, showing three rows of timber uprights driven in the seabed, and rubble mass added to the base, and dated 1894 and 1896 respectively.[4] It continues to offer protection to the quay from northerly weather but the history of its construction is not referred to in a paper describing Barton's role in building the harbour.[5] Barton is known to have conducted some dredging within Carlingford Lough to improve navigation access but the sources that might reveal whether this included dredging alongside the quay and in association with the breakwater are currently not known.

Figure 16.3 View looking north along east-facing side of the breakwater/groyne, ADCO 02.

The quay (ADCO 03) has been upgraded as the port developed and currently provides two berths (Figure 16-4). While the historic quay is not a registered feature, its design by James Barton in 1869

[4] Reference 028-img2319, Irish Railway Record Society, 2018.

[5] O'Mahony, 'Iron rails and harbour walls, pp 145–146.

was innovative at the time. Barton, in common with Bindon Blood Stoney in Dublin, wrestled with the concept of using mass concrete to create substantial blocks that would serve as foundations for quay walls. The use of relatively small units, weighing between 3 and 4 tonnes in weight was known, but Barton was able to lay 100-ton blocks for the sub-tidal section at Greenore, extending for a distance of 800 yards (731.52 m).[6] Blood Stoney would excel further in Dublin, where he designed 350-ton blocks to create the North Wall Quay Extension that would establish a new deepwater basin; namely Alexandra Basin. Blood Stoney's work captured the imagination of the time and is remembered as an engineering marvel of the 1880s. Barton's work at Greenore a decade earlier was part of the same innovative processes that are a hallmark of the Victorian Age.

Figure 16.4 View along façade of stone-built quay (ADCO 03) in 2017 before it was buried in the development of Berth 2. The stone work was constructed above the 100-ton blocks that served as the foundation element to the quay.

The quay has been upgraded in stages since *c.* 2000 and the old stone façade is now buried behind a combi-wall that uses driven tubular and sheet piles inserted into the seabed in front of the stone quay, with tie rods extending across the quay deck to a line of anchor piles driven through the deck. The deck level is then raised and finished with a new reinforced concrete cap.

Capital dredging has been carried out to bring the ruling depth of the berth pockets to –7.5m Chart Datum, with silt removal in 2001 and rock dredging at Berth 1 in 2015. Berth 2 was redeveloped since 2019.

[6] Ibid.

Archaeological assessment and monitoring of the ground disturbance works within the port area, the quay construction works and the associated capital dredging has taken place.[7] The monitoring that was carried out during the Berth 2 works observed a small section of intact railway line associated with the former rail head, and that section was preserved as part of the industrial heritage of the port and county.

16.6.3 Observations

16.6.3.1 Sub-tidal/Intertidal element, ADCO 01

The underwater archaeological inspection area ADCO 01 is indicated on Figure 16-2. The un-dredged areas of seabed were similar across the surveyed area. The seabed surface is made up of a sandy bottom with rounded and sub-rounded pebble and small cobble inclusions, typically measuring less than 50mm in diameter. The sandy surface outside the breakwater is gently rippled. Sea shells, including razor clam and native Irish oyster, are frequent, and there is a wide scatter of seaweed clumps throughout. There is good penetration of the surface sand up to *c.* 100mm.

The nature of the seabed changes dramatically along the dredge slope, which is angled at approximately 45 degrees and the bed levels drop rapidly from a surface depth of –2.5m to –10.5m at the base of the dredge pocket. The soft sand matrix gives way to a dark grey-coloured silty clay (marl), with occasional boulder, mussel shell and starfish inclusions. The marl is relatively soft, with penetration depth up to 1.5m experienced.

There was little evidence for debris rubbish on the seabed; a single metal bottle top (Vodka) was observed in the course of diving. The metal detection did not add further insight.

The seabed alongside the breakwater retains two loose timbers that measure up to 11m in length. The timbers retain scarf joints, lie in a haphazard manner, and are elements of the breakwater (ADCO 02) that have fallen from the structure and lie abandoned on the seabed.

The shoreline where it is proposed to develop Berth 3 has a gravel and shingle surface that rises above the sub-tidal area and presents a narrow expanse of intertidal foreshore. A line of concrete cubes set on to the foreshore forms the current boundary, with rock armour added behind the cubes to infill the ground area between the shore and the port area.

The un-dredged portion of the seabed has good holding capacity and is regarded as a stratum that retains archaeological potential. Capital dredging works are proposed as part of the proposed development, to create the berthing capacity of Berth 3 and across the pontoon area. Such works will impact on ADCO 01.

[7] Audrey Gahan, 'Greenore Harbour, Greenore, Co. Louth. 01D056', www.excavations.ie; Martin Fitzpatrick, 'Greenore Harobur. 01E0988', www.excavations.ie; Niall Brady, 'Cultural heritage assessment, Greenore Port Berrth 2, Greenore, Co. Louth. 17D0032, 17R0051', ADCO report, 2017; Colm Flynn, 'Final archaeological monitoring report for development of a new quay at Berth 2, Greenore, Co. Louth. 19E0506', 2022.

16.6.3.2 Breakwater, ADCO 02

The breakwater has two principal elements, comprising an openwork timber superstructure that stands approximately 3.5m above a rubble rock armour base that is some 1.9m high and reaches *c.* 4m east of the visible uprights (Figure 16-3).[8] The breakwater is unregistered in the cultural heritage registers.

The timber superstructure is formed of two visible lines of square-sectioned timber piles that are staggered to create a zig-zag linear formation which runs the length of the breakwater. The uprights stand to various heights and are separated by approximately 2m intervals but there are variations both greater and smaller. Historic mapping indicates a third line of uprights, which received angled braces on the south side. While the braces remain today, the third line of vertical timbers is not visible and must be buried by the rubble armour.[9] The two visible lines of vertical timber uprights are braced horizontally by a series of cross beams which form lintels at the top of the feature and also lower down where the rubble mound buries the base of the piles. The vertical piles are cut with simple scarf joins to receive the lintels, which are then fixed to the piles with iron bolts. A series of timbers also brace the vertical piles as buttresses set at 45-degree angles, and these are fixed to the piles by means of steel plates. The buttress timbers are only seen on the east-facing side of the breakwater, facing the quay, as recorded in the late nineteenth-century profile drawings.

As noted in section 16.6.3.1, two of the timber braces have fallen away and lie on the seabed off its east-facing side.

A series of steel beams fixed to the west-facing side of the breakwater at its north end appear to serve a similar bracing purpose, but they are probably a later addition as they are not continued along the length of the breakwater.

A poured concrete pier is located at the centrepoint of the breakwater's length. The pier rises almost to the same height as the timber piles. It appears to have functioned as a central anchor point.

The remains of a metal pole fitted with a circular grid lies off the north end of the breakwater on its west-facing side. This appears to have been a navigation aid that has fallen down, and may be the remnants of the Green Light fixture, or a version thereof, recorded on the historic OS map (Figure 16-2).

The base of the piles are not visible, as the base of the breakwater has a mound of granite rubble that offers rock-armoured protection to the feature. The rubble mound stands *c.* 1.9m above current seabed level and reaches *c.* 4m east of the visible extent of the timberwork. There are no obvious set stones forming a wall line and the rubble mound is substantial.

The function of the breakwater and its role in the history of the port's development is not documented in the sources accessed for the present study. It remains an integral component of the historic fabric of Greenore, and the current project will ensure that the breakwater is not impacted negatively.

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[8] Measurements based on interpolation of point cloud survey completed for the port. Measurements courtesy of McCarthy Browne consulting engineers.

[9] Reference 028-img2319, Irish Railway Record Society, 2018.

It is likely that the breakwater was constructed both to offer protection to the quay from adverse northerly weather, and to induce tidal scour alongside the quay, using the dynamic tidal conditions that exist at Greenore to maintain adequate depth for shipping berthed at the quay. When trying to secure the shipping channel into Dublin City across the tidal flats of the River Liffey, Dublin Corporation first constructed a timber breakwater that was detached from the city's quays and reached out into the active channel, between what is today Pigeon House Harbour and Poolbeg Lighthouse. Known simply as 'The Piles', the works were recorded in 1757 by the cartographer John Rocque as a parallel line of timber-post couplets. The Piles were subsequently replaced by a substantial stone wall that survives today as the Great South Wall. The Piles in Dublin are no longer visible but bear comparison with the breakwater in Greenore. If the comparison is valid, the breakwater in Greenore is a rare surviving example of maritime engineering in Ireland.

The superstructure element of ADCO 02 will not be impacted by the works associated with the proposed development during construction or operation. However, repair works to the rock armour base of the breakwater may be required. Such works may include the addition of rock armour where there are gaps or localised settlement, and reconstruction or reinforcement of the toe. The superstructure will be protected against all such impacts, direct and indirect. Those members of the superstructure that have fallen on to the seabed will be recovered during the dredging works so that they can be available to reattach to the superstructure when appropriate. A point cloud survey of the superstructure serves as a detailed baseline record of ADCO 02.

16.6.3.3 Landside inspection, ADCO 03–ADCO 08

The protected structures of the Lighthouse and Lighthouse Keeper's House survive and lie outside the development area. However, it is clear that many of the landside elements of the nineteenth-century harbour no longer stand above ground, including the historic quay (ADCO 03). Figure 16-2 shows the extent of the railhead complex *c.* 1890-1900, while the annotations describe those elements that remain standing today, and a further series of ADCO numbers are assigned to provide easy reference to them. There is cross-over of these elements with details covered in Chapter 17.

The hotel does not stand, and only an element of the railway station wall remains intact.

While the water tower stands and is used as office space, the engine shed that abutted it is largely gone, except for a wall length that serves today to separate a parking area to the south from an operational zone to the north (ADCO 04). The wall length retains a series of architectural features, including a fractured wall end, six blocked-up window opes and one blocked-up doorway ope. A point cloud survey has been carried out for the port of the standing wall length. The survey serves as a detailed baseline record of ADCO 04.

ADCO 05 is a square-shaped stone building that stands to the east of the water tower.

ADCO 06 refers to elements of the building to the north of the tower that are clearly retained within current sheds.

The boundary wall that defines the curtilage of the Lighthouse and Lighthouse Keeper's House also warrants inclusion (ADCO 07).

Review of the 1890-1900 OS map shows further boundaries to the south along Shore Road and a row of buildings that no longer survive. ADCO 08 refers to the boundary wall on Shore Road that retains stretches of stone construction that would be original features, while other elements have been replaced with breeze-block walling.

Elsewhere across the operational area of the port, there is little evidence of former structure standing, with the space occupied either by modern sheds and silos or as open surface.

The four standing structures that are proposed to be demolished as part of the development comprise the former Open Hydro works building; part of the port's office accommodations; an ESB substation, and an unoccupied residential bungalow built before the 1970s. None of these four structures retain cultural heritage interest but consideration should be given to monitoring their demolition in the event that buried horizons are observed in the foundation levels of same.

16.6.3.4 Conclusions

Greenore Harbour is historically an important construction of the late 1800s, as one of few new-build harbours in Ireland at that time. Its construction was developed under the watchful eye of renowned railway engineer James Barton.

The surveyed area was inspected comprehensively above and below the waterline.

16.7 The 'Do Nothing' Scenario

In a 'Do Nothing' scenario, the existing baseline environment may be changed in accordance with the extant permissions for Greenore Port as permitted developments; namely:

i. Extension and modification of existing Warehouse, LCC Planning Ref 20268, ABP Ref 307862
ii. New Warehouse, LCC Planning Ref Planning ref 20543, ABP Ref 310184

In the case of LCC Planning Ref 20268, ABP Ref 307862, which considers the demolition of the Open Hydro building, the opportunity will be presented to monitor archaeologically the ground surfaces that will be exposed in the course of said demolition, and record any features that may be exposed in the course of such works. Such is likely to expose elements of the former railhead that have not been recorded prior to the construction of the warehouse.

In the case of LCC Planning Ref 20543, ABP Ref 310184, permission was granted to demolish the remaining upstanding wall element of the former railway hotel (NIAH 13831026), and the Engine Shed wall recorded in this chapter as ADCO 04.

The demolition of the upstanding wall element of the former hotel is not proposed as part of this development and is outside the application site boundary. The Engine room wall is being kept in the proposed development and incorporated into the landscape design.

16.8 Potential Significant Effects

Impact/effect categories devised by the Environmental Protection Agency (EPA) for archaeological matters are categorised as having a direct impact, an indirect impact or as having no predicted impact. Each impact is qualified both in terms of magnitude of impacts (high, medium, low) and in terms of significance of impacts by being considered profound, significant, moderate, slight or imperceptible. The duration of effects is also assessed in terms of a scale ranging from temporary to permanent.[10] The impacts assessed for the O&M facility project are summarised in Table 16-4.

Table 16.4 Impact assessment on Cultural Heritage Assets and locations within the Greenore Port and the O&M facility project area (including Archaeological, Industrial & Architectural).

Reference	Site type	Status	Impacts from O&M project	Impact Magnitude	Impact Significance[11]
NIAH 13821043; RPS Lhs 009-043	Lighthouse	Standing	None	n/a	n/a
NIAH 1321044; RPS Lhs 009-044	Lighthouse Keeper's House	Standing	None	n/a	n/a
NIAH 13831026	Hotel	Largely demolished One wall length standing	None	n/a	n/a
NIAH 13831025; RPS Lhs 009-001	Water Tower	Standing	None	n/a	n/a
ADCO 01	Seabed	Un-dredged	Dredging Piling	High	Direct, Negative, Signficant, Permanent
ADCO 02	Breakwater	Standing	Repair works to rock armour	Medium	Direct, Positive, Moderate, Permanent
ADCO 03	Quay	Buried	None	n/a	n/a
ADCO 04	Engine Shed	Largely demolished One wall length standing	None	n/a	n/a
ADCO 05	Building	Standing	None	n/a	n/a
ADCO 06	Building	Standing	None	n/a	n/a

[10] EPA 'Guidelines for Information to be Contained in EIAR' 2022, 'Guidelines on the information to be contained in Environmental Impact Statements', 2002; 'Advice notes on Current Practice (in preparation of Environmental Impact Statements), 2003 and Revised Draft 2015, EPA; and Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes, 2006, National Roads Authority.

[11] Following impact/effect categories devised by the EPA; see note 9 above.

Reference	Site type	Status	Impacts from O&M project	Impact Magnitude	Impact Significance[11]
ADCO 07	Boundary wall	Standing	None	n/a	n/a

The majority of the cultural heritage assets listed in Table 16-4 will not be impacted by works associated with the O&M facility. However, the proposed works will have impacts on the seabed (ADCO 01) by way of capital dredging and marine piling. Such works will require archaeological mitigation, while the landside works present the opportunities for archaeological monitoring and recording.

16.8.1 Demolition Phase

The demolition of the four modern standing structures (namely, the former Open Hydro works building; part of the port's office accommodations; an ESB substation, and an unoccupied residential bungalow built before the 1970s) represent direct impacts. Archaeological monitoring will be carried out to observe, record and recover any material of archaeological interest that occurs.

16.8.2 Construction Phase

While the breakwater (ADCO 02) superstructure will not be impacted, repair works to the rock armour base of the breakwater may be required. Such works may include the addition of rock armour where there are gaps or localised settlement, and reconstruction or reinforcement of the toe. Such impacts will be considered direct and positive impacts insofar as they will help to further stabilise the structure. They should be limited in scope and consequently may be deemed to be moderate in scale and will be permanent in nature. Archaeological monitoring will be carried out to ensure the opportunity is present to observe, record and recover any material of archaeological interest that occurs.

Construction of new buildings, car park and the landscaping proposed along the southern perimeter of the Port area have the potential to expose previously unrecorded archaeological levels and archaeological monitoring will be carried out to observe, record and recover any material of archaeological interest that occurs.

16.8.3 Operational Phase

It is not anticipated that impacts will occur during the operational phase. However, should impacts, direct and indirect, occur, an Archaeology Management Plan will be in effect to ensure the observation, recording and recovery of any material of archaeological interest that occurs at this time.

16.8.4 Cumulative Effects

The cumulative assessment takes into account the impacts associated with the proposed development together with other proposed and reasonably foreseeable projects, plans and existing and permitted projects. The projects and plans selected as relevant to the cumulative assessment presented within this chapter are based upon the results of a screening exercise that draws on Planning applications; Strategic Infrastructure Developments (SIDs); EPS licence applications; Local Area plans and

Aquaculture licenses (listed in Appendix 1-1 of this EIAR). Each project and plan has been considered on a case-by-case basis for screening in or out of this chapter's cumulative assessment.

Extant planning permissions within the project area are screened out because it is not feasible to implement previously granted permissions in combination with the subject scheme. There are no planning applications located within the archaeological study area that need to be screened in.

There are no SIDs within the archaeological study area that need to be screened in.

There are no EPA licenses within the archaeological study area that need to be screened in.

The subject site is located within the functional area of Louth County Council and is governed by the Louth County Development Plan 2021-2027 (LCDP), which was adopted by the members of Louth County Council (LCC) at a Special Council Meeting on the 30th of September 2021. The Plan came into full effect on the 11th of November 2021.There are no further Plans such as Local Area Plans in place within the archaeological study area.

Sixteen (16) no. Licensed Aquaculture Sites were identified within a 1.5 km Zone of Influence (ZoI) from the subject site at Greenore, Co. Louth, of which three sites, T01-026A, T01-089A and T01-044A are located within 500m of the proposed marine dredging and pontoon construction site. Licences T01-026A and T01-089A are granted to Keenan Oysters Ltd, and T01-044A to Carlingford Oyster Company Ltd.

The sensitivity of the aquaculture sites are deemed to be of high vulnerability. The sensitivity of the receptor is therefore considered to be high.

No intrusive works will take place within the Aquaculture licensed areas. The cumulative impact is predicted to be of local spatial extent, short term duration, intermittent and low reversibility. It is predicted that the impact may affect the receptor indirectly. The magnitude is therefore, considered to be negligible.

Overall, the magnitude of the cumulative impact is deemed to be negligible and the sensitivity of the receptor is considered to be high. The cumulative effect will, therefore, be of slight adverse significance, which is not significant in EIA terms.

16.8.5 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 16.5 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Seabed, ADCO 01	Moderate	Significant	Slight	Moderate	Permanent	Dredging and piling activities
Breakwater, ADCO 02	Moderate	Significant	Slight	Low	Permanent	Dredging activities
Landside ground works	Moderate	Moderate	Moderate	Moderate	Permanent	Demolition works exposing buried surface levels

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 16.6 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Seabed, ADCO 01	Moderate	Imperceptible	Slight	Low	Permanent	Dredging and piling activities
Breakwater, ADCO 02	Moderate	Imperceptible	Slight	Low	Permanent	Dredging activities

16.9 Mitigation

16.9.1 Incorporated Design Mitigation

No specific design mitigation measures are being proposed.

16.9.2 Demolition Phase Mitigation

The following archaeological monitoring and management measures will be undertaken:

- An archaeologist experienced in maritime archaeology will be retained by the developer for the duration of the relevant works i.e. all terrestrial, inter-tidal/foreshore and seabed disturbances associated with the development.

- An Archaeology Management Plan will be prepared by the archaeologist to prepare the protocols that ensure proper management and response to archaeological monitoring, recording and resolution that will be required in the course of the project.

- Archaeological monitoring will be carried out by suitably qualified and experienced maritime archaeological personnel licensed by the DHLGH. Archaeological monitoring is conducted during all terrestrial, inter-tidal/foreshore and seabed disturbances associated with the development. The monitoring will be undertaken in a safe working environment that will facilitate archaeological observation and the retrieval of objects that may be observed and that require consideration during the course of the works. The monitoring will include a finds retrieval strategy that is in compliance with the requirements of the National Museum of Ireland.

- Archaeological licences for monitoring and site investigations of terrestrial and nearshore environments will be acquired from the Department of Housing, Local Government and Heritage (DHLGH), as necessary.

- Discovery of archaeological material. In the event of archaeologically significant features or material being uncovered during the construction phase, machine work will cease in the immediate area to allow the archaeologist/s to inspect any such material.

- Archaeological material. Once the presence of archaeologically significant material is established, full archaeological recording of such material will be recommended. If it is not possible for the construction works to avoid the material, full excavation will be recommended. The extent and duration of excavation will agreed with the licensing authorities.

- Archaeological dive team. Where any archaeologically significant/potential material is identified in the course of the seabed disturbance activities, these works will stop pending a dive inspection by an archaeological dive team. The dive team would deal with any rescue excavation required. The dive team and all in-water work will conform to the Port's safety protocols for Diving at Work. .

- Secure wet storage facilities will be provided on site to facilitate the temporary storage of artefacts that may be recorded during the course of the site work.

- Buoying/fencing of any such areas of discovery will be necessary if discovered during excavation.

- Machinery traffic during construction will be restricted to avoid any identified archaeological site/s and their environs.

- Spoil will not be dumped on any of the selected sites or their environs.

- All site work will be conducted in strict compliance and accord with STATUTORY INSTRUMENTS: S.I. No. 299 of 2007: Safety, Health and Welfare at Work (General Application) Regulations, 2007; and STATUTORY INSTRUMENTS: S.I. No. 254 of 2018 as amended by S.I. No. 180 of 2019, HSA Safety, Health and Welfare at Work (Diving) Regulations, 2018-2019, where required.
- Post-construction project report and archive. It is a condition of archaeological licensing that a detailed project report is lodged with the DHLGH within 12 months of completion of site works. The reports will be particular to each licence granted. The reports should be to publication standard and should include a full account, suitably illustrated, of all archaeological features, finds and stratigraphy, along with a discussion and specialist reports. Artefacts recovered during the works need to meet the requirements of the National Museum of Ireland in terms of recording, conservation and storage

16.9.3 Construction Phase Mitigation

Archaeological monitoring of the ground and seabed works associated with the Berth 3 upgrade, the dredge works and the piling activities associated with the pontoon, with the proviso to resolve fully any material of archaeological interest recovered at that point.

Dredging in the vicinity of the breakwater to ensure that the dredging does not undermine the base of the breakwater and avoid impacts to superstructure.

16.9.4 Operational Phase Mitigation

There are no potential significant archaeological issues predicted during the operational phase and therefore no mitigation is required.

16.10 Residual Impact Assessment.

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

It is not anticipated that there will be residual impacts on Archaeology arising from the proposed development.

16.11 Risk of Major Accidents or Disasters

It is not anticipated that there will be risk of impacts on Archaeology arising from the vulnerability of the project to risks of major accidents or disasters.

16.12 Interactions

This chapter on interacts most closely with Chapter 17 Cultural Heritage: Built heritage.

16.13 Monitoring

The mitigation measures included in Section 16.9 include a number of monitoring requirements during the construction phase. No monitoring is proposed for the operational phase.

16.14 Summary of Mitigation and Monitoring

A summary of mitigation and monitoring measures is included in Chapter 19 of this EIAR.

16.15 Conclusion

Greenore Harbour is historically an important construction of the late 1800s, as one of few new build harbours in Ireland at that time. Its construction was developed under the watchful eye of renowned railway engineer James Barton.

The surveyed area was inspected comprehensively above and below the waterline.

Much of the historic fabric of Greenore Harbour is now lost to view. This report identifies those elements that are still visible above ground in addition to the three protected structures.

Impact avoidance is the principle mitigation recommended. Where impacts are required, archaeological monitoring is the mitigation recommended. Archaeological monitoring is licensed by the Department of Housing, Local Government and Heritage through the National Monuments Service.

16.16 References and Sources

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CHAPTER 17

CULTURAL HERITAGE: BUILT HERITAGE

VOLUME II

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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17 Cultural Heritage: Built Heritage

17.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on the built heritage of the historic village of Greenore, Co Louth.

It should be read in conjunction with EIAR Chapters 1,2 & 16 of this EIAR, along with the design statement and other plans and reports submitted with the planning application.

17.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Fergal Mc Namara of 7L Architects.

Fergal Mc Namara MRIAI is a RIAI Grade 1 Conservation Architect with over twenty years of experience in building conservation. He founded 7L Architects in 2018 and has an interest in industrial heritage, with projects for transport, mining and food production sites, as well as coastal built heritage. His thesis (M.Arch.Sc 2002. UCD) was on the urban morphology of Dublin's Docklands.

He has experience in the preparation of Architectural Impact Assessments in a wide range of contexts and has contributed to EIARs for the following projects:

- Ballinasloe Flood Relief Scheme
- Bus Connects
- Maynooth Transfer Pipeline

17.3 Proposed Development

A full description of the proposed development is provided in **Chapter 2** of this EIAR. The following is a summary of the proposed works:

Greenore Port Unlimited Company intend to apply for a 10-year permission for development at Greenore Port and site of dwelling house on Shore Road (A91DD42), Greenore, Co. Louth, (total site area c.4.88 hectare).

The development will provide for Operations and Maintenance (O&M) Facilities serving as a support base for future offshore windfarm projects. In general, it will comprise of terrestrial (landside) and nearshore works, with three standalone buildings incorporating office, warehouse and ancillary space landside and a pontoon to accommodate Crew Transfer Vessels (CTVs) marine side. To facilitate the proposed development, dredging within the nearshore and the demolition of existing port buildings and a vacant residential property is required.

The Operations and Maintenance Facilities (OMF) will provide twenty-four-seven, year-round support, to three individual offshore renewable energy (ORE) projects that will be owned and operated by entities separate from the applicant. These ORE projects will consist of offshore windfarms on the East Coast of Ireland.

Three standalone operation and maintenance buildings incorporating office, warehouse and ancillary space (canteen, welfare, plant, cycle parking etc.) are proposed within the 'terrestrial port' area. Each building has a gross floor area of c.1,670 sq.m and a maximum height of 13.5m.

A new quay wall will be developed at Berth 3 (70m length). This will include a new quay wall face and upgraded deck. A pontoon will be constructed to accommodate crew transfer vessels (CTVs), for use by the operators to travel out to the offshore windfarms. The CTV's will be accessed via an access ramp connected to the quay wall and deck. Approx 45,000m^3 of material will be dredged to facilitate navigable access at this location, and it will be disposed of on land. Where rock is encountered (estimate max of 1,000m^3), it will be reused on site.

Adjacent to the buildings, space is allocated for 76 car parking spaces, with a further 135 spaces proposed in the surface carpark at the 'Residential Site' on Shore Road. The existing carpark associated with the former Open Hydro building (60 spaces) will be used during the construction phase and Phase 1 of the development.

Pedestrian and motor vehicle access is via the existing entrance beside the Port's office, which served the previous Open Hydro development. Heavy goods vehicles will access the buildings via the Port's existing heavy goods entrance on Shore Road (R175). Pedestrian access from the surface carpark to the OMF buildings will be provided along a new pedestrian route within the Port's landholding.

To facilitate the development, demolition works are required, including the former Open Hydro building, an ESB substation, a small portion of the Port's office accommodation and the vacant dwelling at the 'residential site' on Shore Road.

Improvement works to the public / private realm in the foreground of the existing Greenore Port office building will comprise of an enhancement to existing road and pathways to facilitate improved pedestrian and vehicular access to the proposed O&M Facilities, a new feature entrance wall, removal of 6 no. port car parking spaces, link to new pedestrian route from the new Shore Road carpark and hard and soft landscaping. These works are located within the Greenore Architectural Conservation Area (ACA). The aim is to redesign the space to improve the character of the ACA at this point; provide a more user friendly space with pedestrian priority; and improve the existing access arrangements to the site. Inside the proposed main entrance to the site, it is proposed to integrate the existing engine room wall and include this as a feature within the landscape design.

Ancillary development will include the installation of drainage infrastructure, landscaping, lighting, signage, boundary treatments, rooftop solar photovoltaic panels, an ESB substation, a communications mast, a bunded fuel storage tank and waste management areas etc.

The infrastructure described above will likely be delivered over two phases. However, this could extend to three phases, or the sequence of the works may vary, depending on the delivery of future ORE projects and the associated Offshore Renewable Energy Auctions.

The proposed scheme is distributed over several individual plots, and for ease of reference, they are described as follows:-

1. **'Terrestrial Port Area'**, (c.1.9ha) which includes, a port commodity warehouse (former Open Hydro building), hardstanding areas, remnant wall associated with the pre-existing 'engine room', and a communications mast.
2. **'Nearshore Environment'** (c.2.3ha) encompassing part of Carlingford Lough and an existing caisson quay wall, known as 'Berth 3'.
3. **'Residential Site'** (c. 0.5ha) a greenfield site with a single-storey unoccupied residential dwelling with frontage to the R175, Shore Road.
4. **'Port Office Entrance'** (c. 0.18ha) encompassing a portion of the existing office building, known as the 'Seafarers room', hardstanding and parking area to the front of the port office with pockets of green space, that front Euston Street.

The following is a general location plan of the plots identified above.

Figure 17.1 Development Areas

17.3.1 Aspects Relevant to this Assessment

Proposals for new facilities at Greenore Port will involve changes to the wider setting of an Architectural Conservation Area and a number of protected structures. No protected structures are located within the boundary of the proposed site area.

17.4 Methodology

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17.4.1 Site Surveys & Investigations

To inform this impact assessment, a field survey was undertaken in October 2023 of the proposed site area and the Architectural Conservation Area along with protected structures within the environs. Structures of interest were photographed as well as key views within the site area and its environs and the ACA. Prior to and following this survey, available online resources were accessed so that the historical background to the village could be better understood. We also consulted and gave advice to the design team as they developed their proposals in relation to potential impacts on the built heritage and possible mitigations.

The baseline study comprised a comprehensive desktop review of existing heritage datasets within the Study Area, which established the baseline cultural heritage sites. Sources included:

- Sites and Monuments Record (SMR), compiled and maintained by the Archaeological Survey of Ireland (ASI) unit of the NMS;
- NIAH Building Surveys, for details regarding buildings, structures, demesnes, designed landscapes and historic gardens of architectural importance;
- Louth County Development Plan (2016-2022) for Greenore ACA;
- Ordnance Survey Ireland for historic cartographic and aerial image sources;
- Online aerial image sources (e.g. Google Earth, Apple Maps);
- Previous reports containing relating to the historic environment of the Site.
- National Library Digital Collection Photographs

17.4.2 Relevant Legislation & Guidance

The Department of Housing, Local Government and Heritage (DHLGH) is responsible for the conservation, preservation, protection and presentation of the cultural heritage of Ireland. The protection of archaeological heritage is the responsibility of the National Monuments Service (NMS); architectural heritage being the responsibility of the Built Heritage Policy Section including the Architectural Heritage Unit (AHU) and the National Inventory of Architectural Heritage (NIAH). Relevant legislation includes:

- National Monuments Acts, 1930 to 2004;
- Heritage Act, 1995;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999;
- Planning and Development Acts, 2000 to 2020;
- Convention concerning the Protection of the World Cultural and Natural Heritage (1972);
- Louth County Development Plan 2021-2027;
- Greenore Architectural Conservation Area (15, Appendix 11, LCDP 2021-2027)
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022) – EPA;
- Framework and Principles for the Protection of the Archaeological Heritage (1999);

17.5 Difficulties Encountered

There were no difficulties encountered in our field survey for accessing or viewing relevant sites or their settings, sufficient for the preparation of the built heritage assessment in this chapter.

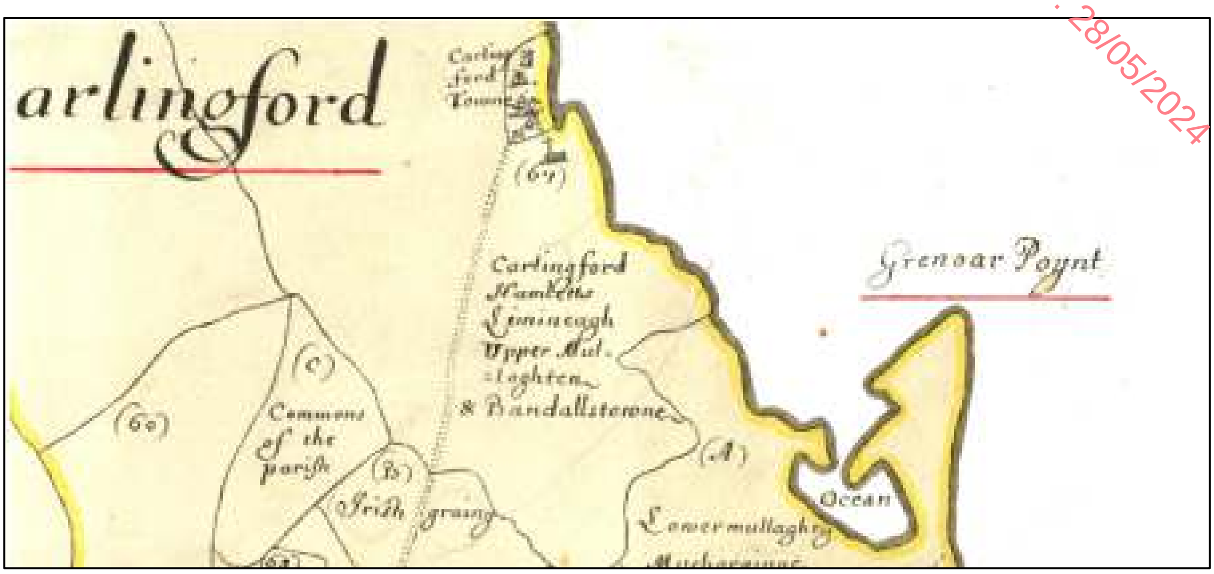

Figure 17.2 Extract from Down Survey map of 1655 in the barony of Dundalk Lower showing Grenoar Poynt (source www.downsurvey.tcd.ie)

17.6 Baseline Environment

17.6.1 Historic Origins

Greenore (an Ghrianfoirt) is a planned village located at the entrance to Carlingford Lough. It is thought that its name means 'sunny-port' for its open aspect and deep natural port or 'sandy bank' where flint shards (SMR ref. LH009-012----) were left on the beach in prehistoric times. Shown as *Grenoar Point* on the 1655 Down Survey map, the spit reaches north to form the mouth of the Lough. Nearby Carlingford was a Norse port settlement and a thriving town from the twelfth century overlooked by King John's Castle.

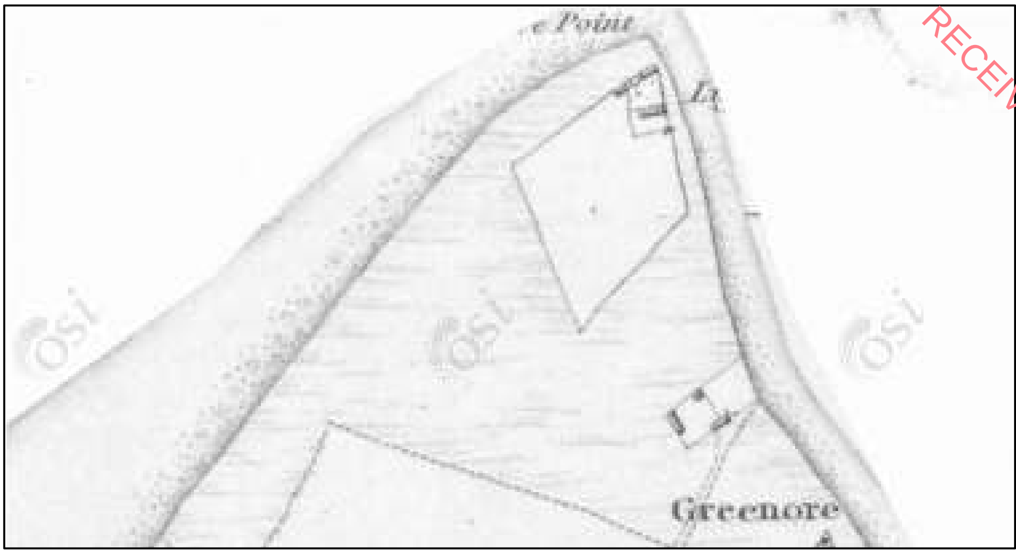

Figure 17.3 Extract from First Edition six-inch scale Ordnance Survey map of ca. 1840 showing Greenore Point following the construction of the lighthouse and the coastguard station (source archaeology.ie).

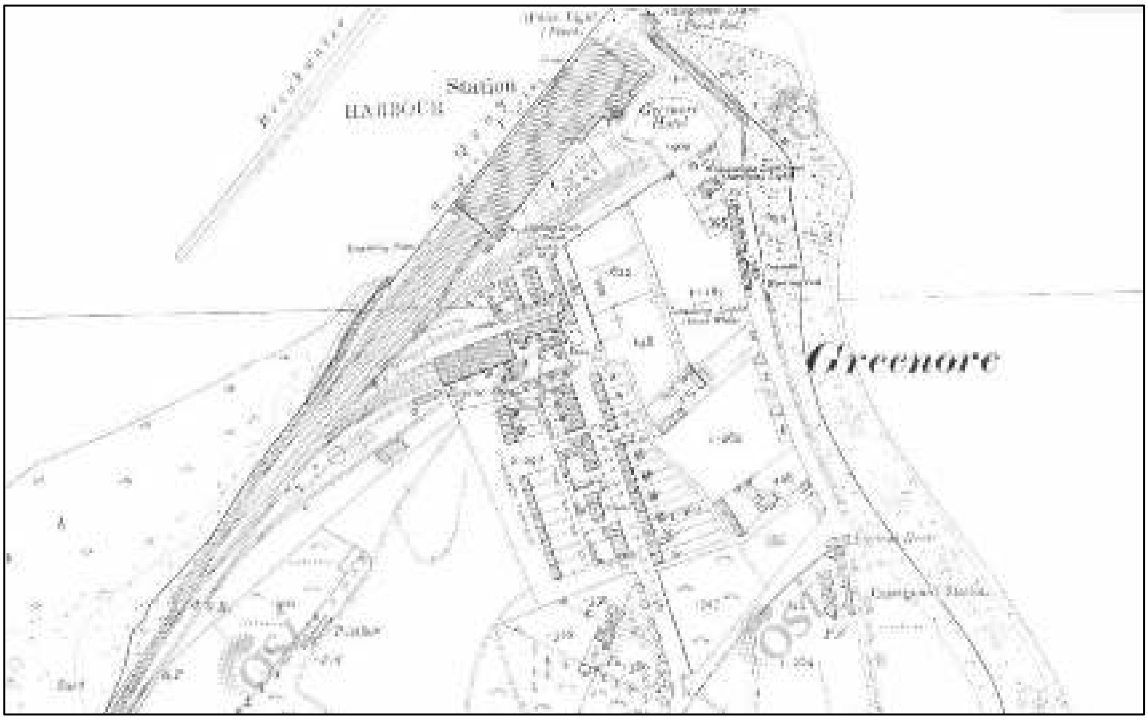

Figure 17.4 Extract from First Edition 25-inch scale Ordnance Survey map of ca. 1900 showing the village of Greenore and its port with railway station following the extensive development of the 1870s.

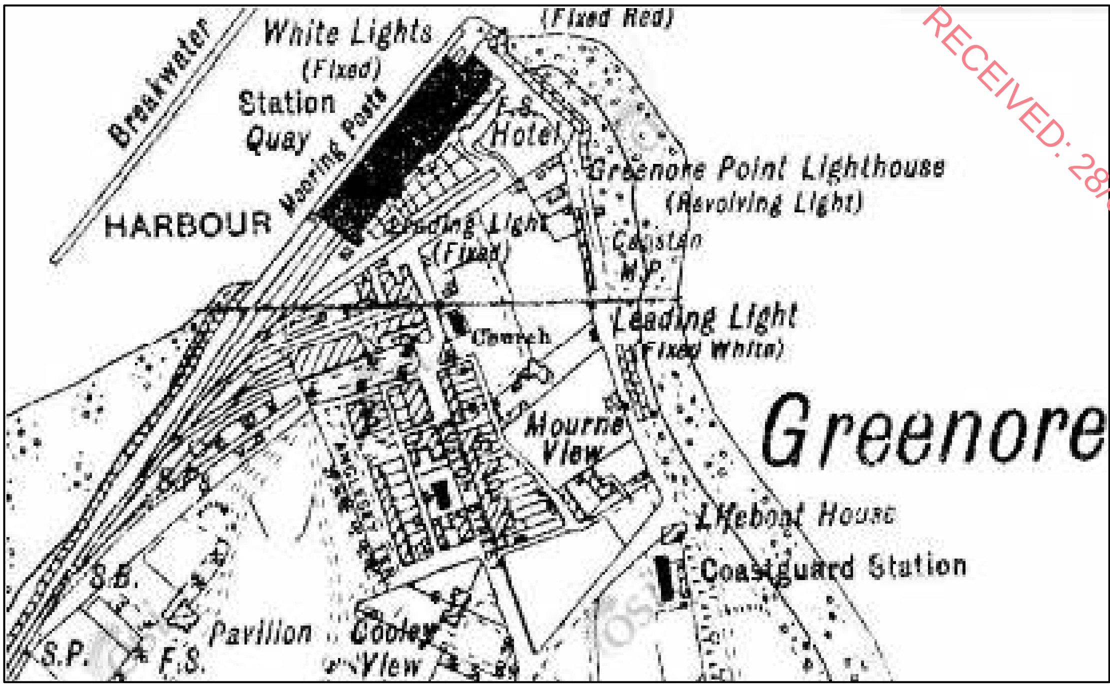

Figure 17.5 Extract from Last Edition 25-inch scale Ordnance Survey map of ca. 1950 showing little change other than the addition of a church close to the port entrance which has long been removed.

17.6.2 Lighthouse & Coastguard Station (1830s)

There was little development at Greenore until a lighthouse (NIAH reg. 13831043) and the keeper's cottage (NIAH reg. 13831044) was constructed in 1830 to the designs of George Halpin Snr. A group of five coastguard houses (NIAH reg. 13831038-42) along with a boathouse were built soon afterwards along the beach to the south with views out to sea from their upper levels but facing towards the new road.

17.6.3 Port & Railway (1870s-)

A new coastal railway planned by the London & North-Western Railway linking Dundalk via Greenore to Newry was commenced in 1863 and was completed by 1876. It was essentially a spur of the Great Northern Railway to serve a new deepwater port sheltered by a breakwater for passenger services from Britain. Land was reclaimed behind new quays walls upon which a - railway station; hotel; cattle pens; cranes; signal box; goods and engine sheds were erected over a short period of development involving a large amount of investment.

This port was constructed by 1867 and served Hewsham and Fleetwood in Lancashire initially, later serving Holyhead on the island of Anglesey in Wales and another service across the Lough to Greencastle. Railway services at the port ceased in 1952, along with ferry traffic, with freight shipping slowly recovering over the following decades.

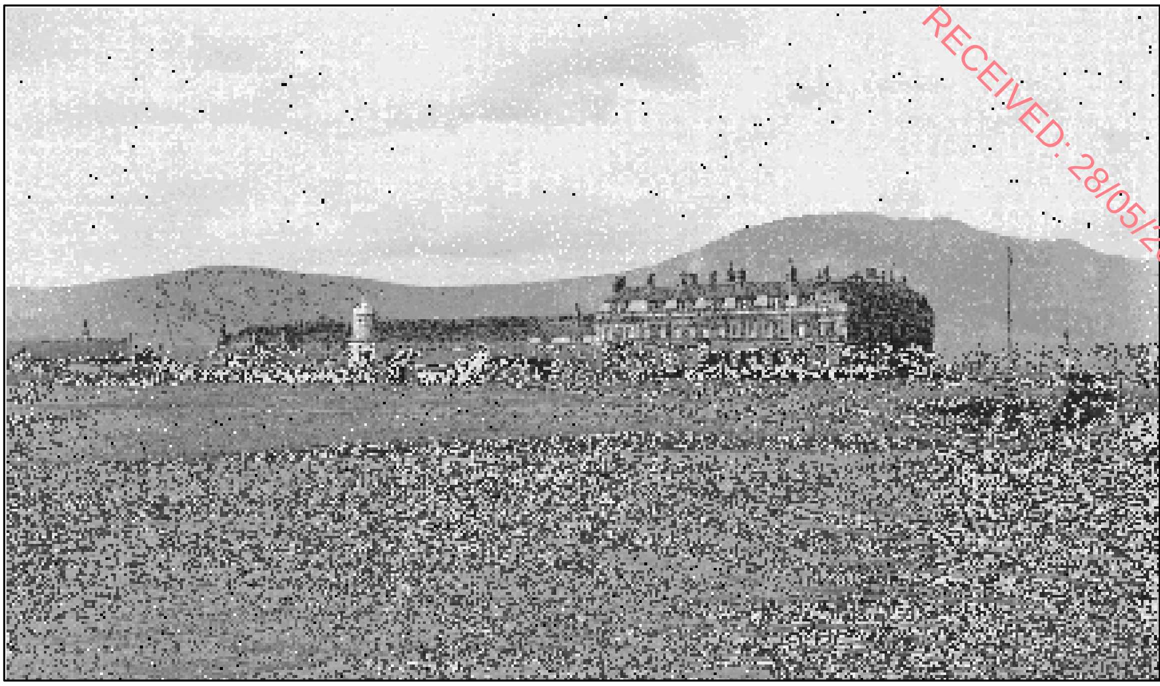

Figure 17.6 View of former railway hotel, railway station, lighthouse in the early twentieth century (source www.nli.ie)

Figure 17.7 View along Euston Street ca. 1900 prior to the prominent brick chimney being removed (source www.nli.ie)

17.6.4 Greenore Village

Alongside the port and railway station, a purpose-built village was constructed by the London & Northwest Railway to house company staff. James Barton (1826-1913), the railway company engineer was the principal designer of the port. He laid out two streets that were named after popular destinations. The principal is Euston Street (NIAH reg. 13831007-31) which was constructed on axis with the port entrance and named for the London railway station. Consisting of two-storey terraced houses to the east side, there is a mixture of larger terraced houses with the addition of a schoolhouse and a house for the master; the Greenore Co-operative Society & assembly rooms; constabulary barracks; to the west side. Anglesey Terrace runs parallel to the rear (west) of Euston Street, separated by a narrow lane. A terrace of eight modest terraced houses (NIAH reg. 13831033) and a short terrace of larger houses (NIAH reg. 13831034-37) have been joined in recent decades by replica infill dwellings. On the approach to the village, larger houses on expansive gardens were constructed for senior staff (NIAH reg. 13831005-6). A golf course was developed at the port in 1896, overlooked by Arts & Craft houses (known as *The Bungalows*) in 1895 (NIAH reg. 13831001-4), attributed to the designs of railway architect WH Mills (1834-1918).

17.6.5 Later Development

The former railway hotel (NIAH reg. 13831026) faced out over the point, partially screening and forming the entry into the station hall. Both of these structures have been removed, with a length of the western wall of the station left standing in the modern port. Another prominent landmark that was removed from the port was the brickwork chimney that terminated the view along Euston Street. The most prominent survival of the railway is the three-stage limestone and brick water tower (NIAH reg. 13831025). A nearby iron oil tank on a limestone base, now covered by ivy and supporting signage for the port which is not included on the NIAH or included on the Record of Protected Structures. Behind a gate, a section of the former engine room survives to the southwest of the water tower. This wall stands approximately 3m in height and approximately 40m in length. Now freestanding, it is the sole standing survival of built heritage within the site area and is not included on the NIAH survey or the Record of Protected Structures.

Figure 17.8 Recent view along Euston Street towards the port entrance.

Figure 17.9 Recent view of parking area to the south of the water tower and port entrance.

Figure 17.10 View of the historic water tower (NIAH reg. 13831025) with the seafarer's rooms to the south and modern office block to the east.

Figure 17.11 View of the historic water tower (NIAH reg. 13831025) with the seafarer's rooms to the south and modern office block to the east.

Figure 17.12 Recent view of south side of historic oil tank and modern office block at port entrance.

Figure 17.13 Recent view to NE corner of historic oil tank that is not included in the NIAH or RPS.

Figure 17.14 View looking eastward along surviving engine room wall towards water tower and seafarers' rooms.

Figure 17.15 View looking towards west end of engine room wall.

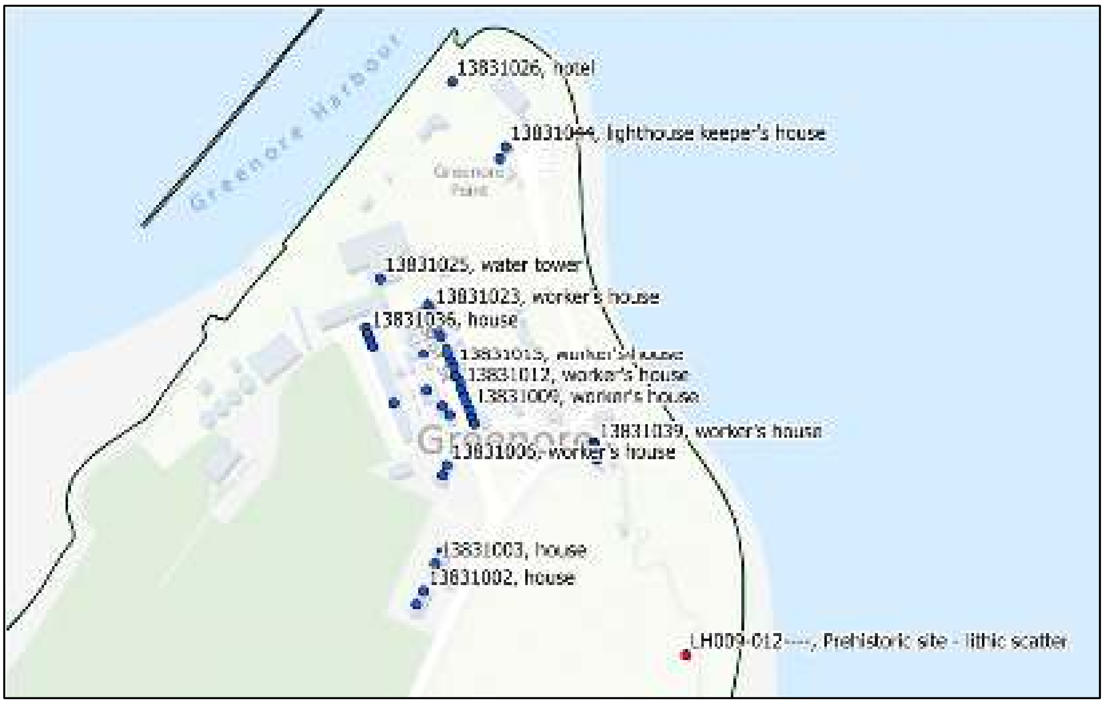

Figure 17.16 Map extract from National Inventory of Architectural Heritage Co Louth Survey (source www.buildingsofireland.ie)

17.6.6 Surviving Built Heritage

Greenore village is recognised as one of the most architecturally significant planned industrial villages in the country. It contains fine examples of domestic and civic architecture laid out to a coherent plan in a good state of preservation. Buildings are well-designed and robustly constructed using quality materials such as yellow and red brick dressings and chimneys; squared limestone rubble with fine granite quoins, smooth, ruled ashlar render and slate roofs with carved timber barges, cast iron rainwater goods and terracotta ridges. Brick details and timber joinery representative of this period has survived well to some of the buildings although there are unfortunate examples of where PVC or aluminium has been used as replacements. Historic street surfaces have generally been replaced; cast iron lanterns are modern.

17.6.7 Statutory Protections

The built heritage significance of this village has been recognised in its designation as an Architectural Conservation Area (ACA). Its coastal industrial heritage in the form of the lighthouse, keeper's and coastguard housing has survived but following the cessation of services in the mid-twentieth century, the railway and ferry built heritage has been reduced to isolated fragments. The ACA boundary is limited to the coastguard and lighthouse buildings and the residential and civic buildings of Greenore. Of the former railway and port buildings, only the water tower and nearby oil tank are within the ACA boundary, along with the modern office block placed in front of the goods shed wall in between. Between the two tanks is a two-storey wing containing offices with textured concrete block facing of modest built heritage value. Another similar modern single storey wing to the south of the water tower contains the seafarers' rooms is proposed to be partially demolished to widen the entrance gates.

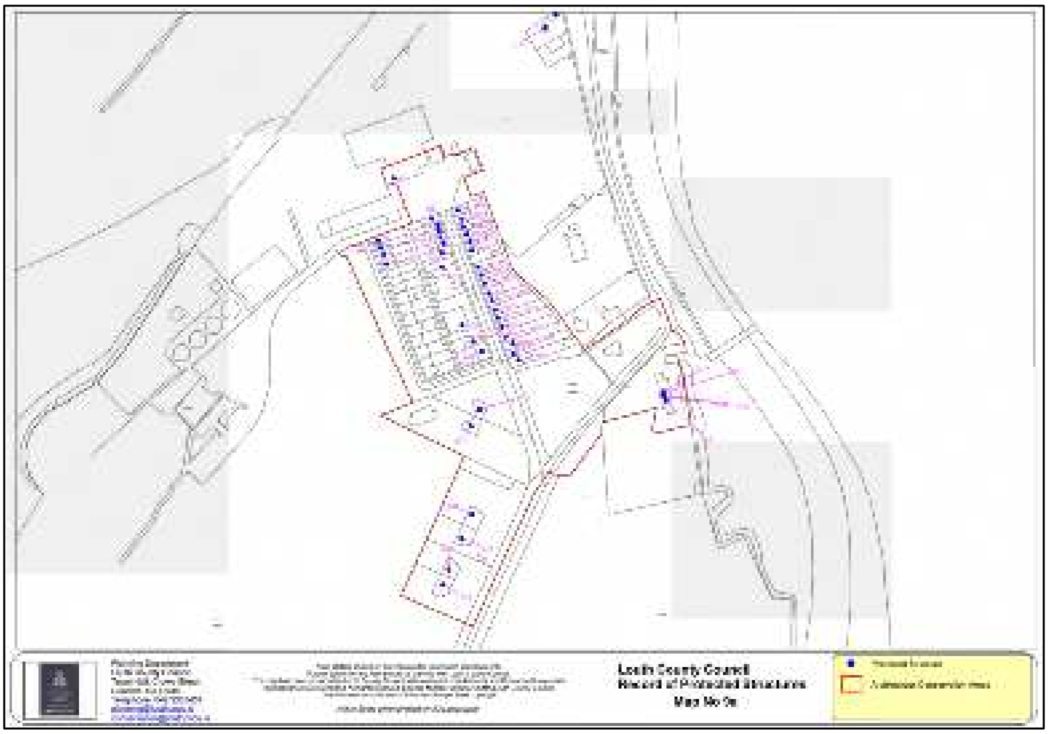

Figure 17.17 Map No9a from Louth County Development Plan showing ACA boundary and protected structures (source www.louthcoco.ie)

The ACA states that - *Greenore is an outstanding example of a purpose-built, English-style industrial village in a coastal setting. The stone and brick terraces of Euston Street, brick schoolhouse, and timber frame bungalows are one of the finest groupings in Ireland.*

Two views are protected in the ACA:

1. *Along Euston Street, north to the Mournes.*
2. *Eastward from the coastguard houses and the seafront.*

Objectives of the ACA are as follows:

1. To preserve the special character of the village and its setting through positive management of changes to the built environment, in particular, by requiring that the height, scale, design and materials of any proposed development within the village and in the surrounding area should complement the character of the village and not diminish its distinctiveness of place.
2. To protect the landscape setting of the village and the views outwards.
3. To preserve the historic street pattern and character of the village, by the retention of buildings and materials as described above, and the retention of existing boundary features, walls, and railings.
4. To require the preservation and reinstatement of traditional details and materials on existing buildings and in the streetscape where improvements or maintenance works are being carried out.
5. To use appropriate materials, street furniture and lighting in any public development of the area.

In the Record of Protected Structures included in the Lough County Development Plan 2021-2027, fifty-five different structures are protected, terraces being included as groups under thirty-one separate entries. Not included are the more modern houses to the south end on Anglesey Terrace that are included on the NIAH Survey, rated as Regional Interest. A historic tank of similar design and materials to the east of the water tank is not included on the NIAH or RPS. There are no protected structures or NIAH sites located within the proposed site area. The station and engine room are now represented by the free-standing brick and limestone wall; the hotel having been demolished. Stores along the seafront have been reduced down to painted boundary walls for extensive yards for stockpiling freight. The half-timbered golf pavilion has been replaced, and the tall brick chimney that once terminated the vista along Euston Street demolished.

17.6.8 Conclusion

Our assessment of the baseline environment is summarised as follows:

Context: Greenore is located on a sandy point at the entrance to Carlingford Lough to the northeast of County Louth.

Character: Greenore is a coastguard station, planned village and port, once serving a railway and passenger ferries, that developed in two main phases in the 1830s and 1870s. Although no longer functioning as a ferry port or railway, it remains a thriving place to live and a busy working port for freight.

Significance: Greenore is one of the most intact and best preserved examples of an industrial planned town in the country, recognised by the number of protected structures and its designation as an Architectural Conservation Area.

Sensitivity: Given the developments in transport and industry over the one hundred and fifty years since the village was constructed, Greenore has suffered losses to its built heritage. While statutory protections are now in place, risks of cumulative losses could be considered to remain, as well as risks to the settings of the historic structures in the village and port.

17.7 The 'Do Nothing' Scenario

If the Proposed Development does not proceed, i.e. the 'do-nothing' scenario, there would be no change to the existing baseline environment. However, Greenore Port has existing permitted developments that might be progressed as follows -

- **LCC Planning Ref 20268, ABP Ref 307862** Extension and modification of existing Warehouse.
- **LCC Planning Ref Planning ref 20543, ABP Ref 310184** New Warehouse

Should the existing permitted proposal for the new warehouse (ref. 20543) be progressed, in this scenario, the former Station Hall and the Engine room walls that are currently freestanding within the port would be demolished.

17.8 Potential Significant Effects

The potential significant effects from the proposals on the built heritage of Greenore are set out below:

Positive Effects: The further development and adaptation of the port to serve wind energy industry should contribute to its further viability and continuity of use as a working port. Enhancement of the public realm to the front of the water tower at the end of Euston Street will improve presentation in this location. The surviving historic walls within the site area are being maintained and are otherwise unaffected by the proposed works. The retention of the Engine Room wall in particular will enhance the historic character of the port area on the approach to the new facilities. The new shore road carpark will be fronted with a new boundary wall constructed to be more sympathetic to the historic character of the wall in front of the lighthouse.

As demonstrated on Photomontage 04b in the photomontages submitted with this application, the view along Anglesey Terrace towards the Mourne Mountains will be improved by the new development which involves the removal of the existing Open Hydro warehouse.

Neutral Effects: The placement of the new facilities have no direct impacts on the two principal views set out in the ACA, or the curtilages or historic fabric of protected structures in Greenore. The removal of the south end of the modern Port office building, to the south of the water tower (seafarers' rooms) has a neutral effect on the built heritage of Greenore.

Negative/Adverse Effects: Increased traffic from construction could soil or damage historic surfaces of the surviving historic walls, even accidentally should improper or insufficient construction management procedures be put in place. It is proposed that all HGV construction traffic will enter and exit the site via the existing port HGV entrance on Shore Road.

17.8.1 Demolition Phase

Demolition phase effects are moderate. While there are works proposed in the parking area at the end of Euston Street, there are no historic surfaces surviving at this location, and it is only proposed to enhance the setting rather than propose new development. The demolition of four modern buildings within the site area will have no significant effect on the built heritage of Greenore.

17.8.2 Construction Phase

Construction phase effects are moderate and relate to potential increased soiling or accidental damage from construction traffic to and from the port, and to the historic fabric such as the water tower and the surrounding walls while construction is ongoing. It is proposed that all HGV construction traffic will enter and exit the site via the existing HGV port entrance on Shore Road.

17.8.3 Operational Phase

Operational phase effects are slight and relate to potential increased soiling or accidental damage from increased traffic to and from the port. It is proposed that all HGV traffic will enter and exit the site via the existing HGV port entrance on Shore Road. The level of traffic using Euston Street will be comparable to levels when the Open Hydro building was operational up until the end of 2018.

17.8.4 Cumulative Effects

The cumulative impact assessment (CIA) assesses impacts associated with the proposed development together with other permitted, proposed and reasonably foreseeable projects. The projects selected as relevant to the CIA presented within this chapter are based upon the results of a screening exercise that draws on current planning applications; Strategic Infrastructure Developments (SIDs); EPS licence applications; and Local Area Plans. Existing planning permissions within the project site area are not considered because the implementation of the current application will mean that they will not be implemented.

The subject site is located within the functional area of Louth County Council and is governed by the Louth County Development Plan 2021-2027 (LCDP), which was adopted by the members of Louth County Council (LCC) at a Special Council Meeting on 30 September 2021, with the Plan coming into full effect on 11 November 2021.

Overall, the magnitude of the cumulative impact is deemed to be negligible in respect of the built heritage of Greenore.

17.8.5 Summary

The following Table summarises the identified likely significant effects during the construction phase of the proposed development before mitigation measures are applied.

Table 17.1 Summary of Construction Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Damage to water tower and surrounding walls	Moderate	Slight	Slight	Moderate	Temporary Reversible	Do Nothing
Damage to protected structures or ACA from construction traffic	Moderate	Slight	Slight	Moderate	Temporary Reversible	Do Nothing

The following Table summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Table 17.2 Summary of Operational Phase Likely Significant Effects in the absence of mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Accidental damage to soiling	Moderate	Slight-Moderate	Slight	Likely	Temporary Reversible	Do Nothing
Resultant damage to soiling	Moderate	Slight-Moderate	Slight	Likely	Temporary Reversible	Do Nothing

17.9 Mitigation

17.9.1 Incorporated Design Mitigation

The proposed development is largely located outside the ACA boundary, and at a distance from nearby protected structures. Works in front of the port office building are partly within the ACA and adjacent to a Protected Structure – the water tower. Design mitigation has been included within the proposals with the sensitive redevelopment of the public realm at the end of Euston Street and the new entrance to the proposed port facilities.

The proposed new wall to the carpark along the Shore Road will be sympathetic of the historic character of its setting.

Views protected under the Architectural Conservation Area include north along Euston Street towards the Mourne Mountains and eastwards from the coastguard houses and the seafront. Photomontage images were commissioned from Pivotal Animations from viewing positions at key locations around Greenore looking towards the development, including the protected view along Euston Street. Also included were views along Anglesey Terrace and at the north end of Euston Street looking towards the port entrances. The photomontages demonstrate that views from Greenore ACA are not significantly impacted by the proposed development.

Figure 17.18 Photograph from viewing position 03.

Figure 17.19 Photomontage from viewing position 03 demonstrating that there are no significant visual impacts looking north along Euston Street due to the proposals. (source Pivotal Animations)

Figure 17.20 Photograph from viewing position 04.

Figure 17.21 Photomontage from viewing position 04 demonstrating visual impact looking north along Anglesey Terrace due to the proposals. (source Pivotal Animations)

Figure 17.22 Photograph from viewing position 02.

Figure 17.23 Photomontage from viewing position 02 demonstrating visual impact looking north from the end of Euston Street towards port entrance due to the proposals. (source Pivotal Animations)

Figure 17.24 Photograph from viewing position 02a

Figure 17.25 Photomontage from viewing position 02a demonstrating visual impact looking west from the north end of Euston Street towards proposed new entrance gate as part of the proposals. (source Pivotal Animations)

Figure 17.26 Photograph from viewing position 04b.

Figure 17.27 Photomontage from viewing position 04b demonstrating visual impact looking northwest from the north end of Anglesey Terrace towards proposals. (source Pivotal Animations)

17.9.2 Demolition Phase Mitigation

No mitigation measures are required as part of demolition works to facilitate the proposed development.

17.9.3 Construction Phase Mitigation

No specific mitigation measures are required for architectural and cultural heritage during the construction phase due to the construction of the proposed development. The Outline Construction and Environmental Management Plan prepared by McCarthy Browne provides the methodology for general protection measures during the construction phase.

17.9.4 Operational Phase Mitigation

No specific mitigation measures are required for architectural and cultural heritage during the operational phase of the proposed development.

17.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

As no mitigation measures are proposed in terms of Built Heritage, the residual impacts on Built Heritage arising from the proposed development will remain as described in Section 17.8.

17.11 Risk of Major Accidents or Disasters

This risk is not relevant to the assessment of the built heritage at Greenore.

17.12 Worst Case Scenario

The worst case scenario is that over time, without proper construction management procedures or routine maintenance into the future leaving it susceptible to damage from weather events or other *force majeure* incidents, the former Engine room wall begins to deteriorate further and over time stone is lost or there is a complete or partial collapse.

17.13 Interactions

This chapter on built heritage interacts most closely with Chapter 16 Cultural Heritage: Archaeology and Chapter 5 Landscape & Visual.

17.14 Monitoring

No post construction monitoring of the Built Heritage of Greenore is proposed.

17.15 Conclusion

The proposed development at Greenore Port has been designed to minimise visual impacts on the nearby historic village of Greenore, an Architectural Conservation Area with numerous protected structures. The continued development of port activities at Greenore requires new and improved facilities over time, maintaining its industrial heritage value. The proposed development retains the surviving historic engine room, and the station hall walls are unaffected, which otherwise have planning approval to be demolished.

17.16 References and Sources

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CHAPTER 18
INTERACTIONS OF THE FOREGOING

VOLUME II
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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18 Interactions of the Foregoing

18.1 Introduction

The construction, operational and cumulative impacts of the proposed development have been assessed within each chapter of the EIAR. This chapter considers the significant interactions of impacts between each of the separate disciplines.

In practice many impacts have slight or subtle interactions with other disciplines. This chapter highlights in Table 18.1 (located at the end of this section) those interactions which are considered to potentially be of a significant nature. Discussions of the nature and effect of the impact is primarily undertaken within each of the relevant chapters, while this chapter identifies the most important potential interactions.

This chapter was prepared by Louise O'Leary, BA MRUP, Dip EIA Management, MIPI. Louise an Associate Director with over 18 years' experience in planning and development projects including experience directing and contributing to the preparation of environmental impact assessments for a variety of projects including port lands, infrastructure and commercial i.e.:-

- Waterford North Quays Reg. Ref. 19/928 – a mixed use development of a brownfield site encompassing retail, leisure, office and residential uses. The permitted development included the removal of existing quayside and wharf and the placement of a piled foundation, alongside and within an SAC. This application included an EIAR and a NIS.
- Cherrywood Infrastructure Development – various applications for the development of roads, drainage and public parks on a greenfield site of c. 300 acres. The permitted developments provided critical infrastructure to enable the development of individual plots to proceed in line with the phasing requirements of the approved SDZ Planning Scheme.

18.2 Population & Human Health

During the construction phase, all environmental factors interact with population and human health. The following are the key areas of interaction:

- **Landscape and Visual -** Construction processes, plant and hoarding used during the construction phase may give rise to visual impacts.
- **Material Assets – Traffic & Transport:** Increased construction traffic movements on the local road network during the construction phase may give rise to noise, dust, and road safety impacts.
- **Material Assets – Built Services:** Excavation during the construction phase may give rise to risks to human health as a result of any excavation work in areas where built services exist through coming into contact with live electricity lines or damaging watermains.
- **Noise & Vibration:** There is potential for effects on human health associated with noise during the construction phase which may impact upon amenity.
- **Air Quality:** There is potential for impact on human health from dust associated with construction activities and thus impacting air quality.

The potential impact on human health arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

During the operational phase, the following are the key areas of interaction with population and human health:

- **Landscape & Visual:** The landscape plan will impact on the quality of the private and public open spaces, which could impact on people's health and well-being.
- **Material Assets: Traffic and Transport:** Traffic flows towards the site has the potential to create safety risks for pedestrians and cyclists**.**
- **Air Quality:** Energy efficient design within the proposed development may give rise to reduced electricity consumption by future tenants, potentially decreasing dependence on fossil fuels for energy generation, resulting in improved air quality. There is potential for impact on human health from a deterioration in air quality associated with emissions from vehicles.
- **Climate:** Energy efficient design within the proposed development may give rise to reduced electricity consumption by future residents, potentially decreasing dependence on fossil fuels for energy generation, resulting in significant CO_2 savings.

The potential significant impacts on human health arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

18.3 Landscape & Visual

During the construction and operational phase, the following aspects have potential to interact with landscape and visual:

- **Biodiversity**: The potential for interactions with Biodiversity to occur will largely be beneficial effects as a result of implementing the proposed landscape masterplan, which includes measures to increase the level of beneficial planting across the existing site with a range of species including native species and pollinator rich species in keeping with the All-Ireland Pollinator Plan. Some minor loss of trees includes 6 no. that are required to be removed due to accommodate the Proposed Development plus 1 no. due to poor health. However, new tree coverage will compensate any losses. The proposed mix of planting species to be used and installation of the planting site will include collaborating with the project ecologist to ensure this new landscaping doesn't negatively impact Carlingford Lough SAC and SPA.
- **Material Assets: Traffic & Transport**: The potential for interactions with Traffic & Transport will be indirect effects upon the landscape character and visual amenity as result of changes to existing traffic levels within the immediate surroundings during the demolition, construction, and operational phases. Positive effects are likely to occur with the emphasis through the design which will improve the flow of traffic on Euston Street and around the existing port buildings and OFM buildings. The car park provisions ensures a concentration of parking within the site so as not to impact on the existing residence parking along the surrounding streets and streetscape character within the ACA. Similarly, the flow of

pedestrians from the surface car park at Shore Road to the OMF site and to the small amenity space at the Port office entrance is improved through the dedicated and separated link through the port's lands.
- **Land and Soils:** The potential for interactions with Land and Soils will occur during the demolition and construction phases with movement of material through/off the site and its temporary storage on site. There will be opportunities to reuse the soil lifted from the residential site for the new carpark surface and transport it to those areas of the terrestrial port area, the main site, which are currently hardstanding and lacking the depth and quality of soil needed for the various proposed planting areas, thus helping to reduce the need to import soil from an outside source.

The potential significant effects on landscape and visual arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

18.4 Material Assets: Traffic & Transport

During the construction phase, the following aspects have potential to interact with traffic & transport:

- **Noise & Vibration:** There are interactions between the traffic assessments and the noise & vibration assessments. With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site.
- **Air Quality:** With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site.
- **Climate:** There are interactions between the traffic assessments and the noise/vibration and air quality/climate assessments. With increased traffic movements due to construction traffic, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise and air quality environment are assessed by reviewing the change in traffic flows on roads close to the site.

During the operational phase, the following aspects have potential to interact with traffic & transport:

- **Noise & Vibration:** There are interactions between the traffic assessments and the noise & vibration assessments. With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site.
- **Air Quality:** Interactions between Air Quality and Traffic (Chapter 6 Material Assets –Traffic and Transport) can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site.

- **Climate:** There are interactions between the traffic assessments and the noise/vibration and air quality/climate assessments. With increased traffic movements due to staff travelling to site, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise and air quality environment are assessed by reviewing the change in traffic flows on roads close to the site.

The potential significant effects on traffic and transport arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur.

18.5 Material Assets: Built Services

During the construction an operational phase, the following aspects have potential to interact with built services:

- **Population and Human Health:** Excavation during the construction phase may give rise to risks to human health as a result of any excavation work in areas where built services exist through coming into contact with live electricity lines or damaging live gas or watermains.
- **Land and Soils:** There are interactions with the land and soils chapter given the proposed infiltration from permeable paving into surrounding soils. Excavations and removal of hardstanding, topsoil and earthworks for the installation of new drainage and utilities may give rise to the erosion of subsoils and subsequent sediment generation.
- **Landscape and Visual:** The proposed permeable paving, substation infrastructure and NZEB plant requirements will have an effect on the visual appearance of the development and are therefore considered in the LVIA.
- **Climate:** The built services have been designed with climate impact in mind including NZEB compliant buildings, SuDS drainage design and landscaping.
- **Water and Hydrology:** There are interactions with the water and hydrology chapter due to the proposed discharge of stormwater to existing outfalls. There will be an increased demand on potable water supply.

The potential significant impacts on built services arising from these interactions have been considered within the relevant discipline, and mitigation measures have been outlined where required. With mitigation measures implemented, no significant permanent residual negative impacts will occur.

18.6 Material Assets: Waste

During the construction phase, the following aspects have potential to interact with material assets: waste:

- **Population & Human Health:** The potential impacts on human beings are in relation to incorrect management of waste during construction, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity.

- **Material Assets: Traffic & Transport:** Local traffic and transport will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction phase of the proposed Development. The increase in vehicle movements as a result of waste generated during the construction phase will be *temporary* in duration.
- **Land & Soils:** During the construction phase, dredged material and some of the excavated soil and stone generated from the excavations will largely be removed off-site. If material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort.
- **Climate**: Interactions across many areas can be used to minimise the GHG emissions from the construction phase. For instances, waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling or incineration.

During the operational phase, the following aspects have potential to interact with material assets: waste:

- **Population & Human Health:** The potential impacts on human beings are in relation to incorrect management of waste during operation, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity.
- **Material Assets: Traffic & Transport:** Local traffic and transport will be impacted by the additional vehicle movements generated by removal of waste from the site during the operational phase of the proposed Development. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movements will be imperceptible in the context of the overall traffic and transportation increase.
- **Climate**: Interactions across many areas can be used to minimise the GHG emissions from the operational phase. For instances, waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling or incineration.

The potential significant effects on waste arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur.

18.7 Land & Soils

During the demolition and construction phase, the following aspects have potential to interact with land and soils:

- **Air Quality:** Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between Air Quality (Chapter 14) and Land and Soils (Chapter 9) in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between Air Quality and Land and Soils.

- **Material Assets: Transport, Built Services and Waste:** Excavated soil and stone will be generated from the excavations required to facilitate site levelling, construction of new foundations and installations of site services. Excavated material will partly need to be removed off-site with the remaining balance being reused on site. There will also be dredging undertaken to facilitate navigable access and suitable berthing. If material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort.
- **Water & Hydrology:** Site preparatory works (i.e., site clearance, re-profiling etc.) and dredging during the construction stage have the potential to impact on the hydrology and hydrogeology due to the risk of suspended solids becoming entrained in surface water run-off and accidental spills etc.
- **Biodiversity:** There is potential for silt laden material or pollution to enter nearby surface waterbodies and impact on local biodiversity and European sites downstream from the works. Furthermore, dust emissions from exposed earthworks have the potential to settle on plants causing impacts to local ecology.

During the operational phase, the following aspects have potential to interact with land and soils:

- **Water & Hydrology:** The operational phase of the proposed development has the potential to interact negatively on groundwater and surface water quality via the proposed surface water network which involves discharging to Carlingford Lough during high tide periods.

The potential significant impacts on land and soils arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

18.8 Water & Hydrology

During the demolition and construction phase, the following aspects have potential to interact with water & hydrology:

- **Land & Soils:** Site preparatory works (i.e. site clearance, re-profiling etc.) during the construction stage have the potential to result in increased sediment runoff which has the potential to interact on surface water quality
- **Biodiversity:** Impacts to water quality during the construction phase, such as accidental pollution/spillage events, may give rise to impacts on sensitive aquatic receptors, such as habitats and fauna, that are hydrologically linked to the site.
- **Air Quality:** Demolition of existing infrastructure construction phase activities such as land clearing, excavations, and stockpiling of materials etc. have the potential for interactions between air quality and water and hydrology in the form of dust emissions that may deposit in surface waters.

During the operational phase, the following aspects have the potential to interact with water & hydrology:

- **Material Assets Built Services:** There will be an increased demand on potable water supply and on the municipal drainage systems. The use of SuDS during operations will mean that the development will result in neutral water impacts in the operational phase with regard to runoff rates and flooding risk. As a part of the SuDS features, it is anticipated that small amounts of hydrocarbon sludge waste and debris may be generated in the hydrocarbon interceptors which will treat the surface water run-off.

- **Biodiversity:** There is potential for impacts to biodiversity associated with uncontrolled discharges to surface water (Carlingford Lough). In this instance the existing and proposed surface water system discharges into Carlingford Lough for the O&M Facility Site and is proposed to discharge to ground for the Shore Road Car Park. Therefore, there is a direct hydrological connection to Carlingford Lough and the Natura 2000 sites located therein (Carlingford Shore SAC & Carlingford Lough SPA).
- **Climate:** Climate change has the potential to lead to increased rainfall in future years which may result in flood impacts and interactions between Hydrogeology and Hydrology, and Land, Soils and Geology.

The potential significant effects on water and hydrology arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur.

18.9 Biodiversity

During the construction and operation phase, the following aspects have potential to interact with biodiversity:

- **Land & Soils:** there is overlap with the biodiversity chapter in that the potential impact of the construction works, through excavation, construction etc., have the potential to adversely affect the receiving environment, both geological and ecological. The mitigation measures in both chapters overlap somewhat as they deal with protecting the receiving environment from the construction works e.g., protecting waterbodies from pollution and sedimentation.
- **Water & Hydrology:** Impacts to water quality during the construction phase, such as accidental pollution events, may give rise to impacts on sensitive aquatic receptors, such as habitats and fauna. The mitigation measures proposed in these chapters address the potential for the Construction Phase to impact receiving waterbodies and ecology.
- **Landscape & Visual:** The proposed landscaping of the Site interacts with its biodiversity through the changes that will occur to the existing habitats and flora at the Site. The landscaping proposals will entail losses and contributions in terms of vegetation at the Site, which in turn will affect its ecology. The Site in its current condition is not of high ecological value, and the proposed landscaping will not result in significant adverse effects in this regard.
- **Air Quality:** A series of mitigation measures have been prepared to minimise dust emissions and they are set out in Chapter 14, Air Quality. It is concluded that provided the dust minimisation measures outlined in the plan are adhered to, the predicted residual air quality effects during the construction phase including demolition are direct, short-term, negative, and not significant. Best practice mitigation measures are proposed for the construction phase of the proposed development, which will focus on the proactive control of dust and other air pollutants, to minimise generation of emissions at source. The mitigation measures that will

be put in place during construction will ensure that the impact complies with all EU ambient air quality legislative limit values, which are based on the protection of human health (see Table 14.1). Therefore, the predicted residual, dust-related, human health effect of the construction phase of the proposed development is direct, short-term, negative, and not significant.

The potential significant impacts on biodiversity arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

18.10 Coastal Processes

During the construction phase, the following aspects have potential to interact with coastal processes:

- **Biodiversity:** Given the close vicinity of multiple licensed aquaculture sites within 1.5km of the proposed development, dredging operations have the potential to interact with aquaculture sites. This potential impact is described and assessed in Chapter 12 (Biodiversity).
- **Population & Human Health:** Dredging operations have the potential to interact with population and human health where there is a risk that this activity may give rise to effects on the aquaculture sites and in turn the farmers / businesses operating them.

There are no potential interactions during the operational phase.

The potential significant impacts arising on coastal processes from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

18.11 Noise & Vibration

During the construction and operational phases, the following aspects have potential to interact with noise and vibration:

- **Material Assets: Traffic And Transport**: There are interactions between the noise and vibration assessment and Material Assets: Traffic and Transport assessment in Chapter 6. With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site.
- **Population & Human Health:** There is potential for interaction with population and human health associated with noise and vibrations generated during the construction phase. To a lesser extent, there is a potential for interaction during the operational phase associated with noise from the use of the surface carpark and the pedestrian path through port lands.

The potential significant impacts on noise and vibration arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative impacts will occur.

18.12 Air Quality

During the construction phase, the following aspects have potential to interact with air quality:

- **Population and Human Health:** An adverse impact due to air quality in the construction phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits.
- **Traffic and Transportation:** With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site.
- **Land & Soils:** Construction phase activities such as land clearing, excavations, stockpiling of materials etc. may give rise to dust emissions.
- **Biodiversity:** Stripping of topsoil and excavation during the construction phase will remove some vegetation such as trees and scrub, and may give rise to dust emissions.
- **Climate:** Air quality and climate are strongly linked, as the burning of fossil fuels during the construction phase may give rise to air quality effects.

During the operational phase, the following aspects have potential to interact with air quality:

- **Population and Human Health:** There is potential for impact on human health from a deterioration in air quality associated with emissions from vehicles.
- **Traffic and Transportation:** Possible increases in traffic movements during the operational phase may give rise to increased vehicular emissions.
- **Climate:** Air quality and climate are strongly linked, as the burning of fossil fuels during the operational phase may give rise to both air quality and climate impacts.

The potential significant impacts arising on air quality from these interactions have been considered within the relevant discipline, and mitigation measures have been outlined where required. With mitigation measures implemented, no significant permanent residual negative impacts will occur.

18.13 Climate

During the construction phase, the following aspects have potential to interact with air quality:

- **Air Quality:** Air Quality and Climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts.
- **Material Assets: Waste**: Interactions across many areas can be used to minimise the GHG emissions from the construction phase. For instances, waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling or incineration.

During the operational phase, the following aspects have potential to interact with air quality:

- **Air Quality:** Air Quality and Climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts.
- **Population and Human Health:** Energy efficient design within the proposed development may give rise to reduced electricity consumption by future residents, potentially decreasing dependence on fossil fuels for energy generation, resulting in significant CO_2 savings.
- **Material Assets: Waste**: Interactions across many areas can be used to minimise the GHG emissions from the operational phase. For instances, waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling or incineration.
- **Water & Hydrology:** Climate has the potential to interact with a number of other environmental attributes. The impact of flood risk has been assessed and the surface water drainage network designed to cater for run-off from the building and the surrounding hardscaped areas.

The potential significant impacts arising on climate from these interactions have been considered within the relevant discipline, and mitigation measures have been outlined where required. With mitigation measures implemented, no significant permanent residual negative impacts will occur.

18.14 Cultural Heritage - Archaeological

During the construction phase, the following aspects have the potential to interact with archaeological heritage:

- **Land and Soils:** Site clearance works may impact on sub-surface archaeology.
- **Cultural Heritage: Built Heritage:** This chapter interacts most closely with Chapter 17 Cultural Heritage: Built Heritage.

No potential operational interactions were identified.

The potential significant impacts on archaeology arising from these interactions have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant permanent residual negative effects will occur.

18.15 Cultural Heritage - Built Heritage

During the construction phase, the following aspects have the potential to interact with archaeological heritage:

- **Cultural Heritage: Archaeology:** This chapter interacts most closely with Cultural Heritage: Archaeology.
- **Landscape & Visual:** The emergence of construction plant and hoarding to secure the development site would interact with the landscape and visual environment in the short term.

During the operational phase, the following aspects have the potential to interact with built heritage:

- **Landscape and Visual:** Indirect operational phase visual impacts are anticipated on the setting of Greenore ACA and the protected structure in the vicinity of Greenore Port.
- **Population and Human Health:** The proposed development includes public realm improvements to part of the Greenore ACA and the existing port carpark at the top of Euston Street. These works are an improvement to the village and ACA setting. The proposed works will also increase awareness of the value of the ACA designation and the protection of protected structures, NIAH structures and heritage features etc.

The potential significant impacts on built heritage arising from these interactions have been considered within the relevant discipline, and mitigation measures have been outlined where required. With mitigation measures implemented, no significant permanent residual negative impacts will occur.

18.16 Conclusion

As outlined above, the proposed development has the potential to impact on various environmental aspects, with interactions and inter-relationships between these aspects as described above. The EIAR has considered these interactions and inter-relationships throughout the appraisal, firstly through the design and layout of the proposed developments, to avoid impacts where possible, and also in the definition of suitable mitigation measures to minimise the impacts.

No significant likely impacts arising from interactions are identified.

Table 18-1 Interactions with Potential for Significant Impacts Before the Implementation of Mitigation Measures

Interaction	Pop&HH		L&V		MA:T&T		MA:BS		MA:Wst		Land&S		Water&H		BioDiv		CoastalP		Noise&V		AirQual		Climate		CH:Arch		CH:BH	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Population & H. Health			×	×	×	×	✓	×	✓	✓	×	×	×	×	×	×	✓	×	✓	✓	✓	✓	×	✓	×	×	×	✓
Landscape & Visual	✓	✓			×	×	×	✓	×	×	×	×	×	×	✓	✓	×	×	×	×	×	×	×	×	×	×	✓	✓
MA: Traffic & Transport	✓	✓	✓	✓			×	×	✓	✓	✓	×	×	×	×	×	×	×	✓	✓	✓	✓	×	×	×	×	×	×
MA: Built Services	✓	×	×	×	×	×			×	×	✓	×	×	✓	×	×	×	×	×	×	×	×	×	×	×	×	×	×
MA: Waste	×	×	×	×	×	×	×	×			✓	×	×	×	×	×	×	×	×	×	×	×	✓	✓	×	×	×	×
Land & Soils	×	×	✓	×	×	×	✓	✓	✓	×			✓	×	✓	×	×	×	×	×	✓	×	×	×	✓	×	×	×
Water & Hydrology	×	×	×	×	×	×	×	✓	×	×	✓	✓			✓	×	×	×	×	×	×	×	×	✓	×	×	×	×
Biodiversity	×	×	✓	✓	×	×	×	×	×	×	✓	×	✓	✓			✓	×	×	×	✓	×	×	×	×	×	×	×
Coastal Processes	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×			×	×	×	×	×	×	×	×	×	×
Noise & Vibration	✓	×	×	×	✓	✓	×	×	×	×	×	×	×	×	×	×	×	×			×	×	×	×	×	×	×	×
Air Quality	✓	✓	×	×	✓	✓	×	×	×	×	✓	×	✓	×	×	×	×	×	×	×			✓	✓	×	×	×	×
Climate	×	✓	×	×	✓	✓	×	✓	✓	✓	×	×	×	✓	×	×	×	×	×	×	✓	✓			×	×	×	×
CH: Archaeology	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×			✓	×
CH: Built Heritage	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	✓	×		

C - Construction Phase | O - Operational Phase | ✓ - Potential Significant Interaction | × - No Significant Interaction

CHAPTER 19
SUMMARY OF MITIGATION MEASURES

VOLUME II
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAY 2024

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19 Summary of Proposed Mitigation and Monitoring Measures

19.1 Introduction

Article 5(1) of the EIA Directive sets out what the developer has to include as a minimum in the EIA Report including mitigation or compensation measures: measures to avoid, prevent or reduce, and offset any identified adverse effects on the environment shall be provided by the developer (Article 5(1)(c) and Annex IV.7).

This chapter summarises the mitigation measures proposed for the construction and operational stage of the proposed development as set out in the preceding assessments contained in Chapters 4 to 17.

All mitigation measures are deemed adopted for the purpose of the Outline Construction and Environmental Management Plan (CEMP) that accompanies this application for permission.

19.2 Incorporated Design Mitigation Measures

The measures outlined in Table 19-1 have been incorporated into the design of the proposed development for the Demolition & Construction and Operational Stage, as appropriate.

Table 19.1 Incorporated Design Mitigation

Aspect	Mitigation
Population & Human Health	▪ The proposed development complies with the Building Regulations, to safeguard users of the buildings and the health of occupants. ▪ The proposed development complies with the requirements of Part M of the Building Regulations and incorporates the principles of universal design so that the development will be readily accessible to all, regardless of age, ability, or disability. ▪ Provision of segregated pedestrian entrance and separation of vehicular traffic. ▪ The inclusion of landscaping elements and a highly accessible layout of the scheme including segregated and safety improved pedestrian walkways will provide for a high quality work place for future employees and the enhancements of the public realm and design of the overall layout will improve the setting of the wider village.
Landscape & Visual	▪ The proposed landscape consists of robust planting species specifically selected to cope with the harsh coastal environment so to minimise the risk of planting failures. ▪ The careful design and placement of building to create new elevations, features and focal points in the views available. While offset from the historic structures within the port so to not impact on their visibility. ▪ The softening of the setting and framing of the elevations with the proposed planting mixes including trees, specimen shrubs and hedgerow to reduce the visual mass of the new building, soften and integrate the development over time from various viewpoints, as identified in the assessment, thereby minimising the visual impacts and generally enhancing the current outlook for many viewpoints. ▪ Tree and shrub planting to help break up the carparking areas throughout the site and implementation of suitable SUD planting in the carparks.

Table 19.1 Incorporated Design Mitigation

Aspect	Mitigation
	▪ The design of the public realm scheme at the end of Euston Street to a high standard and seamless integration of the Port end off Euston Street and surrounding streetscape within Greenore ACA. ▪ The design has considered the movement of vehicles, cyclists and pedestrians within the site and surrounding area and improves upon the existing access to minimise disruption. Proposed pedestrian routes through the site will have strong legibility by using contrasting paving materials. ▪ Integration of the proposed planting with all other proposed services so that these services don't affect the new planting and existing vegetations long term growth and maintenance ▪ The site layout has been designed, for each phase, so that there is adequate levels of parking within the site lands to accommodate employees vehicles of the OMFs and those of the existing Port operations so that no parking will occur within the surrounding streets and minimise disturbance to character of the ACA.
Material Assets: Traffic & Transport	▪ The proposed development access is achieved through the existing port office entrance at Euston Street which it is proposed will be modified and enhanced in the interest of increases efficiency of vehicular entry and in the interest of pedestrian safety. ▪ Access to the new car park is provided directly from Shore Road. The location of the proposed new car park will ensure that Shore Road continues to provide an element of orbital function to Euston Street aiding in the distribution of traffic away from the centre of Greenore. ▪ The specific attributes of the scheme design and public realm enhancements at the northern end of Euston Stret contributes to achieving objectives of DMURS and includes well designed pedestrian crossing facilities along the key travel desire lines through the scheme. ▪ The enhancements at the port office entrance and entrance to the OMF buildings was designed with careful consideration for pedestrians and efficient movement of vehicles to and from the port offices and the proposed development. ▪ The proposed works include a segregated footway which will become the future link between Shore Road and the port office and OMF buildings. Internal provision for pedestrians includes for 2.0m segregated facilities on the main access road. ▪ High quality and slip resistant materials will be used in the construction of crossings and gradients at dropped crossings will be sufficiently shallow to allow access for users of all abilities. ▪ Sightlines at the new car park junction on Shore Road are provided in accordance with DMURS from a maximum setback of 2.4m. Roadside features and landscaping is so positioned not to obstruct visibility for drivers approaching or emerging from the Shore Road car park junction.
Material Assets: Built Services	▪ All new infrastructure will be designed in accordance with relevant standards and Codes of Practice. ▪ Surface water drainage systems have been designed in accordance with the Louth County Council Development Plan 2021-2027, Greater Dublin Strategic Drainage Study and CIRIA SuDS Manual 2015. This ensures that the surface water discharges are in line with sustainability standards. Specific measures include:

Table 19.1 Incorporated Design Mitigation

Aspect	Mitigation
	o The provision of permeable paving o Stormwater attenuation tank provision o Rainwater harvesting o Flow control devices o Chemical interceptors ▪ Fuel and chemical storage areas will be double skinned and/or bunded in accordance with best practice. ▪ Wastewater networks have been designed in accordance with current regulations and standards. Efficiencies in water usage will be considered throughout the engineering design of the development. ▪ Buildings will be designed to achieve TGD Part L, NZEB 2002 compliance which incorporates renewable energy technologies and measures to avoid energy losses. These will have a positive effect on the electrical demand of the proposed development.
Material Assets: **Waste**	▪ The principles of the 'Waste Hierarchy' and 'Circular Economy' have been applied in the design. o The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. o The circular economy principle aims to keep materials, components, and products in-use in the economy for as long as possible. In circularity, the key objective is to design consumption and production systems to create and retain value. Both principles.
Land & Soils	<u>Waste Water Drainage</u> ▪ A new network of foul sewers will be installed to serve the proposed development, discharging to the existing connections to the foul collection tank located within the application site. The collection tank is an Uisce Eireann asset, and they empty the chamber for off-site disposal to Dundalk Wastewater Treatment Plant (WWTP). <u>Surface Water Drainage</u> ▪ The surface water system proposed to service the development comprises of various drainage components including positive stormwater networks, attenuation systems and several Sustainable Drainage System (SuDS) elements. The proposed surface water drainage is designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), Draft WSD Guidelines and CIRIA SuDS Manual, 2015. The design of the attenuation storage system has been carried out for the 1 in 100-year event with a 20% allowance for climate change. ▪ There are two separate drainage proposals for the proposed development, one for the O&M facility and a separate system for the Shore Road carpark **O&M Facility** o There is no discharge to ground proposed as part of the surface water drainage strategy from the O&M site and the existing outfall into Carlingford Lough will be utilised. Therefore there are no effects on the land, soils and geology at the proposed development.

Table 19.1 Incorporated Design Mitigation

Aspect	Mitigation
	o There is existing capacity sufficient to cater for the proposed new development. The surface catchment area will increase in comparison with the existing situation, however, for the O&M facility site, as the outfall is directly to sea, full attenuation for a 100 year return storm is not required. This is as per the Greater Dublin Strategic Drainage Study, Section 6.6, Vol.2. Instead, the principal issue is water quality not quantity. o A bypass separator will be installed to intercept pollutants such as petroleum and oil before the Surface water outfalls to sea. **Shore Road Car Park** o Surface water drainage will discharge by a series of filter drains into an underground stone-filled reservoir attenuation system. This system has been designed using the results of the soakaway tests in accordance with BRE 365, 2016. These results are included in the Engineering Report by CSEA included with this application. o It is proposed to limit the surface water discharge to the equivalent Qbar value to 2.13 l/s/ha in compliance with the Greater Dublin Strategic Drainage Study (GDSDS), Water Services Guidelines for Planning Authorities (Draft – 2018) and CIRIA SuDS Manual, 2015. A "Hydrobrake Optimum" (downstream of the attenuation unit) vortex flow control devices to restrict the flows to the amounts calculated. o A bypass interceptor will be installed to capture pollutants such as petroleum and oil and prevent their entry to the public drainage system or groundwater or groundwater where an infiltration system is utilised. o Surface water will discharge to the public surface water pipe on Shore Road **Storage of Hazardous Material** ▪ A fuel storage facility with a capacity of ≥200,000 liters will be provided in a dedicated area that will be maintained and managed by Greenore Port. This quantity of proposed fuel storage is significantly below the applicable threshold of 2,500 tonnes for petroleum products and alternative fuels detailed in Part 2 of Schedule 1 of the Control of Major Accident Hazards (COMAH) Regulations 2015. ▪ In addition to this the tanks will be bunded or double skinned so in the event of a spill no discharge to ground will occur. ▪ Surface water will be drained from this area into the proposed network with petrol interceptors included to ensure no hydrocarbon contamination exits the site through the surface water drainage system.
Water & Hydrology	**Surface Water Drainage** ▪ Storing surface water during high tides to limit discharge rates at the outfall to the sea. ▪ Tide locking the outfall during extreme high tide events, with a closure period of up to 6 hours. ▪ Assuming no outfall rate during the entire 6 hours of tide lock in the worst-case scenario. ▪ Draining roofs, yards, internal roads, and parking areas through a sealed drainage system, collected and conveyed through stormwater pipes before discharging into an underground attenuation tank.

Table 19.1 Incorporated Design Mitigation

Aspect	Mitigation
	▪ Draining car parks, parking bays, and access roads through permeable paving and supplementary gully system, with surface water pipework discharging into a Stormtech Attenuation system. ▪ Introducing stormwater manholes at appropriate spacing distances for maintenance purposes (no greater than 90m). ▪ Draining the satellite car park catchment area through proposed filter drains, collecting surface water runoff from impermeable vehicular aisles and discharging into a stone-filled attenuation system. ▪ Using stormwater drainage network pipework with diameters ranging from 225mm to 450mm, depending on flow capacity. ▪ Ensuring the proposed surface water network can handle up to a 30-year critical storm event plus a 20% climate change allowance without causing flooding. ▪ The proposed surface water drainage system designed for this development also includes a number of Sustainable Urban Drainage Systems (SuDS) measures such as permeable paving/ grasscrete, filter drains and attenuation systems. These measures will be incorporated to reduce run-off volumes and improve run-off water quality. The design of the attenuation storage system has been carried out for the 1 in 100-year event with a 20% allowance for climate change. The design of the 2 no. attenuation systems has been completed as follows: o Underground Arch-Type Attenuation Storage: The attenuation storage systems shall comprise of underground Arch-type storage units, i.e., stormtech systems or similar approved. Its final discharge destination will be Irish Sea through by-pass petrol separators. o Underground Stone-Fill Reservoir Attenuation System: Surface water drainage from the Satellite Car Park shall discharged into an underground stone-fill reservoir designed using the results of soakaway tests in accordance with BRE 365, 2016. Its final discharge destination will be the 100mm diameter pipe along Shore Road. ▪ The catchment at the Shore Road carpark will be connected to the public Louth County Council surface water collection on the public road. It is proposed to limit the surface water discharge from the Shore Road carpark catchment zone of the development to the equivalent Qbar value to 2.13 l/s/ha in compliance with the Greater Dublin Strategic Drainage Study (GDSDS), Water Services Guidelines for Planning Authorities Draft (2018) and CIRIA SuDS Manual, 2015. It is proposed to use a "Hydrobrake Optimum" (downstream of each attenuation unit) vortex flow control devices to restrict the flows to the amounts calculated. **Foul WasteWater Drainage** ▪ A new network of foul sewers will be installed to serve the proposed development, discharging to the existing collection tank. There will be no direct or indirect foul water discharge into Carlingford Lough. **Potential Impacts on Water Framework Directive Status** ▪ A fuel store with a capacity of ≥200,000 litres will be provided in a dedicated area that will be maintained and managed by Greenore Port. The overall volume will be stored in 1-2 bunded tanks and located in a secure area of the site to avoid accidental impact. The tanks will be fitted with overfill prevention, bund alarm and automatic shut off valves to mitigate risk of spills.

Table 19.1 Incorporated Design Mitigation

Aspect	Mitigation
	▪ Surface water will be drained from this area into the proposed network with petrol interceptors included. ▪ The proposed stormwater drainage network design includes sustainable drainage systems (SuDS) these measures by design ensure the stormwater leaving the site is to be attenuated and treated within the new development site boundary to ensure suitable quality, before discharging to the Carlingford Lough ▪ It is proposed to separate the surface water and foul drainage networks, which will serve the proposed development, and provide independent connections to the local public surface water and foul sewer networks respectively. ▪ The surface water discharges from the site are indirect, and will be adequately attenuated via SuDS measures, hydro-brake (or equivalent) and oil/water separator ensure there is no long-term negative impact to the WFD water quality status of the (Carlingford Lough) and (Dundalk GWB).
Biodiversity	▪ The design integrates enhancement measures for swifts in the form of 10 swift boxes per OMF building, for a total of 30 boxes. ▪ The landscape design is carefully considered to ensure that all species are capable of thriving within this coastal setting. Native species are included together with pollinators as advised by the All Ireland Pollinator Plan.
Coastal Processes	None
Noise & Vibration	None
Air Quality	None
Climate	Construction Phase ▪ Some excavated material, bricks, tiles and ceramics, metals and timber and will be diverted from waste processing by recycling or disposal in landfill, and will instead be reused on-site. This will reduce the associated CO_2 by approximately 32.6 tonnes
Cultural Heritage - Archaeology	▪ Project design to avoid impacts on known archaeological features where possible.
Cultural Heritage – Built Heritage	▪ Works in front of the port office building are partly within the ACA and adjacent to a Protected Structure – the watertower. Design mitigation has been included within the proposals with the sensitive redevelopment of the public realm at the end of Euston Street and the new entrance to the proposed port facilities. ▪ The proposed new wall to the carpark along the Shore Road will be sympathetic of the historic character of its setting.

19.3 Mitigation Measures

The recommended mitigation measures for the Demolition & Construction and Operational Stages are summarised in Tables 19-2 and 19-3 below.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
Population & Human Health	▪ **Construction and Environmental Management Plan (CEMP)**: The appointed contractor(s) will update the Outline CEMP submitted with the application and submit to Louth County Council prior to the commencement of development. o The CEMP will comply with all appropriate legal and best practice guidance for construction sites. o The purpose of a CEMP is to provide a mechanism for the implementation of the various mitigation measures which are described in this EIAR and to incorporate relevant conditions attached to a grant of permission. The CEMP requires that these measures will be checked, maintained to ensure adequate environmental protection. The CEMP also requires that records will be kept and reviewed as required to by the project team and that the records will be available on site for review by the planning authority. o All construction personnel will be required to understand and implement the requirements of the Contractor's CEMP and shall be required to comply with all legal requirements and best practice guidance for construction sites. o All mitigation and monitoring measures included in the Summary of Mitigation and Monitoring Measures in Chapter 19 of this EIAR will be included in the CEMP and adhered to. ▪ **Community Liaison Officer**: The contractor will appoint a liaison officer to ensure that any issues from the local community are dealt with promptly and efficiently during construction. These details will be included in the contractor's CEMP. ▪ **Construction Working Hours**, except for dredging and pile driving works, will generally be limited to the hours 0700 – 2000 Monday to Friday and 0700 – 1600 hours on Saturday. Some works have to be undertaken at low tide and their construction hours will be linked to tides (for example works associated with the pontoon construction and quay wall). o Pile driving works will be limited to 0800-1800 Monday to Friday and 0800 - 1600 hours on Saturday. It is not envisaged that works will take place on public holidays. o Dredging, due to the nature of the activity, is undertaken on a 24 hour basis to achieve the maximum production rates within tidal envelopes Dredging activities will occur for approximately 8-10 weeks. o If works are required outside of these hours, in exceptional circumstances, the planning authority will be notified in advance ▪ Project supervisors for the construction phase (PSCS) will be appointed in accordance with the Health, Safety and Welfare at Work (Construction Regulations) 2013, and a Preliminary Health and Safety Plan will be formulated during the detailed design stage which will address health and safety issues from the design stages, through to the completion of the construction phase. ▪ The Resource Waste Management Plan (RWMP) will be updated by the Contractor, as necessary, as per mitigation outlined in Chapter 8.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	▪ **Aquaculture Protection:** All suitable and appropriate mitigation measures included in Table 4 of the Risk Assessment for Shellfish Aquaculture, given below, are recommended to be deployed during the dredging works and included in the Contractor(s) CEMP. Dredging: local resuspension of sediments and increased sedimentation rates on intertidal / subtidal foreshore ▪ Planning of excavation to avail of minimal tidal dispersion effects ▪ Use of closing backhoe bucket, in areas of soft sediment, to minimise spillage ▪ Avoidance of side-casting of excavate prior to barge loading ▪ Deployment of turbidity monitoring and recording buoys with automated real time alarms ▪ Deployment of buoy mounted oxygen monitoring and recording sensors with automated real time alarms ▪ Aerial monitoring of sediment dispersion/dredging plume conducted by drone surveillance once per week on peak flood and ebb when dredging. ▪ Management of unloading/transhipment to avoid spillage ▪ All suitable and appropriate mitigations to be included in the **Construction Environmental Management Plan** Dredging: Transport of sediments, particularly of finer fractions, and release of contaminants to other areas, resulting in an increase in contaminant levels, most notably TBT/DBT ▪ Use of closing backhoe bucket, in areas of soft sediment, to minimise spillage ▪ Planning of excavation to avail of minimal tidal dispersion effects ▪ Avoidance of side-casting of excavate prior to barge loading ▪ Deployment of turbidity monitoring and recording buoys with automated real time alarms ▪ Aerial monitoring of sediment dispersion/dredging plume conducted by drone surveillance once per week on peak flood and ebb when dredging. ▪ Management of unloading/transhipment to avoid spillage ▪ All suitable and appropriate mitigations to be included in the **Construction Environmental Management Plan** Dredging: release of nutrients, consumption of oxygen resulting in reduced oxygen saturation of the water body ▪ Planning of excavation to avail of minimal tidal dispersion effects ▪ Use of closing backhoe bucket, in areas of soft sediment, to minimise spillage ▪ Avoidance of side-casting of excavate prior to barge loading ▪ Deployment of turbidity monitoring and recording buoys with automated real time alarms ▪ Deployment of buoy mounted oxygen monitoring and recording sensors with automated real time alarms ▪ Aerial monitoring of sediment dispersion/dredging plume conducted by drone surveillance once per week on peak flood and ebb when dredging. ▪ Management of unloading/transhipment to avoid spillage ▪ All suitable and appropriate mitigations to be included in the **Construction Environmental Management Plan**

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	Dredging and installation of quay wall extension and floating pontoons: contamination/pollution of water body by hydrocarbons/liquid contaminants ▪ Prepare protocol for the management of hydrocarbons and cement. ▪ For cement, specifically this should detail measures to: o Assess where any wastewater associated with the use of cement will run and the most appropriate way to dispose of it. o Ensure that appropriate measures are in place to avoid the potential for the run-off of cement into the marine area. Further ensure there is no potential for the run-off of cement into stormwater drains or that drains and gutters in the vicinity have been blocked off. o Use spill mats to contain any spills o Use sandbags or diversion booms to direct the any run-off to an appropriate safe location away from marine areas. o Set up a designated Washdown Area away from marine areas or with potential to run-off to it. o Ensure proper management in the event of an accidental spill. ▪ For hydrocarbons, mitigations should require: o All hydrocarbons to be stored in bunded containers at least 20m away from marine areas. o All plant and machinery and vessels should be regularly checked for leaks (fuel, oil and coolant). o Drip trays will be used underneath any mobile plant and drums whilst in use on site. o All machinery and vessels to have an on-board spill kit. o A hydrocarbon oil boom to be available at all times onsite in the event of it needing to be deployed. o If required, generators to be on a hydrocarbon mat at all times
Landscape & Visual	▪ Appropriate site management measures as contained within the site's Construction and Environmental Management Report will when implemented help keep potential temporary disturbance to landscape and visual receptors to a minimum. These measures will include: the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, agreed working hours, etc. ▪ The construction traffic route has been designed so that site traffic/deliveries will run via Shore Road to ensure minimal disturbance to residences within the core of the village during the works. ▪ Visual impact during the construction phase will be mitigated through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish. Any temporary lighting will be directed down and away from the residences and will only be switched on only when necessary to ensure works can be safely carried out. ▪ The retained trees along the boundaries will be protected by installation of fencing in accordance with BS5837:2012: Trees in Relation to Construction around the root protection areas (RPAs) as per the arborists Arboricultural Impact Assessment (AIA) report. ▪ Site hoarding, where necessary, will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate
Material Assets: Traffic & Transport	▪ A Construction Traffic Management Plan will be prepared by the appointed contractor(s), including measures to provide information to affected parties, including

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	advising land and property owners in advance of any diversions. Local access shall be maintained at all times. In addition, it is proposed that temporary signage shall be put in place to minimise disruption and ensure all road users understand that construction works are in progress. ▪ 'Construction Environmental Management Plan'(CEMP) shall include details on working hours, , construction traffic including deliveries, parking arrangements and incorporate the mitigation measures outlined here. ▪ All HGV vehicle movements will be restricted to the Main Port Entrance on Shore Road.
Material Assets: Built Services	▪ A site-specific Construction and Environmental Management Plan will be enacted by the Contractor. ▪ Pre-construction consultation and authorisation will be achieved for all the relevant infrastructure connections. ▪ Any works required to material assets on or around the Site will be carried out in conjunction with the relevant provider to ensure minimal disruption to the existing users. ▪ Any works required to material assets on or around the Site will be carried out strictly in accordance with the relevant provider's Code of Practices
Material Assets: Waste	▪ Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 8.1) in agreement with LCC and in compliance with any planning conditions, or submit an addendum to the RWMP to LCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream. ▪ The Contractor will implement the RWMP throughout the duration of the proposed demolition phase and should treat the document as outlined in the guidance as a live document. <u>Demolition</u> ▪ On-site segregation of waste materials will be carried out where practicable. The following waste types will always be segregated: o Glass o Concrete, Bricks, Tiles, Ceramics o Plasterboard o Asphalts o Metals and o Timber ▪ Any suitable demolition materials to be re-used on-site, where possible; ▪ All waste materials will be stored in skips or other suitable receptacles in designated areas of the site; ▪ Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, and oils) will be segregated and will be stored in appropriate receptacles (double-skinned, if required). ▪ A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the demolition works; ▪ All staff will be provided with training regarding the waste management procedures; ▪ All waste receptacles leaving the site will be covered or enclosed.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	▪ All waste requiring off-site management will be reused, recycled, recovered or disposed of at a facility with the appropriate registration, permit or licence. ▪ All waste leaving the site will be directed for reuse, recycling or recovery, where possible, to limit the volume of material designated for disposal. ▪ All waste leaving the site will be recorded, and the main Contractor will maintain copies of relevant documentation. <u>Construction</u> ▪ Building materials will be chosen to 'design out waste'; ▪ Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible; ▪ All waste materials will be stored in skips or other suitable receptacles in designated areas of the site; ▪ Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required); ▪ A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works; ▪ All construction staff will be provided with training regarding the waste management procedures; ▪ All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal; ▪ All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and ▪ All waste leaving the site will be recorded and copies of relevant documentation maintained. ▪ The project design team have estimated that approx. 2,960 m^3 of excavated soils and approx. 45,000m^3 of soft dredged material will be removed offsite. The material will be correctly classified and segregated (where necessary) to ensure that any potentially contaminated materials are identified and disposed of in an appropriate manner at a suitably licenced facility. o Where excavated materials meet the definition of By-Product, they will be notified to the EPA as such, using the Article 27 process. o The next option (beneficial reuse) may be appropriate for the excavated material, pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean, inert material may be used as fill material in other construction projects or engineering fill for waste-licensed sites. o If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the *Waste Management Act 1996* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. o Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

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Aspect	Mitigation
	o In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately from any non-hazardous material. It will be treated off-site at a suitably licenced facility or disposed of abroad via Transfrontier Shipment of Wastes (TFS). ▪ While it is not envisaged that bedrock will be encountered in the dredge if it is encountered, any volume would be small. A nominal value of approx. 1,000m^3 has been considered. If bedrock is to be crushed onsite, the appropriate mobile waste facility permit will be obtained from Louth County Council. ▪ Silt and petrochemical interception will be carried out on runoff and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed offsite. ▪ C&D waste, which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboard, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the main contractor's waste team to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle. ▪ If any asbestos or ACMs are found onsite, they will be removed by a suitably competent contractor and disposed of as asbestos waste before the demolition works begin. All asbestos removal or encapsulation work must be carried out per *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.* ▪ On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and/or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately. ▪ It is currently not envisaged that the crushing of waste materials will occur onsite, however if the crushing of material is to be undertaken a mobile waste facility permit will first be obtained from LCC and the destination of the excepting waste facility or if an application under regulation 28 will be made using National End-of-Waste Decision EoW-N001/2023, will be supplied to the LCC waste unit. ▪ Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arising on site. ▪ All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project RM. ▪ All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project RM will maintain a copy of all waste collection permits on-site.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	▪ If the waste is being transported to another site, a copy of the Local Authority waste COR/permit or EPA Waste/IE Licence for that site will be provided to the nominated project RM. If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records. ▪ Building materials will be chosen to 'design out waste'. ▪ Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc, if required. ▪ During the construction phase the project Construction Environmental Management Plan (CEMP) will be followed in regard to implementing and managing all environmental management requirements. o This CEMP explains the construction techniques and methodologies which will be implemented during the construction of the proposed development. o The CEMP mitigation measures will be implemented to ensure that pollution and nuisances arising from site clearance and construction activities is prevented where possible and managed in accordance with best practice environmental protection. ▪ The CEMP will be implemented and adhered to by the C&D contractors and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, RM and Ecological Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures
Land, Soils & Geology	<u>Construction Phase</u> • The Outline CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures. ▪ The Outline CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site. All mitigation measures outlined here, and within the Outline CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to consent conditions which may be imposed ▪ An emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process. This plan will include for events such as: o Pollution incidents: These may involve spillages, the malfunction of temporary structures, embankment collapse, acts of vandalism, fires, and other related events. o Extreme weather occurrences: Events such as heavy rainfall, flooding, are important factors to consider due to their potential impact on the construction process.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	▪ The Contractor will be required to implement emergency response procedures that align with industry best practice guidance. All personnel working on the site will be informed of the emergency measures in place. Soil Excavation, Removal and Infill ▪ Excavated soils and stones that are in excess of the requirements for reuse within the proposed development site will be taken for appropriate offsite reuse, recovery, recycling and / or disposal. ▪ Excavated soft dredge arisings will be taken for appropriate offsite reuse, recovery, recycling and / or disposal. ▪ The effects of soil stripping and stockpiling will be mitigated through the implementation of an earthworks handling protocol by the Contractor. ▪ Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment is free of nuisance dust and dirt on roads. ▪ A suitably qualified person will carefully monitor excavation works at the location to identify and segregate any potentially contaminated soil from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil will be tested and classified as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication, HazWasteOnline tool or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with *EC Decision 2003/33/EC*. It will then be removed from the site by a suitably permitted waste contractor to an authorised waste facility. Sources of Engineering Fill and Aggregates ▪ All imported fill and aggregate that may be required for the proposed development will be sourced from reputable suppliers. All suppliers will be vetted for: o Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development; o Environmental Management status; and o Regulatory and Legal Compliance status of the Company Fuel and Chemical Handling ▪ Designation of a bunded refuelling areas on the site if refuelling cannot be undertaken off site; ▪ Provision of spill kit facilities across the site; ▪ Where mobile fuel bowsers are used the following measures will be taken: o Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use. o The pump or valve will be fitted with a lock and will be secured when not in use. o All browsers are to carry a spill kit. o Operatives must have spill response training. o Drip trays will be used on any required mobile fuel units. ▪ In the case of drummed fuel or other potentially polluting substances which may be used during construction, the following measures will be adopted:

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	o Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area; o Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage; o All drums to be quality approved and manufactured to a recognised standard; o If drums are to be moved around the site, they will be secured and on spill pallets; and o Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment. ▪ All contractors will be required to implement mitigation measures discussed above. ▪ All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed by the contractor prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash-down and washout of concrete transporting vehicles will take place at a designated wash out point on site. Environmental Procedures ▪ There will be comprehensive emergency response procedures and standard operating procedures to respond to chemical spillage of all types. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures.
Water & Hydrology	Demolition Phase None Construction Phase ▪ The Outline CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures. ▪ The Outline CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site. All mitigation measures outlined here, and within the Outline CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to consent conditions which may be imposed ▪ An emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process. This plan will include for events such as: o Pollution incidents: These may involve spillages, the malfunction of temporary structures, embankment collapse, acts of vandalism, fires, and other related events. o Extreme weather occurrences: Events such as heavy rainfall, flooding, are important factors to consider due to their potential impact on the construction process.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	▪ The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be informed of the emergency measures in place. **Surface Water Run-Off** ▪ Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. ▪ Should any discharge of construction water be required during the construction phase, discharge will be to the surface water network. Therefore there will be interaction between silt laden construction water and surface water quality combined with Pre-treatment and silt reduction measures on site and hydrocarbon interceptors. All refuelling will be carried out at adequate distances away from waterbodies from doubled skinned bowsers and spill kits will be available at all times. ▪ Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be low and limited to localised perched water. It is therefore proposed that the water be discharged via the existing stormwater sewer network. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer. There shall be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry, however this is expected to be low due to the low permeability of the subsoils and the relatively shallow nature for excavations. Likewise, infiltration to the underlying aquifer is not anticipated (Refer to Chapter 9 (Land, Soils, Geology and Hydrogeology) for further details). ▪ Run-off water containing silt will be contained on-site via settlement tanks/lagoons and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds). ▪ The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted and/or backbucketed to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the stormwater drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Soil from works will be stored away from existing drainage features to remove any potential impact. ▪ Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from surface water drains will be maintained. **Fuel and Chemical Handling** ▪ The following mitigation measures will be taken at the construction stage in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts: o Designation of a bunded refuelling areas on the site; o Provision of spill kit facilities across the site;

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	o Where mobile fuel bowsers are used the following measures will be taken: Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use. The pump or valve will be fitted with a lock and will be secured when not in use. All bowsers to carry a spill kit. Operatives must have spill response training. Bowsers to be double skinned. ▪ In the case of drummed fuel or other potentially polluting substances which may be used during construction, the following measures will be adopted: o Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area; o Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage; o All drums to be quality approved and manufactured to a recognised standard; o If drums are to be moved around the site, they will be secured and on spill pallets; and o Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment. **Cement/Concrete Works** ▪ Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. ▪ No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Washouts will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer submit to agreement with Uisce Éireann. ▪ The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the Site will be suitably trained in the implementation of the procedures. **Soil Removal and Compaction** ▪ Excavated soil and stone surplus to requirements on-site will be taken for appropriate offsite reuse, recovery, recycling and/or disposal. ▪ Dredge material will be taken for appropriate offsite reuse, recovery, recycling and / or disposal. ▪ Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any surface water drains and surface waterbodies (Carlingford Lough). Movement of material will be minimised to reduce degradation of soil structure and generation of dust. ▪ All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor. **Environmental Procedures**

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Aspect	Mitigation
	▪ There will be comprehensive emergency response procedures and standard operating procedures to respond to chemical spillage all types. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures
Biodiversity	**Mitigation Measure No. 1** Where feasible, the timing of the clearing of the vegetation within the 'Residential Site' will avoid the bird breeding season (March-August inclusive). Where the construction programme does not allow this seasonal restriction to be observed, a pre-clearance check of that area of the proposed development site for nests will be carried out by a suitably qualified ecologist in advance of commencing the clearance. Where it can be confirmed that no nesting birds are present, the clearance will commence. Where breeding birds are confirmed to be present, the clearance must not commence until it can be confirmed that the chicks have fledged. **Mitigation Measure No. 2** Prior to any works commencing the Outline Construction Environment Management Plan (OCEMP) included with this application will be reviewed and updated by the Contractor to become the Construction Environment Management Plan (CEMP) . It will, *inter alia*, include all of the mitigation measures detailed in this section. The CEMP will be reviewed by a qualified ecologist to ensure it meets the requirements of this chapter and the Natura Impact Statement. The CEMP will include details of the following: ▪ Details of all chemical/fuel storage areas (including location and bunding to contain run-off of spillages and leakages). ▪ Details of how and where hazardous wastes such as oils, diesel and other hydrocarbon or other chemical waste are to be stored and disposed of in a suitable manner. ▪ Details of emergency plan to deal with the containment of chemical spillage, cement spillage. ▪ Truck wheel wash details (including measures to avoid and treat runoff). ▪ Site run-off management, including details of appropriate containment measures to be put in place at the quayside to prevent contamination of the lough. ▪ A Waste Management Plan (WMP) which clearly sets out the Contractor's proposals regarding the treatment, storage and disposal of waste. ▪ In addition, the CEMP will detail the relevant person with overall responsibility for the implementation for the CEMP. **Mitigation Measure No. 3** Care will be taken at all times to avoid contamination of the environment with cementitious material. Such measures will be detailed in the CEMP. Specifically, this should detail measures to: ▪ Assess where any wastewater associated with the use of cement will run and the most appropriate way to dispose of it. ▪ Ensure that an appropriate area of the site, at least 50m from the marine area, is designated for concrete WASHOUT. Further, ensure this area is away from

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Aspect	Mitigation
	stormwater drains or that drains and gutters in the vicinity have been blocked off. ▪ Use spill mats to contain any spills. ▪ Use sandbags or diversion booms to direct any run-off to an appropriate safe location away from marine areas. ▪ Ensure proper management in the event of an accidental spill. **Mitigation Measure No. 4** The assessment of impacts indicated that the accidental spillage of hydrocarbons had the potential to lead to a localised significant impact on the receiving environment. Therefore, the following mitigation will be implemented during the construction phase to avoid the possibility of accidental spillage of any hydrocarbons associated with the use of plant, machinery or inshore vessels (if used). The proper use and storage of oils and fuels as set out below will be implemented by the appointed contractor. ▪ A designated area within the site compound will be established for the storage of plant, machinery and materials during the construction phase of the project. The site compound will be suitably located with due regard for the receiving environment and in particular the sensitive receiving waters. ▪ Where feasible plant and machinery will be refuelled at a dedicated refuelling area within the site compound with appropriate spill controls in place. ▪ All plant and machinery will be regularly checked for leaks. ▪ Any hydrocarbons used on the project site will be contained within a bunded container or area. ▪ A hydrocarbon oil boom to be available at all times onsite in the event of it needing to be deployed. ▪ If required, generators to be on a hydrocarbon mat at all times. OR appropriately self binned ▪ Spill kits to deal with any accidental spillage of hydrocarbons will be available at the project site. ▪ The roles and responsibilities of construction and associated staff regarding the protection of the receiving environment will be clearly set out and documented. **Mitigation Measure No. 5** The assessment of impacts indicated the potential for the introduction of IAS associated with plant and small vessels working in the intertidal and subtidal areas. Therefore, the following mitigation will be implemented by the developer: Boats, barges and marine equipment working in the intertidal and nearshore area will be free of fouling by the use of appropriate application of antifouling paints and/or washdowns for smaller boats and plant. All visible hitchhikers will be removed from any tracked plant and equipment entering the intertidal area. **Mitigation Measure No. 6** Where feasible, any pile driving element of the marine piling works will not take place between the 20th of May and the 30th of June. Where the construction programme does not allow this seasonal restriction to be observed, a pre-construction check of the

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	breakwater for nesting black guillemot will be carried out by a suitably qualified ecologist in advance of commencing the pile driving works. Where it can be confirmed that no nesting birds are present, the pile driving will commence. Where birds are confirmed to be present, the pile driving works must not commence until it can be confirmed that the chicks have fledged, and the site has been abandoned. **Mitigation Measure No. 7** Where feasible, any rock-breaking element of the capital dredge will not take place between the 20th of May and the 30th of June. Where the construction programme does not allow this seasonal restriction to be observed, a pre-construction check of the breakwater for nesting black guillemot will be carried out by a suitably qualified ecologist in advance of commencing the rock-breaking works. Where it can be confirmed that no nesting birds are present, the rock breaking will commence. Where birds are confirmed to be present, the rock-breaking works must not commence until it can be confirmed that the chicks have fledged, and the site has been abandoned. **Mitigation Measure No. 8** To mitigate any startle effect from the pile-driving element of the piling works on overwintering birds, a suitably qualified observer will monitor that aspect of the works, and piling driving will start later than the general construction operation commencement on each day to ensure a slow start-up to habituate the birds. **Mitigation Measure No. 9** NPWS (2014) provides guidance to manage the risk to marine mammals from man-made sound sources in Irish waters. This document provides guidance and mitigation measures to address key potential sources of anthropogenic sound that may impact negatively on marine mammals in Irish waters. The mitigation methods should follow the guidance prescribed by the NPWS to avoid PTS. The guidance set out in NPWS (2014), **Mitigation Measure No. 10** A suitably qualified, and experienced Marine Mammal observer is to supervise piling and dredging to implement NPWS (2014) Guidelines (and any amendments) **Mitigation Measure No. 11** A pre-demolition bat survey of structures proposed for demolition will be carried out by a suitably qualified ecologist.
Coastal Processes	▪ A documented Accident Prevention Procedure will be put in place before commencement. ▪ A documented Emergency Response Procedure will be put in place before commencement.
Noise & Vibration	**Hours of Work** ▪ Construction Working Hours, except for dredging and pile driving works, will generally be limited to the hours 0700 – 2000 Monday to Friday and 0700 – 1600 hours on Saturday. Some works have to be undertaken at low tide and their construction hours will be linked to tides (for example works associated with the pontoon construction and quay wall).

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	Pile driving works will be limited to 0800-1800 Monday to Friday and 0800 - 1600 hours on Saturday. It is not envisaged that works will take place on public holidays. Dredging, due to the nature of the activity, is undertaken on a 24 hour basis to achieve the maximum production rates within tidal envelopes Dredging activities will occur for approximately 8-10 weeks. If works are required outside of these hours, in exceptional circumstances, the planning authority will be notified in advance **Liaison with Interested Parties** ▪ The contractor will appoint a liaison officer to ensure that any issues from the local community are dealt with promptly and efficiently during construction. These details will be included in the contractor's CEMP **Selection of Quiet Plant** ▪ Careful consideration must be given to the noise emission levels of plant items when they are being considered for use on the site. **Control of Noise Sources** ▪ If the use of low noise plant or replacing a noisy item of plant are not viable or practicable options, consideration should 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, often 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. ▪ BS5228 states that *"as far as reasonably practicable sources of significant noise should be enclosed".* In applying this guidance, constraints such as mobility, ventilation, access and safety must be taken into account. Items suitable for enclosure include pumps and generators. Demountable enclosures that could be moved around site as necessary may also be used to screen operatives using hand tools such as angle grinders. ▪ BS5228 makes a number of recommendations in relation to "use and siting of equipment". These are relevant and hence are reproduced below. These recommendations should be implemented on the site. o *"Plant should always be used in accordance with manufacturers' instructions. Care should be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading should also be carried out away from such areas.* o *Circumstances can arise when night-time working is unavoidable. Bearing in mind the special constraints under which such work has to be carried out, steps should be taken to minimise disturbance to occupants of nearby premises.* o *Machines such as cranes that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. Machines should not be left running unnecessarily, as this can be noisy and waste energy.* o *Plant known to emit noise strongly in one direction should, when possible, be orientated so that the noise is directed away from noise-sensitive areas. Attendant operators of the plant can also benefit from this acoustical*

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	phenomenon by sheltering, when possible, in the area with reduced noise levels. o *Acoustic covers to engines should be kept closed when the engines are in use and idling. The use of compressors that have effective acoustic enclosures and are designed to operate when their access panels are closed is recommended.* o *Materials should be lowered whenever practicable and should not be dropped. The surfaces on to which the materials are being moved could be covered by resilient material."* ▪ Also note the following outline guidance in relation to specific considerations which may be deployed as required by the contractor. o 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 should be switched off when not in use and not left idling. o For piling plant, noise reduction can be achieved by enclosing the driving system in an acoustic shroud. For steady continuous noise, such as that generated by diesel engines, it may be 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. o 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 ensuring any leaks in the air lines are sealed. Erect localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries. o For all materials handling ensure that materials are not dropped from excessive heights and drop chutes/dump trucks are lined with resilient materials. o For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation. o Demountable enclosures can also be used to screen operatives using hand tools and may be moved around site as necessary. o All items of plant should 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** ▪ Site hoarding along the boundary between the construction site and the residential receptors that will provide a degree of barrier screening. Any screening will incorporate existing boundary walls on the site (i.e. where a suitable 2 – 2.4m boundary wall exists there is no need to install hoarding in that specific location). Further benefits may be achieved through the use of additional smaller localized screens on the site itself. ▪ The use of screens can be effective in reducing the noise level at a receiver location and should be employed as a complementary measure to all other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen and its position relative to both the source and receiver. The height and length of any screen should, where practicable, be such that there is no direct line of sight between the source and the receiver.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	▪ BS 5228 states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the screen should be such that there are no gap or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the barrier rather than the transmission through the barrier itself.
Air Quality	**Communications** ▪ Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses. ▪ The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details. **Site Management** ▪ A feedback register will be kept on site detailing all correspondence received in connection with dust or air quality concerns, together with details of any actions carried out. **Preparing and Maintaining the Site** ▪ Plan site layout so that machinery and dust causing activities are located away from sensitive receptors, as far as is possible. ▪ Avoid site runoff of water or mud through the use of bunds. ▪ Keep site fencing, barriers and scaffolding clean using wet methods. ▪ Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. ▪ Cover, back bucket, seed or fence stockpiles to prevent wind whipping. **Operating Vehicles / Machinery and Sustainable Travel** ▪ Ensure all vehicles switch off engines when stationary - no idling vehicles. ▪ Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. ▪ Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). ▪ Produce a Traffic Management Plan to manage the sustainable delivery of goods and materials. ▪ Implement a Traffic Management that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing) **Operations** ▪ Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. ▪ Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. ▪ Use enclosed chutes and conveyors and covered skips.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	▪ Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. ▪ Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. **Waste Management** ▪ No bonfires or burning of waste materials. **Demolition Phase** ▪ Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). ▪ Water suppression should be used, preferably with a hand-held spray. Cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used. ▪ Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed. ▪ Avoid explosive blasting, using appropriate manual or mechanical alternatives. **Earthworks** ▪ Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. ▪ Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. ▪ Only remove the cover in small areas during work and not all at once. ▪ During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust. **Construction** ▪ Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are identified and put in place where possible. ▪ Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. ▪ For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. **Trackout** ▪ A site speed restriction of 15 kph will be applied as an effective control measure for dust for on-site vehicles. ▪ Avoid dry sweeping of large areas. ▪ Ensure truck bodies entering and leaving sites are covered to prevent escape of materials during transport. ▪ Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	▪ Record all inspections of haul routes and any subsequent action in a site log book. ▪ Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. ▪ Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). ▪ Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. ▪ Access gates to be located at least 10m from receptors where possible.
Climate	▪ Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. ▪ Ensure all plant and machinery are well maintained and inspected regularly. ▪ Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site. ▪ Waste materials will be re-used on site where possible and where re-use is not possible on-site they will be sent off-site for recycling, re-use or recovery. ▪ Sourcing materials locally where possible to reduce transport related CO2 emissions. ▪ Materials with a reduced environmental impact will be incorporated into the construction design through re-use of materials or incorporation of recycled materials in place of conventional building materials. The following materials will be considered for the construction phase: o Ground Granulated Blast Furnace Slag (GGBS) & Pulverised Fuel Ash - used where feasible as replacements for Portland cement to increase sustainability and carbon footprint of civil and structural works; and o Steel - the carbon emissions emitted during the production of virgin steel can be higher than some other structural materials on a tonne by tonne basis, and therefore, recycled steel will be used where possible. Additionally, where possible the steel reinforcement used will be supplied directly from stocks within the port or on backloads from the reinforcement providers for the port development, thereby reducing CO_2 emissions associated with its transportation.
Cultural Heritage: Archaeological Heritage	▪ An Archaeologist experienced in maritime archaeology will be retained by the developer for the duration of the relevant works i.e. all terrestrial, inter-tidal/foreshore and seabed disturbances associated with the development. ▪ An Archaeology Management Plan will be prepared by the archaeologist to prepare the protocols that ensure proper management and response to archaeological monitoring, recording and resolution that will be required in the course of the project. ▪ Archaeological monitoring will be carried out by suitably qualified and experienced maritime archaeological personnel licensed by the DHLGH. Archaeological monitoring is conducted during all terrestrial, inter-tidal/foreshore and seabed disturbances associated with the development. The monitoring will be undertaken in a safe working environment that will facilitate archaeological observation and the retrieval of objects that may be observed and that require consideration during the course of the works. The monitoring will include a finds retrieval strategy that is in compliance with the requirements of the National Museum of Ireland.

Table 19.2 Demolition & Construction Mitigation

Aspect	Mitigation
	▪ Archaeological licences for monitoring and site investigations of terrestrial and nearshore environments will be acquired from the Department of Housing, Local Government and Heritage (DHLGH), as necessary. ▪ In the event of archaeologically significant features or material being uncovered during the construction phase, machine work will cease in the immediate area to allow the archaeologist/s to inspect any such material. Once the presence of archaeologically significant material is established, full archaeological recording of such material will be recommended. If it is not possible for the construction works to avoid the material, full excavation will be recommended. The extent and duration of excavation will be a matter for discussion between the client and the licensing authorities. ▪ Where any archaeologically significant/potential material is identified in the course of the seabed disturbance activities, these works will stop pending a dive inspection by an archaeological dive team. The dive team would deal with any rescue excavation required. The dive team and all in-water work will conform to the Port's safety protocols for Diving at Work ▪ Secure wet storage facilities will be provided on site to facilitate the temporary storage of artefacts that may be recorded during the course of the site work. ▪ Buoying/fencing of any such areas of discovery will be necessary if discovered during excavation. ▪ Machinery traffic during construction will be restricted to avoid any identified archaeological site/s and their environs. ▪ Spoil will not be dumped on any of the selected sites or their environs. ▪ All site work will be conducted in strict compliance and accord with STATUTORY INSTRUMENTS: S.I. No. 299 of 2007: Safety, Health and Welfare at Work (General Application) Regulations, 2007; and STATUTORY INSTRUMENTS: S.I. No. 254 of 2018 as amended by S.I. No. 180 of 2019, HSA Safety, Health and Welfare at Work (Diving) Regulations, 2018-2019, where required. ▪ It is a condition of archaeological licensing that a detailed project report is lodged with the DHLGH within 12 months of completion of site works. The reports will be particular to each licence granted. The reports should be to publication standard and should include a full account, suitably illustrated, of all archaeological features, finds and stratigraphy, along with a discussion and specialist reports. Artefacts recovered during the works need to meet the requirements of the National Museum of Ireland in terms of recording, conservation and storage ▪ Dredging in the vicinity of the breakwater to ensure that the dredging does not undermine the base of the breakwater and avoid impacts to superstructure.
Cultural Heritage: Built Heritage	None

Table 19.3 Operational Mitigation

Aspect	Mitigation
Population & Human Health	None
Landscape & Visual	**Lighting** ▪ Lighting has been designed to minimise the potential for light spillage into the surrounding area through the use of suitable directional lighting centred to fall within the site. ▪ The lighting will be only on as required to provide safe access through the site during operations and for security cover of the site. **Maintenance** ▪ The landscape scheme will be implemented and maintained in accordance with the proposed landscape plans and specifications.
Material Assets: **Traffic & Transport**	▪ The Occupants will prepare a Modal Management Plan and encourage sustainable travel to work
Material Assets: **Built Services**	▪ SuDS features will be maintained appropriately throughout the operational phase of the development by the relevant management body. ▪ Interceptors & COSHH stores will be maintained during the Operational phase of the development by the relevant management body. ▪ NZEB technologies employed in the development will continue to be maintained throughout the operational phase of the development by the relevant management body.
Material Assets: **Waste**	▪ All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins, skips or other suitable receptacles in a designated, easily accessible areas of the site. o The Operator(s) / Facilities Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – for the authoring and implementation of an Operational Waste Management Strategy, ensuring a high level of recycling, reuse and recovery at the site of the proposed development. o The Operator / Facilities Manager will regularly audit the onsite waste storage facilities and infrastructure, and maintain a full record of waste documentation for all waste movements from the site. ▪ The Operator will ensure on-Site segregation of all waste materials into appropriate categories, including (but not limited to): o Organic waste; o Dry Mixed Recyclables; o Mixed Non-Recyclable Waste; o Glass; o Waste Oil; o Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment; o Batteries (non-hazardous and hazardous); o Light bulbs; o Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and

Table 19.3 Operational Mitigation

Aspect	Mitigation
	o Bulky Items ▪ The Operator will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials; ▪ The Operator will ensure that all waste collected from the site of the proposed development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and ▪ The Operator will ensure that all waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.
Land, Soils & Geology	None
Water & Hydrology	None
Biodiversity	**Mitigation Measure No. 12** The assessment of impacts indicated that the accidental spillage of hydrocarbons from smaller vessels using the pontoon had the potential to lead to a localised impact on the receiving environment. Therefore, the following mitigation will be implemented during the operational phase of the project to avoid the possibility of accidental spillage of any hydrocarbons: ▪ Refuelling of vessels via decanting from containers will not be permitted at the pontoon or within the port area. ▪ Bilges and/or ballast water (if relevant) will not be emptied at the pontoon. ▪ Detergent will not be used to clear up small spills of hydrocarbons. Oil absorbent cloths will be used instead. ▪ Greenore Port will maintain a kit of oil absorbent cloths and small booms to deal with accidental spillages. ▪ Oil absorbent collars will be fitted around the fuel nozzle to catch any drips or overflow. ▪ Clear signage indicting refuelling protocols will be displayed at the pontoon. **Mitigation Measure No. 13** The assessment of impacts indicated the potential for the introduction of IAS through small boats using the marina. Therefore, the following mitigation will be implemented by the developer: ▪ Recreational vessels will not be permitted to use the pontoon. ▪ Ballast water (if relevant) will not be discharged within the port area. ▪ Regular inspections of the hulls of visiting vessels for obvious IAS will be carried out by the operators. ▪ Clear signage indicating biosecurity protocols will be displayed at the pontoon. ▪ Staff will be trained in the identification of obvious IAS. ▪ Fouled vessels should not be allowed to enter the pontoon area. ▪ Any IAS recorded will be reported to the National Biodiversity Data Centre. **Mitigation Measure No. 14**

Table 19.3 Operational Mitigation

Aspect	Mitigation
	Outside of Carlingford Lough, disturbance to marine mammals during operation may occur as vessel traffic will increase. The new quay wall and pontoons will provide berths for up to 11 CTV which will access the North Irish Sea from Greenore. These vessels will be required to use existing channels on the approach to and from the port. Each vessel pilot and captain is responsible to act accordingly and slow speeds to match environmental conditions and restrict any risk of wake. Once clear of the Lough vessels will reach operational speed, which could cause disturbance and a collision risk to marine mammals. In accordance with Maritime Notice 15, a speed limit of 7knots is to be adhered to when encountering areas of mammal populations. These routes have not yet been established and disturbance and displacement will need to be considered by each ORE project through the environmental assessment undertaken for those projects. **Mitigation No. 15** Post-construction (Phase 1 and Phase 2) survey of seals in June and September to ensure haul out sites still being used by common and grey seals.
Coastal Processes	None
Noise & Vibration	▪ As a general mitigation, As part of the detailed design of the development, Selection of quiet plant items and, where necessary, appropriately selected remedial measures (e.g. enclosures, silencers etc.) will be specified in order that the adopted plant noise criteria is achieved at the façades of noise sensitive properties. ▪ a range of 'good practice' measures are recommended for operatives that arrive to site from the Shore Road Car Park: o Vehicle engines shall not be left idling once on site. o Drivers should minimise impact sounds whilst exiting or entering their vehicle. o All radios and amplified music in the vehicles shall be turned off prior to the doors being opened. o There should be no unnecessary shouting or communicating in raised voices whilst on site. o There should be no unnecessary sounding of horns whilst on site.
Air Quality	None
Climate	▪ Achieve air permeability rate of 3 m3/m2/hr @ 50Pa; ▪ Ensure every effort is made to reduce the risk of thermal bridging by upgrading the façade to ensure continuity of insulation. This is to limit local thermal bridging as much as practically possible where an existing construction element to be retained shows risk of thermal bridging; ▪ Building fabric U-Value calculations will be completed to at least meet the requirements of TGD Part L in relation to thermal performance; ▪ Central ventilation systems with heat recovery will be used to retain as much heat as possible. Amenities will be designed for mechanical ventilation with occupancy sensing to minimize the time for overrun; ▪ The space heating and domestic hot water system will likely be provided by a central heat pumps system with optional back up/tie-in to future district heating system. The final system will be selected based on operating cost and efficiency mandated by TGD Part L. it is likely that VRF Air condition systems will be utilised to meet the space heating demand and NZEB requirements; ▪ The following NZEB technologies will be considered for this development:

Table 19.3 Operational Mitigation

Aspect	Mitigation
	o Centralized air to water heat pumps o Photovoltaic system for on-site electricity use o District Heating o Combined heat and power (CHP) for thermal and electricity generation ▪ The electrical design will require that all lighting be LED with occupancy sensing where required.
Cultural Heritage: Archaeological Heritage	None
Cultural Heritage: Built Heritage	None

19.4 Monitoring Measures

Tables 19-4 and 19-5 below summarise the recommended monitoring measures for the demolition, construction, and operational stages.

Table 19.4 Demolition & Construction Monitoring

Aspect	Monitoring
Population & Human Health	None
Landscape & Visual	None
Material Assets: Traffic & Transport	▪ The contractor will be required to ensure construction activities operate within the parameters set out in the Contractors CEMP and the Construction Traffic Management Plan.
Material Assets: Built Services	None
Material Assets: Waste	▪ Recording of waste generation should be maintained to advise on future developments. ▪ The appointed Resource Manager will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. ▪ Where targets are not being met, the Resource Manager will identify the reasons for this and work to resolve any issues.
Land, Soils & Geology	Construction ▪ Regular inspection of surface water run-off and sediments controls (e.g., silt traps); ▪ Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off; ▪ Excavation works to be monitored to record any signs of potentially contaminated soil; ▪ Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). ▪ Soil sampling of excavated soils and monitoring of surface water run off will be required in case of accidental discharges to underlying geology.

Table 19.4 Demolition & Construction Monitoring	
Aspect	**Monitoring**
Water & Hydrology	▪ Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all storage is located at least 20 m from surface water receptors. ▪ Regular inspection of surface water run-off and sediments controls will be implemented throughout the construction phase and full adherence to the Outline Construction Environmental Plan will be maintained. ▪ Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life. ▪ Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off; and ▪ Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc). ▪ Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network.
Biodiversity	None
Coastal Processes	None
Noise & Vibration	▪ The contractor will be required to ensure construction activities operate within the noise limits set out within this assessment. ▪ Any noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.
Air Quality	**Site Management** ▪ During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. Dry and windy conditions are favourable to dust suspension therefore mitigations must be implemented if undertaking dust generating activities during these weather conditions. ▪ Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust and record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary. ▪ Monitoring of construction dust deposition (including dust from demolitions) at nearby sensitive receptors will be carried out to ensure mitigation measures are working satisfactorily. This will be done using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 $mg/m^2/day$ during the minimum monitoring period of between 28 - 32 days. If construction dust deposition rates exceed 350 $mg/m^2/day$, site procedures will be reviewed and improved to achieve a level below 350 $mg/m^2/day$. ▪ Increase the frequency of site inspections by the person accountable construction dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions

Table 19.4 Demolition & Construction Monitoring

Aspect	Monitoring
Climate	None
Cultural Heritage: Archaeological Heritage	The mitigation measures included in Section 16.9 include a number of monitoring requirements during the construction phase.
Cultural Heritage: Built Heritage	None

Table 19.5 Operational Monitoring

Aspect	Monitoring
Population & Human Health	None
Landscape & Visual	▪ Inspection of planting to ensure the planting becomes established over the initial years and any failed planting is duly replaced
Material Assets: Traffic & Transport	None
Material Assets: Built Services	▪ Appropriate measures to maintain surface water drainage systems and infrastructure shall be put in place such as tank & bund monitoring alarms.
Material Assets: Waste	▪ waste generation volumes should be monitored by the Operator / Buildings Management ▪ There may be opportunities to reduce the number of bins and equipment required in the Waste Storage Area (WSA's), where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contractor costs.
Land, Soils & Geology	▪ Maintenance of the surface water drainage system, including separators / interceptors, and foul sewers is recommended to minimise any accidental discharges to soil or groundwater. ▪ Monitoring of surface water run off will be required in case of accidental discharges to underlying geology
Water & Hydrology	▪ Oil separators will be maintained and cleaned out in accordance with the manufacturer's instructions. ▪ Maintenance of the surface water drainage system and foul sewers is recommended to minimise any accidental discharges to surface water.
Biodiversity	None
Coastal Processes	None
Noise & Vibration	None
Air Quality	None
Climate	None
Cultural Heritage: Archaeological Heritage	None
Cultural Heritage: Built Heritage	None