



LOUTH COUNTY COUNCIL

NATURA IMPACT STATEMENT

FOR

PROPOSED COASTAL PROTECTION WORKS, BALLYNAMONY (MURPHY), BALLAGAN, GREENORE, Co. LOUTH

VOLUME I. REPORT

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2	CARLINGFORD SHORE SAC [002306] CARLINGFORD LOUGH SPA [004078]

1 INTRODUCTION

1.1 Project Planning Background

Louth County Council wishes to carry out coastal protection works at Ballynamony (Murphy), Ballagan, County Louth (see Figures 1-5 and Plate 1 below).



Plate 1. Aerial photograph taken at 50m elevation taken from seaward facing in an easterly direction towards proposed coastal works protection area which is approximately 245m in length

It is understood that the current coastal protection infrastructure was constructed at Ballynamony (Murphy), Ballagan some time ago. This consists of a wall of concrete approximately 1.2m to 1.3m high that appears to have been constructed against a rock armour consisting of various sizes of rounded and subrounded marine boulders which were collected from the shore (see Plate 2 below).



Plate 2. 4K Aerial photograph taken at 40m elevation over foreshore facing in a southerly direction showing the northern end of the damaged seawall with collapsed concrete capping

This wall has been damaged in places with wave action undermining its foundation or seawater penetrating through cracks/breaks and washing out the gravel and boulders behind the wall (see Plate 3 below).



Plate 3. Ground photographs of seawall with crack caused by sea erosion

At certain sections of the seawall a concrete cap was placed on top. This cap runs to the edge of the roadway. The cap has collapsed downwards at a number of locations with the seawall then collapsing towards the roadway and exposing the boulders and gravel behind the seawall to wave action and subsequent erosion (see Plate 4 below and following Plate 5).



Plate 4. Concrete cap along seawall showing evidence of erosion at the cap seawall interface at the top and where the cap and seawall have collapsed exposing the gravel and boulder foundations to erosion



Plate 5. Areas along seawall where concrete cap has completely collapsed and buckled inwards

In order to proceed with the proposed coastal protection works, Louth County Council are required to submit a planning application to An Bord Pleanála under Section 177AE (relating to Appropriate Assessment (AA)) of the Planning and Development Act, 2000, as amended. Given the location of the site proposed for the coastal protection works, which are inside a Natura 2000 site, an appropriate assessment screening process is required with a natura impact statement prepared for the application. The results of the appropriate assessment screening process are discussed in the following section, Section 3. This document provides information to allow the planning authority (An Bord Pleanála) to carry out a planning assessment of the proposed project. This document will assess whether significant effects to the integrity of the Natura 2000 network are likely to occur as a result of granting planning permission in accordance with Article 6(3) of the Habitats Directive and the Planning and Development (Amendment) Act. It will determine whether mitigation measures are required to ensure that negative effects can be avoided to the Natura 2000 network. Article 6(3) of the Habitats Directive and the Planning and Development (Amendment) Act states the following:

'6. Appropriate Assessment screening

On the basis of the information provided with the application and in the absence of screening for Appropriate Assessment /Natura Impact Statement the Planning Authority cannot be satisfied that the proposed development (which is within Carlingford Shore SAC) individually, or in combination with other plans or projects would not be likely to have a significant effect on the designated Natura 2000 site or any other European site, in view of the site's Conservation Objectives. The applicant is therefore requested to undertake and submit a screening report for Appropriate Assessment and /or Stage 2 AA (NIS) in order to determine the likelihood of any significant adverse effects on the integrity of the aforementioned European sites in view of the sites' conservation objectives. (6 copies)'

1.2 Project Works Description

The objective of the proposed works at Ballynamony (Murphy), Ballagan is to provide coastal defences along a 229m stretch and repair the existing concrete stone seawall using a range of measures. These remedial measures can be summarised as follows:

- 0-4 metres – repointing of stonework;
- 4-15 metres – concrete crack repair;
- 15-35 metres – In situ concrete to fill voids of the existing sea wall;
- 35-75 metres – Break up damaged section of existing coastal defences and compact down. The sea wall is then to be replaced with composite concrete and boulders;
- 75-100 metres – In situ concrete infill to voids of existing sea wall;
- 100-144 metres – concrete crack repair;
- 144-150 metres – repointing of stonework;
- 150-159 metres – no works proposed;
- 159-164 metres – In situ concrete infill to voids of existing sea wall; and
- 189-229 metres – install rock armour.

2 METHODOLOGY FOR APPROPRIATE ASSESSMENT

2.1 Introduction

A number of guidance documents on the appropriate assessment process have been referred to during the preparation of this NIS, including:

- *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities* (DoEHLG 2009, Revised February 2010);
- *EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (2007)*;
- *Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (Nov. 2001 – published 2002);
- *Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (2000); and
- *European Communities (Birds and Natural Habitats) Regulations 2011* (DoEHLG 2011).

The assessment requirements of Article 6 of the Habitats Directive are commonly dealt with in a stage-by-stage approach. The stages as outlined in “*Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities*” are outlined below.

2.2 Stage 1 – Screening

This initial process identifies the likely impacts of a proposed project or plan upon a Natura 2000 site, either alone, or in combination with other projects or plans and considers whether these impacts are likely to be significant.

2.3 Stage 2 – Appropriate Assessment

The consideration of the impact of the project or plan on the integrity of the Natura 2000 Site, either alone or in combination with other projects or plans to the sites structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts.

2.4 Stage 3 – Assessment of Alternative Solutions

The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site.

2.5 Stage 4 – Assessment where Adverse Impacts Remain

An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed. It should be noted that neither Stage 3. Assessment of Alternative Solutions nor Stage 4. Assessment where Adverse Impacts Remain were applicable in this instance, as the proposed coastal protection works will not adversely affect the integrity of any Natura 2000 site and, in particular, it will not adversely affect the Carlingford Shore Special Area of Conservation [002306] and the Carlingford Lough Special Protected Area [004078] once mitigation measures are put in place.

3 SCREENING

According to the guidelines as laid by NPWS (2009), Appropriate Assessment Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

*' i) Whether a plan or project is directly connected to or necessary for the management of the site; and
ii) Whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.'*

As the footprint of the proposed Coastal Protection Works at Ballynamony (Murphy), Ballagan is inside the boundaries of both the Carlingford Shore Special Area of Conservation [002306] and the Carlingford Lough Special Protected Area [004078]; the works are, in effect, directly connected to both the SAC and the SPA, which are Natura 2000 Sites (see Figure 5). The purpose of the screening exercise is to inform the AA process in determining whether the proposed works, alone or in combination with other plans and projects, is likely to have significant effects on the Natura 2000 sites within the study area (and in particular on Carlingford Shore Special Area of Conservation [002306] and the Carlingford Lough Special Protected Area [004078]. If the effects are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the AA process must proceed to Stage 2 - Appropriate Assessment and the preparation of a Natura Impact Statement (NIS). Screening has been undertaken for this development in accordance with the European Commission's Guidance on Appropriate Assessment (European Commission, 2001) which comprises the following:

- Description of the Project/Works;
- Identification of Natura 2000 sites potentially affected by the Project/Works;
- Identification and description of individual and cumulative impacts likely to result from the Project/Works;
- Assessment of the significance of the impacts identified on the conservation objectives of the site(s); and
- Exclusion of sites where it can be objectively concluded that there will be no significant impacts on conservation objectives.

Please note that as a result of a European Court of Justice decision, Article 6(3) of Council Directive 92/43/EEC of 21st May, 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site.

Given that the proposed Coastal Protection Works are within Carlingford Shore Special Area of Conservation [002306] and the Carlingford Lough Special Protected Area [004078] and given the above ruling, although the screening process was 'stepped through' for this assessment, no AA

screening report was prepared for this development. This report, in effect ‘bypasses’ that stage and is a Natura Impact Statement for the proposed Coastal Protection Works as required under European and Irish legislation. However, a short AA Screening Report statement has been prepared and is included in Appendix 1 of this report.

4 FIELD WORK & REPORTING METHODOLOGY

4.1 Desk Study

A comprehensive GIS mapping and data review was carried out to identify all statutory protected areas and other non-statutory areas within 15km of the site. This involved a review of inland freshwater water ecosystems. All ecological, biological/Q-Index and hydrological/chemical monitoring data available from the websites of NPWS, National Biodiversity Data Centre, Bat Conservation Ireland, Louth C.C., EPA, GSI, OPW and WFD were reviewed. Information on protected species of fauna and flora listed for protection under Annex II of the EU Habitats Directive (92/43/EEC), Annex I of the Birds Directive (79/409/EEC) and the Wildlife (Amendment) Act (2000) will be sought from NPWS, the National Biodiversity Data Centre and published sources were reviewed. The National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage, Regional Rural and Gaeltacht Affairs database of designated conservation areas and NPWS records of rare and protected plant species were checked with regard to the location of the lands at Ballynamony (Murphy), Ballagan.

The online database hosted by the Irish National Biodiversity Data Centre (NBDC) (www.biodiversityireland.ie) was also utilised to assess the importance of the study area for mammals and bats. Other sources accessed to gather information on bats in the study area included The Bat Conservation Trust's report '*Distribution Atlas of Bats in Britain and Ireland 1980-1999*' (Richardson, 2000). The '*Irish Red Data Book 2: Vertebrates - Threatened Mammals, Birds, Amphibians and Fish in Ireland*' (Whilde, 1993) and the updated '*Irish Red List No.3: Terrestrial Mammals*' (Marnell *et al.* 2009) were also reviewed.

Recent, high resolution, colour aerial photographs were used to identify habitats of conservation value. Relevant mapping was prepared for this report through a combination of Autocad Map 2017 and ArcGIS Pro. Ornithological data submitted as part of previous Ecological Impact Assessments, Natura Impact Statements and Appropriate Assessment Screening reports for developments within the vicinity of site were reviewed.

4.2 Unmanned Aerial Vehicle (Drone) Photogrammetry Survey

Mulroy Environmental Ltd. carried out 4K photogrammetric drone survey of the site and the surrounding area on the 22nd June, 2023 and a 4K video survey of the site on the 13th September, 2023. Mulroy Environmental are licensed SOP holders with the Irish Aviation Authority/EASA and have drone specific insurance in addition to our normal Public and Employers Liability Insurance. The site is not in an IAA restricted flight zone and did not require SOP permission from the IAA. The purposes of the drone surveys were to familiarise Mulroy Environmental with the topography and vegetation of the site and to help in the production of drawings for report. Two dimensional orthomosaics were generated for each survey which were used in the production of detailed drawings for the site and in the accurate calculation of habitat area through their use in ArcGIS Survey 123. In addition, a 3D model of the site was produced which assisted in and in the mapping of habitats within the site.

4.3 ArcGIS Pro & Autocad Mapping

GIS maps of different scales were produced using the ArcGIS Pro computer programme. These maps were used to identify the proximity of the site to Special Areas of Conservation (SACs) and Special Protected Areas (SPAs), and to surrounding surface waters. SAC and SPA data was imported from NPWS and added as a layer (NPWS, 2023). Orthomosaics developed through drone photogrammetric surveys were imported into ArcGIS Pro and Autocad 2017 added as a map surface layer. The site boundary was identified and outlined within this map. A 15km buffer was created around a centre point within the site boundary.

4.4 Habitat Survey

A site-based habitat assessment was carried out on the 31st August and the 13th September 2023 using ArcGIS Survey123 software installed on a GPS enabled Samsung Galaxy Tab Active 4 Pro All Weather tablet. The habitat survey was carried out following the Heritage Council's *Best Practice Guidance* (Smith et al., 2011). Habitats were classified to Level 3 of the Heritage Council's classification (Fossitt, 2000), and also according to the *Habitats Directive types* (European Commission, 2013) where appropriate. In addition to habitat mapping, notes on plant species composition, structure and management were collected. Plant species were assigned a DAFOR abundance rating within each habitat. The DAFOR scale is presented in the following table, Table 1 which was modified from Smith et al. (2011) *Habitat Mapping Guidelines*.

Table 1. DAFOR Abundance Rating

RATING	DESCRIPTION
Dominant (D)	A Dominant species generally covers more than two-thirds of the habitat.
Abundant (A)	Abundant species typically cover between one-third and two-thirds of the habitat. A rule of thumb for evaluating Abundant species is 'everywhere you look you see lots'.
Frequent (F)	Commonly encountered species seen when walking through the habitat. 'Everywhere you look you see some'.
Occasional (O)	Occasional species generally have relatively low frequency and low cover. However, they do not have to be searched for to be found.
Rare (R)	Rare species are those that are only found once or a very few times during the survey, depending on the size of the habitat. Species cover is also very low where Rare species are found.
Locally Abundant (LA)	Used where overall occurrence of species is either occasional or rare, but species is abundant over a small area.

Plant nomenclature follows Stace (2010). Plant species identification was assisted by the PictureThis plant identification application with 98% accuracy (PictureThis, 2023). The identification and classification of these plants was also assisted by databases provided by the NBDC, the EPA, Teagasc, Biodiversity Ireland and the NPWS.

4.5 Bird Survey

A bird song survey was carried out along the foreshore to the northwest and southeast of the site location and along the proposed area for the coastal works on the 13th September 2023. This recording began at 8.38am and had a duration of 52 minutes. This survey was carried out using Cornell Lab Merlin Bird ID software application installed on a Samsung Galaxy Tab Active 4 Pro tablet. Bird sightings were also noted.

5 EXISTING ENVIRONMENT

5.1 Description of Works Area

The proposed coastal protection works site at Ballynamony (Murphy), Ballagan is approximately 245m by 3m in footprint and is located on the eastern edge of a country road which runs in a north to south direction. The site is approximately 2km to the southeast of Greenore Port (see Plates 6 and 7 below). The foreshore to the northeast and east of the site is populated with oyster beds that are farmed by Cooley Oysters Ltd. whose facility is located approximately 520m to the north of the site (see Figure 4 and following Plates 8 and 9 following).



Plate 6. Aerial photograph taken at 50m elevation to the east of the site facing in a north-westerly direction towards Greenore Port (note Hanlon's Transport yard on the right and Cooley Oyster farm with slipway on left)



Plate 7. Aerial photograph taken at 50m elevation to the north of the site facing in a southerly direction at low tide (note oyster beds on foreshore to the east and southeast of the proposed coastal protection works area)



Plate 8. Aerial photograph taken at 50m elevation to the north of the site facing in a northerly direction at low tide towards beds farmed by Cooley Oysters along foreshore (note tractors working on oyster beds to the right)

There are 5 residences within 100m of the edge of the proposed coast protection works with 1 residence directly to the west of the proposed coastal protection works (see Figures 7 and 8 and Plate 9 below).



Plate 9. Aerial photograph taken at 40m elevation at the southern end of the proposed coastal protection works area facing in a northerly direction (note oyster bed to the right i.e., the east)

5.2 Site History

A review of 25-inch historical Ordnance Survey mapping indicates the existence of the current road. However, the road ends in a cul-de-sac to the north of the site (see following Plate 10). An inspection of the mapping indicates that at that time only two of the current residences existed i.e., the cottage to the northwest of the proposed works area and another cottage to the southwest of the site (see Figure 7).

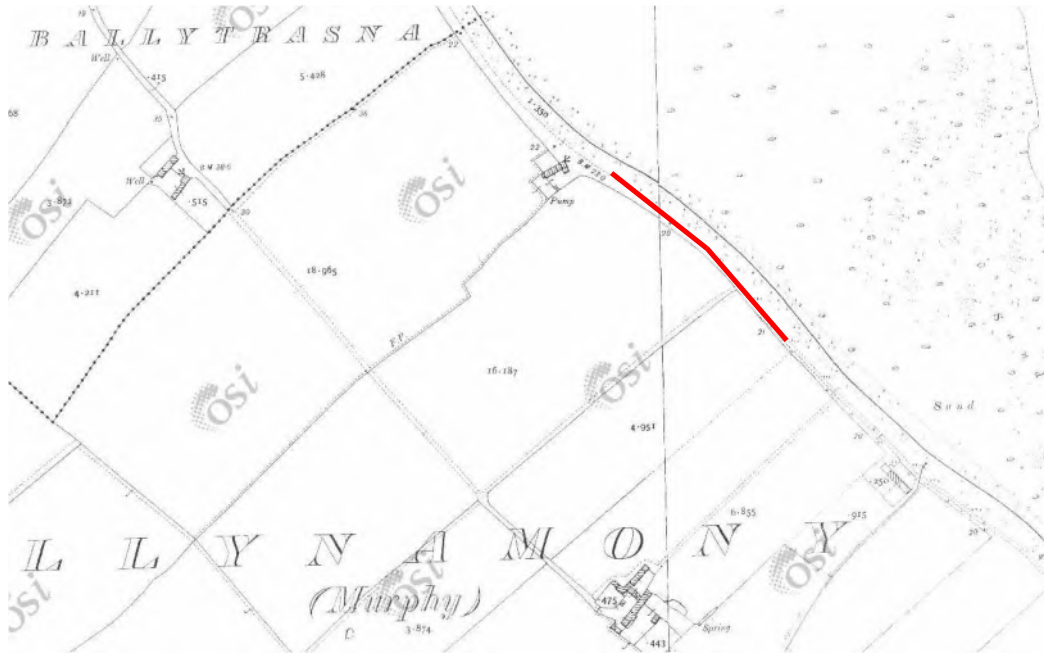


Plate 10. Extract of last Edition of 25-inch historical OS Mapping (note red LINE indicates the approximate location of the site)

5.3 Topography

The agricultural land to the west of the road is relatively flat with the exception of 2 isolated low-lying depressions to the south of the site where groundwater springs may exist. The overall regional topography of the area is characterised by the land closest to the site sloping gently from west to east towards the foreshore (see Plate 11 following).

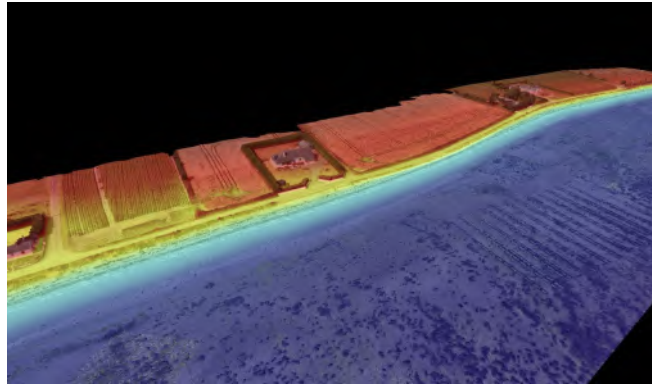


Plate 11. Extract of Dronedeploy 3D Elevation Model

The northeastern edge of the road adjacent to the works area has an elevation of 3.696m AOD at Chainage 0 (see proposed works layout in Figures 11 to 14). The elevation increases to 3.814m AOD at Chainage 60 and then decreases to 3.627m AOD at Chainage 120. The elevation then remains at approximately 3.62m AOD until the end of the works area at Chainage 229. The following plate, Plate 12 shows a section through the adjacent residence's front garden, the adjacent road, the seawall and down onto the foreshore. As can be seen from the section to the left of Plate 12, the elevation varies from approximately 4.65m AOD to 0m AOD (i.e., sea level) approximately 80m to the east on the foreshore. This consists of a wall of concrete approximately 1.2m to 1.3m high that appears to have been constructed against a rock armour consisting of various sizes of rounded and subrounded marine boulders which were collected from the shore (see Plate 12 below).

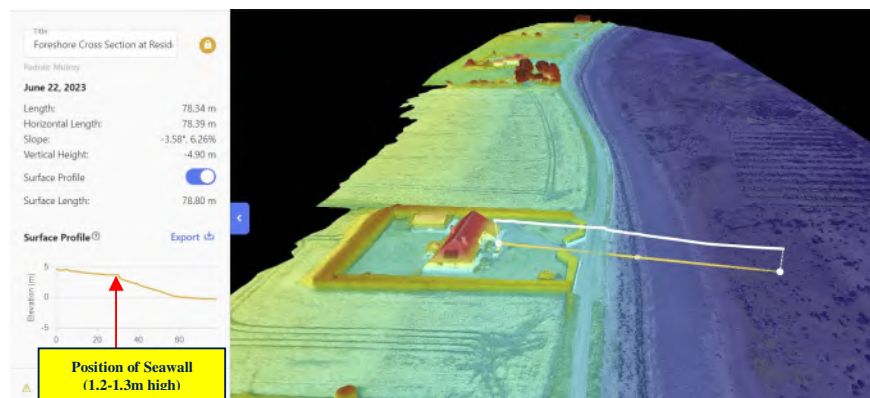


Plate 12. Cross-section through residence, road, seawall and foreshore prepared using Dronedeploy 3D Elevation Model

5.4 Surrounding Property & Infrastructure

Figure 4 shows the extent of the Shellfish Waters Directive Area for Carlingford Lough to the east of the Cooley Peninsula and the Ballynamony (Murphy), Ballagan Area. The processing building for a large oyster farm, Cooley Oysters is located approximately 460m to the northwest of the site (see Figures 4, 7 & 8). An extensive area of the foreshore to the east of this process building is farmed under licence by Cooley Oysters (see Plate 13 below).

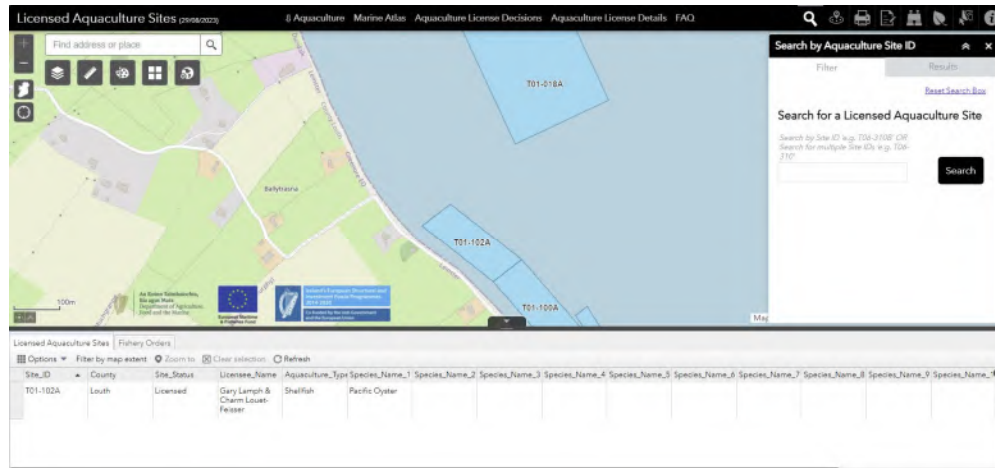


Plate 13. Extract of DAFM Licensed Aquaculture sites showing licensed oyster farms in the vicinity of the site

The foreshore to the east of the proposed coastal works area is also farmed under licence for oysters (see Figures 7 & 8 and Plate 14 below). This area is currently accessed by a licensed slipway and haul road which runs along the foreshore to provide access to the various licensed areas (see Plate 14 below).



Plate 14. Aerial photograph taken at 40m elevation to the southwest of the proposed coastal protection works area facing in a westerly direction (note position of licensed slipway)

5.5 Existing Stormwater Drainage

There are no surface water bodies, surface water infrastructure or land drains within the footprint of proposed coastal protection works or along its perimeter. The regional hydrology of the area is discussed in Section 5.7 of the report. At various locations along the road, hand dug ditches have been constructed to allow stormwater falling on the road to dissipate on to the foreshore.

5.6 Closest Designated Protected Sites

It should be noted that the site is approximately 15.6km to the southeast of the border with Northern Ireland. As part of the appropriate assessment only the potential impact to Special Areas of Conservation and Special Protected Areas (i.e., Natura 2000) sites are assessed. Natural Heritage Areas (i.e., within the Republic of Ireland) and Area of Special Scientific Interests (ASSIs) (i.e., within Northern Ireland) are not regarded as Natura 2000 sites and are not part of this assessment.

The works site is located within and on the edge of a Special Area of Conservation, Carlingford Shore SAC (002306) and a Special Protected Area, Carlingford Lough SPA (004078) which run along the shore's edge. A review of mapping indicates that the existing sea wall demarcates the western edge of both the SAC and the SPA (see Figure 6).

Another Special Area of Conservation, Carlingford Mountain SAC (000453) (and within the Rep. of Ireland) is located approximately 4.46km upgradient and to the northwest of the site (see Figures 1 to 3).

5.7 Site Hydrology

5.7.1 Regional Hydrology

The site is located within the Newry, Fane, Glyde and Dee Water Framework Directive (WFD) River Basin District (RBD). The site is in the WFD Subcatchment Sub Big[Louth]_SC_010. Beneath this Subcatchment the site is located within WFD River Sub Basins GREENORE_010 (see Appendix 1 for hydrological desk study information).

The Greenore River is located approximately 1.36km to the west of the site and flows in an approximate south to north direction (see Figure 3). The Greenore River originates from a small surface water reservoir (Greenore Water Works) approximately 1.8km to the southwest of the site. To the east of the Cooley Inn, located 1.5km to the northwest of the site is an historical spring, which is known as St. James Well. This spring appears to contribute to the Greenore River after which the river is culverted under the local road and then the main Greenore Road where it runs along the southern boundary of the Millgrange Fen. It then passes along the southern boundary of a residential area following which it turns to the north and enters Greenore Golf Club. Within Greenore Golf Club this river contributes to several water features and then enters man-made coastal lagoons prior to entering Carlingford Lough approximately 2km from its source.

A careful review of 6-inch and 25-inch Ordnance Survey mapping shows the existence of a set of small land drains feeding into a small stream which is, in effect, a separate and distinct catchment to the northwest of the site (see Figure 3). This small stream and catchment have not been identified and/or mapped by the EPA and/or work done on it under the Water Framework Directive. However, it is clearly visible with easterly facing directional flow arrows from both historical and the latest OS Mapping. Figure 3 shows the approximate route of the land drainage network flowing in an approximate north-easterly direction and discharging on the foreshore to the east of the Cooley Oyster Farm.

The closest surface water body is the Ballynamony Stream located approximately 0.49km to the south of the site. This stream flows in a southeasterly direction and acts as a tributary to the Ballagan River, which is located approximately 0.67km to the southeast of the site. This river flows in an easterly direction and discharges into Carlingford Lough 0.69km to the southeast of the site.

There are no EPA Q-index water monitoring locations or hydrometric stations on either of these surface water bodies. It should also be noted that there is no Water Framework Directive risk analysis of the surface water body to the north of the site. However, the WFD Risk Analysis for the Ballagan River has classified the ecological status of this catchment as 'Poor'. However, it should be noted that this is based on modelling and not on sampling. The catchment for both of these rivers appears to be wetland bogs to the southwest of Muchgrange. The site is significantly distant from these catchments and the proposed coastal protection works will have no effect on their quality.

5.7.2 Local Site Hydrology

As stated previously, there are no surface water bodies or land drains within the works site or along the perimeter of the site. However, there is a land drain located approximately 150m to the southeast of the site which flows in a southwest to northeast direction and which is culverted under the country road and discharges on to the foreshore. During the site inspection no water was observed in this land drain. The source of water for this land drain is most likely 2 small ponds/waterlogged areas located approximately 320m to the southeast and 430m to the east of the proposed coastal protection works (see Figure 3 and Plate XX below).



Plate 15. Ground photograph of land drain 135m to the southeast of the site facing in a northerly direction before its discharge on to the foreshore (note land drain was dry during the inspection)

It is likely that water flows in this land drain during the winter months when the groundwater table rises with surface water appearing in the pond through run-off from the adjacent farmland.

Based on the position of flotsam and drift lines remaining after tidal events, it is likely that the base of the sea wall on the western boundary of the works site is covered by seawater at spring tides. As there are no surface water bodies in or on the boundaries of the works site, there are in effect no discharges of stormwater from the site into (i.e., there is no connectivity) (see Figure 3).

5.8 Site Geology

5.8.1 Introduction

This section addresses the soil and geology aspects of the environment and assesses the impacts of the proposed development on the existing soil, subsoil and bedrock environments. This section was prepared following a site audit and desk study work. Relevant documents that were accessed comprised geological maps and publications by the National Soil Survey of Ireland and the Geological Survey of Ireland (GSI).

5.8.2 Soil

5.8.2.1 Soil (Top Horizon)

The formation of topsoil is known as the '*pedogenic*' process. The General Soil Map of Ireland, published by An Foras Talúntais (1980) indicates that the predominant or principal soil type in the Greenore area is Soil Association No. 14 with the Principal Soil identified as *Acid Brown Earths* (75%) with associated '*Secondary*' soils *gleys* (15%) and brown *podzolics* (10%). A National Soil Mapping Project carried out jointly by the EPA and Teagasc has identified the footprint of the site as soil type *AminDW, well drained mineral material*. Reference to the National Soil Map of Ireland (SIS National Soils) published recently and jointly by the EPA and Teagasc indicates that the predominant or principal soil type in the Greenore Area is Soil Association '*1110e Ballylanders – Fine loamy over shale and slate bedrock*' (see Plate 16 below). Approximately 310m southwest of the site another soil type found in the Greenore area is that of *Clonroche* soil types. This soil is described as *fine loamy drift with siliceous stones*, it has a fine loamy texture and has good drainage capabilities. About 400m to the southwest of the site, an area of *Peat* is located. This has not been assigned to any soil association. It should be noted that to the west of the site, the soil type present is '*Carrigvahanagh- Peat over lithoskeletal acid, igneous rock*'. This soil has a peaty texture with imperfect drainage capabilities. The locations of these soil types are indicated on extracts from the EPA maps which can be seen in the Appendix 1. Based on Mulroy Environmental's site-specific observations during the inspection of the foreshore, the general classification for the area is considered appropriate for the site.



Plate 16. Topsoil mapping for site showing Soil Associations such as Ballylanders (note red star indicates the location of the subject site) (from EPA/Teagasc database)

5.8.2.2 Subsoil (Quaternary) Geology

The origin of the subsoil material in this region is associated with the movement and deposition from glaciers during the last Ice Age. The ice sheets ground down the underlying bedrock, breaking the rock and grinding it to small sizes ranging from clays to boulders. The powerful erosive force of these ice sheets are considered to have moulded/sculpted the landscape in the area, with glacial features evident in the area. Glacial deposits in the area consist of tills, which were deposited at the base of moving glaciers, and to a lesser extent fluvio-glacial sand and gravels, which were deposited by glacial meltwaters.

The National Soil Mapping Project carried out jointly by the EPA and Teagasc have identified the footprint of the site as subsoil type 'MGs-Marine Sands & Gravels' (see Plate 17 below). Three small pockets of low permeability lacustrine clays which are identified as 'L-Lacustrine sediments' are located to the west and southwest of the site. These areas flood as ponds during the wintertime. Land to the west of the site is dominated by 'TLPSsS – Till derived from sandstone and shale till (Lower Palaeozoic)' (see Appendix 1). The next nearest subsoil classification type to the site is 'Cut-Cutover Peat', which is 1.5km to the southwest of the site. Approximately 1.3km to the southwest of the site there is also a soil classification of 'A-Alluvium Undifferentiated'.

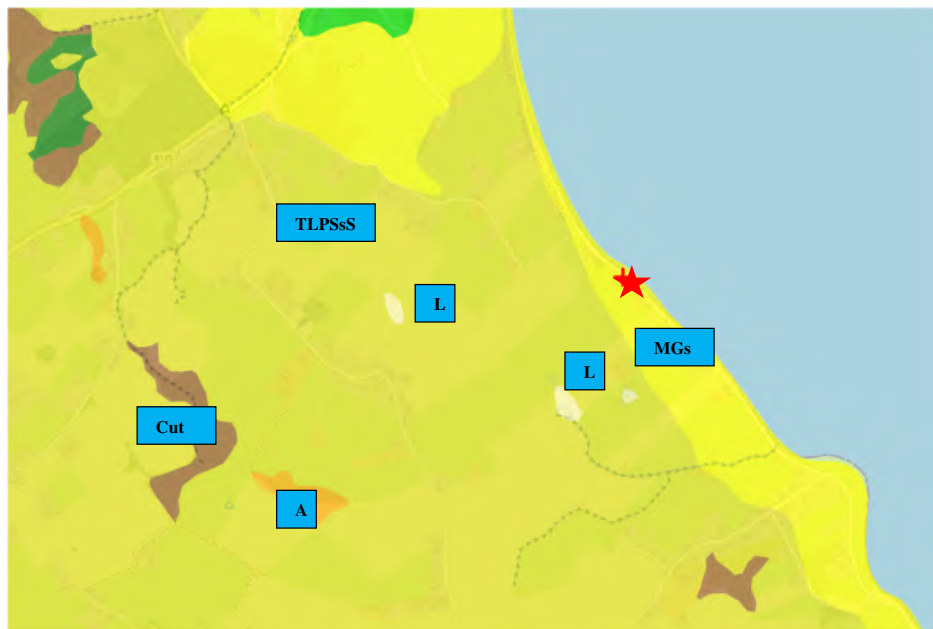


Plate 17. Subsoil mapping for site (from EPA/Teagasc database)

5.8.2.3 Site Specific Soil & Subsoil Detail

There is no site-specific information available on subsoils underlying or in the vicinity of the site, but the subsoils are likely to be marine sands and gravels as detailed by GSI mapping.

5.8.3 Geology

5.8.3.1 Regional Bedrock Geology

According to the GSI Bedrock 1:100,000 scale digital geological map series, the Bedrock formation underlying the site is described as '*Dinantian Limestone - Undifferentiated*' (see Appendix 1).

Louth County Council commissioned a water abstraction borehole approximately 170m to the south of the former Greenore Water Works which was a former public water supply to the Greenore area. This well, which was drilled by Dunnes Drilling Ltd. has a total depth is 91m deep with broken rock encountered at approximately 12m below ground level (see Plate 17 below). There was an estimated yield of 18m³/hour (432m³/day).¹ It is understood that water from this supply provides water for agricultural purposes in the area. A review of GSI geological records within 2km of the site revealed 7 borehole records. Only one of these records has a reasonable accuracy of 50m. This borehole record indicates a well approximately 530m to the northeast of the site and shows a Total Depth of 11.6m. However, no depth to bedrock is provided. There are 7 borehole records within 2km of the site. However, the exact location for these boreholes cannot be determined as the GSI gives an accuracy of up to 1-2km. The records for these boreholes are presented in Appendix 1.

5.8.3.2 On-site Bedrock Geology

An inspection of the site did not indicate any bedrock outcrop within the works site or in the general vicinity of the site.

5.8.4 Hydrogeology

5.8.4.1 General Hydrogeological Classification

The GSI have classified the bedrock aquifer underlying the site as *Lm -Locally Important Aquifer - Bedrock which is Generally Moderately Productive except for Local Zones* (see Appendix 1). Locally important gravel aquifers would generally have 'moderate' to 'good' well yields - 100-400 m³/d.

5.8.4.2 Groundwater Vulnerability

Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The vulnerability category is based on the relative ease with which infiltrating water and potential contaminants may reach groundwater in a vertical or sub-vertical direction. The permeability and thickness of the subsoil, which influences the attenuation capacity, are important elements in determining the vulnerability of groundwater. The Irish GSI has produced guidelines on groundwater vulnerability mapping that aim to represent the intrinsic geological and hydrogeological characteristics that determine how easily groundwater may be contaminated by human activities. Vulnerability depends on the quantity of contaminants that can reach the groundwater, the time taken by water to infiltrate to the water table and the attenuating capacity of the geological deposits through which the

¹ *Borehole record provided by Dunnes Drilling Ltd.*

water travels. These factors are controlled by the types of subsoils that overlie the groundwater, the way in which the contaminants recharge the geological deposits (whether point or diffuse) and the unsaturated thickness of geological deposits from the point of contaminant discharge. For vulnerability assessments with regard to bedrock aquifers the relevant geological layer is the subsoil between the release point of contaminants and the top of the bedrock. Any unsaturated bedrock layer is not considered as it is assumed that bedrock has little or no attenuation capacity due to its fissure flow characteristics. Groundwater encountered in low permeability glacial tills, or other non-aquifer subsoils, is not considered to be a target. Therefore, where low permeability subsoils overlie the bedrock, it is the thickness of subsoil between the release point of contaminants and bedrock that is considered when assessing vulnerability of bedrock aquifers, regardless of whether the low permeability materials are saturated or not.

The site has been given an aquifer vulnerability category rating of High (H) by the GSI (see Plate 18 below and Appendix 1).

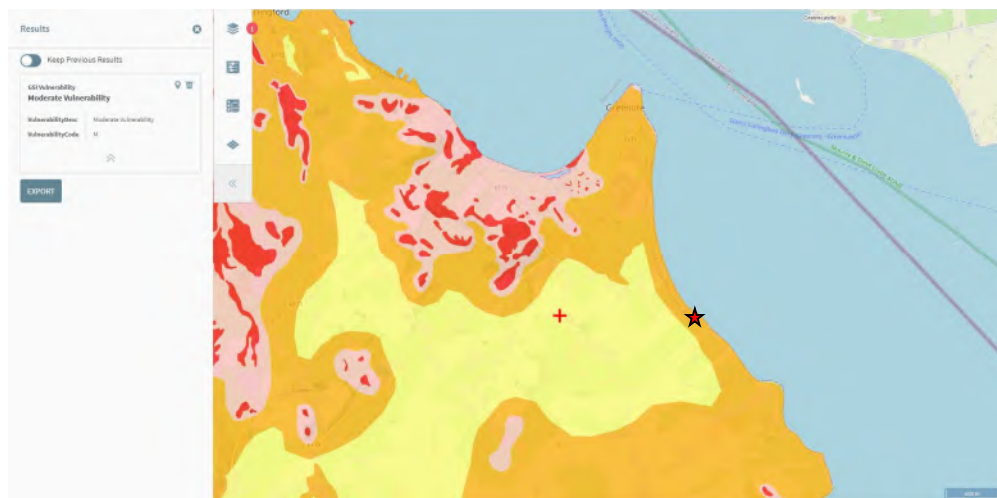


Plate 18. Groundwater vulnerability mapping for the North-Eastern end of the Cooley Peninsula (note red star is in the centre of the site and site's vulnerability is 'High')

5.8.4.3 Groundwater Source Protection

The DoE-LG, EPA and GSI guidelines for Groundwater Protection Schemes allow for the combination of aquifer classification and vulnerability rating giving classifications of groundwater protection zones. The purpose of these zones is to place a control on the activities practised within a zone and thus provide protection to any underlying groundwater resources. Using DoE-LG, EPA and GSI criteria and the aquifer classification and vulnerability categories defined for the site, a PI/H ('H – High') would be assigned for the site (see Table 2).

Table 2. Groundwater Vulnerability Mapping Guidelines

Vulnerability rating	High permeability (sand/gravel)	Moderate permeability (sandy till)	Low permeability (clayey subsoil)
Extreme	0 – 3.0m	0-3.0 m	0 – 3.0m
High	>3.0m	3.0-10.0m	3.0 – 5.0m
Moderate	N/A	>10m	5.0 – 10.0m
Low	N/A	N/A	>10.0m

5.8.4.4 Groundwater Quality Status

EPA Water Catchment mapping indicates that the site is within the Dundalk Groundwater Body (IE_NB_G_015). The overall groundwater quality of this body is described as good (see Appendix 1).

5.8.4.5 Hydrogeological Risk from Proposed Coastal Protection Works

Given the nature and scale of the proposed coastal protection works, the risk posed to the underlying aquifer is negligible. Provided that mitigation measures laid out in the Construction Environmental Management Plan (CEMP) are implemented on site, with regard to offsite banded fuel storage (i.e., within the offsite builder's compound) and utilisation of spill kits near the work area, the risk of hydrocarbon spillage and contamination of surface water and/or groundwater will be minimal.

5.9 Site Ecology

5.9.1 On-site Ecology

5.9.1.1 Overview

The proposed site for the rock armour is located in Ballynamony (Murphy), Ballagan, County Louth, along a public coastal shore area. The coastal protection works have been proposed along existing concrete protection structures in the upper littoral zone of the foreshore. The site location lies between the Ballytrasna road to the southwest and the foreshore along the northeastern boundary. An existing stone seawall built in the 1800's lines the shore to the northwest of the site. A concrete coastal protection sea wall then continues along the site location with scattered bouts of vegetation and occasional grass verges. This concrete wall terminates at the southeastern edge of the site location.

Several residential properties and agricultural fields overlook the shoreline along the Ballytrasna road. An oyster farm business, Cooley Oysters is located approximately 480m to the northwest of the site with a significant footprint of oyster farming cages located on the foreshore to the north and the northeast of the site location. These farms are visible at low tide.

5.9.1.2 Methodology

A site-based habitat assessment was carried out on the 31st August and the 13th September 2023 of the entire site location and adjacent northwest and southeast areas, along approximately 500 metres of the shore. The proposed coastal protection works is approximately 229m in length with the site's footprint approximately 687m² in area. The habitat survey was carried out following the Heritage Council's *Best Practice Guidance (Smith et al., 2011)*. Habitats were classified to Level 3 of the Heritage Council's classification (*Fossitt, 2000*), and also according to the *Habitats Directive types (European Commission, 2013)* where appropriate.

Prior to field survey, a desk study was undertaken to identify habitats through 2D drone photogrammetric survey imagery (i.e., orthomosaics) and 3D mapping. Habitat types and data sets obtained from National Parks and Wildlife Service (NPWS), the National Biodiversity Data Centre (NBDC), the Environmental Protection Agency (EPA), and other sources were employed to assist in the drafting of a habitat map in preparation of the field survey.

In addition to habitat mapping, notes on plant species composition, structure and management were collected. As stated in Section 2 on Methodology, plant species were assigned a DAFOR abundance rating within each habitat. The DAFOR scale is presented in the previous table, Table 1 which was modified from *Smith et al. (2011) Habitat Mapping Guidelines*. Plant nomenclature follows Stace (2010). Plant species identification was assisted by the PictureThis plant identification application with 98% accuracy (PictureThis, 2023). The identification and classification of these plants was also assisted by databases provided by the NBDC, the EPA, Teagasc, Biodiversity Ireland and the NPWS.

Five GIS maps of different scales were produced using the ArcGIS computer programme. These maps were used to identify the proximity of the site to Special Areas of Conservation (SACs) and Special Protected Areas (SPAs), and to surrounding surface waters. SAC and SPA data was imported from NPWS and added as a layer (NPWS, 2023). An orthomosaic developed through a drone photogrammetric survey was imported into ArcGIS Pro and added as a map surface layer. The site boundary was identified and outlined within this map. A 15km buffer was created around a centre point within the site boundary.

It is general practice when screening a plan or project for compliance with the Habitats Directive, to identify all Natura 2000 sites (SPAs & SACs) within the functional area of the plan/project itself and within 15km of the boundaries of the area the plan/project applies to. This approach is currently recommended in the Department of the Environmental, Heritage and Local Government's document Guidance for Planning Authorities and as a precautionary measure, to ensure that all potentially affected Natura 2000 sites are included in the screening process.

5.9.1.3 Habitat Descriptions

Eight habitat types were found in the vicinity of the area proposed for the rock armour works and within the site location (see Figures 9 & 10). These habitats included: *Sea Walls, Piers and Jetties* (CC1), *Buildings and Artificial Surfaces* (BL3), *Improved Amenity Grassland* (GA2), *Dry Meadows and Grassy Verges* (GS2), *Shingle and Gravel Shores* (LS1), *Mixed Substrata Shores* (LR4), *Sand Shores* (LS2) and *Fish Cages and Rafts* (CC2). The footprint for the proposed coastal protection works area covers approximately 720m². Within the site boundary, 3 No. habitat types were identified: *Buildings and Artificial Surfaces* (BL3), *Sea Walls, Piers and Jetties* (CC1), and *Shingle and Gravel Shores* (LS1). The majority of the *Shingle and Gravel Shore* (LS1) habitat borders the boundary immediately northeast of the site, followed by *Mixed Substrata Shores* (LR4) and *Sand Shore* (LS2) habitats further northeast down the lower shore.

Sea Walls, Piers, and Jetties (CC1)

This habitat category includes coastal constructions that are partially or fully submerged at high tide, or subject to sea splash or wave action (see Figures 9 & 10). This includes sea walls, piers, jetties, slipways, causeways, and other marine structures either in rural or urban areas. Artificial structures which are exposed at low tide are also included, such as: coastal defences or groynes, wrecks, and pipes or pipelines. Building materials such as materials such as rock, cement, metal, wood, or plastic are commonly used during construction. If plant or animal communities are present along in the littoral and sublittoral zones of sea walls, piers, and jetties, they are typically similar to those of natural rocky substrata described in the marine section of the classification. The existing concrete coastal protection wall within the site location falls under this CC1 category, along with the other existing stone and concrete sea wall which forms a boundary between coastal and terrestrial habitats to the northwest of the site. The proposed works include repairing the existing structure and will consist of concrete and boulders. Some areas will be broken up and replaced, and some areas are designated for stonework repointing. Varying patches of vegetation can be seen along the existing sea wall structures throughout

the site location. The species found along this CC1 habitat are listed in Table 3. It should be noted that a rock armour is also proposed for the southeastern edge of the proposed coastal protection works between the 189m and 229m chainage. This rock armour will replace LS1 plant species located along this area, which have been listed in Table 4.

Dry Meadows and Grassy Verges (GS2)

Dry meadows and grassy verges are rarely fertilized, mowed or grazed upon by livestock (see Figures 9 & 10). This type of grassland is usually visible on grassy roadside verges, on the margins of tilled fields, on railway embankments, in churchyards and cemeteries, and in some neglected fields or gardens. A wide range of grass and broadleaved herb species were recorded along the Ballytrasna road further northwest along the existing sea wall, and to the southeast of the site boundary. A high percentage of tall, coarse dry grassland species such as orchard grass (*Dactylis glomerata*) and false oatgrass (*Arrhenatherum elatius*) were recorded. There were abundances of narrow leaved grasses including hard fescue (*Festuca ovina*), common spike-rush (*Elocharis palustris*), wavy hair grass (*Avenella flexuosa*) and red fescue (*Festuca rubra*). Bush-grass (*Calamagrostis epigejos*), lyme grass (*Leymus arenarius*) and perennial ryegrass (*Lolium perenne*) were dominant species in this habitat. The species noted within this habitat have been listed in Table 5. These also include smaller broadleaved herbs such as ribwort plantain (*Plantago lanceolata*), burnet saxifrage (*Pimpinella saxifraga*), common bird's-foot trefoil (*Lotus corniculatus*), cow parsnip (*Heracleum sphondylium*), wild carrot (*Daucus carota*) and birdeye speedwell (*Veronica persica*).

Shingle and Gravel Shores (LS1)

Accumulations of shingle and gravel (i.e., mostly 4-256mm in diameter) were noted along the semi-exposed shoreline along with occasional shell fragments (see Figures 9 & 10). This band of shingle and gravel is itself divided between an upper stretch above the high-water mark, which is vegetated, and a lower stretch which is composed of bare stones, cobble etc (see following Plate 19). This shingle and gravel shore habitat is located along the existing coastal protection structures throughout the site location. A strandline runs along the entirety of the upper shore above the high tide mark, comprised of predominantly dead and dried out brown and red seaweed species. Beach fleas and sand hoppers were noted along the decaying seaweed. Some sparse bouts of sea sandwort (*Honckenya peploides*) occur along the driftline from the 180-metre mark along the southeast within the site location, which loosely resembles the Annex I (Habitats Directive) habitat 'Annual Vegetation of Drift Lines 1210' (see Table 4). This occurs occasionally further outside of the site boundary to the southeast and the northwest. Occasional frequencies of other accompanying annual plant species along the driftline, including narrow-leaved saltbush (*Atriplex littoralis*), triangle orache (*Atriplex prostrata*), sun spurge (*Euphorbia helioscopia*) and knotgrass (*Polygonum aviculare*), signals the presence of small, typically fragmented areas of the Annex I habitat 'Annual Vegetation of Drift Lines 1210' along the upper stretch of the shore outside the site location, southeast past the 240-metre mark (see Plate 19).

The stretch of vegetation that follows the sea wall between the 189-metre mark and the 240-metre mark to the southeast of the site includes plant species growing within stony banks along the upper shore

above the high tide mark. These species conform to the Annex I (Habitats Directive) habitat '*Perennial vegetation of stony banks 1220*', with the presence of sea sandwort (*Honckenya peploides*), curled dock (*Rumex crispus*), sea beet (*Beta vulgaris* ssp. *maritima*), sea mayweed (*Tripleurospermum maritimum*), sea radish (*Raphanus raphanistrum* ssp. *maritimus*) and lyme grass (*Leymus arenarius*) (see Plate 19 below). Vegetated stony banks are thought to occur in a mosaic with annual vegetation of drift lines, which is apparent in Ballynamony (Murphy), Ballagan shore. Further southwest beyond the site boundary, plant species within these habitats have experienced disturbance caused by sediment and cut lawn grass dumping, littering, and fragmentation caused by the construction of a concrete slipway (see following Plates 20 and 21). Both of the above Annex I habitat types have been listed as designated priority habitats within the conservation objectives for Carlingford Shore SAC (002306). Plant species found within the LS1 shore have been listed in Table 4. Coastal dry grassy verges occur in tangent with these habitats further up shore closer to the Ballytrasna road along the stony bank vegetation. This habitat widens further southwest beyond the site boundary.



Plate 19. Annex I (Habitats Directive) habitat '*Annual Vegetation of Drift Lines 1210*' and '*Perennial vegetation of stony banks 1220*' located between the c. 189-metre and 220-metre mark within the site (note cut lawn grass dumped on top of the vegetation)



Plate 20. Annex I (Habitats Directive) habitat ‘Annual Vegetation of Drift Lines 1210’ and ‘Perennial vegetation of stony banks 1220’ located along the upper stretch of the shore outside the site location, southeast past the 240-metre mark.



Plate 21. The concrete slipway and sediment dumping accumulations on top of vegetation to the southwest of the site boundary.

Mixed Substrata Shores (LR4)

A mixed substrata shore comprises of rock and sediment, of which includes gravel, sand, or mud (see Figures 9 & 10). Ballynamony (Murphy), Ballagan shore is moderately exposed, and the lower littoral area can be classed as predominantly a mixed substrata shore, although sandy shore areas occur, mostly across the northwest area of the shore. Within the mixed substrata shoreline, there is a large proportion of stone, gravel and sand (see Plate 22). Shell fragments and scattered rocks occur across the shore surface. The furoid seaweed communities are similar to rocky shore habitats, although they occur more sporadically with less percentage cover. The upper to mid-shore is typically dominated by bladder wrack (*Fucus vesiculosus*) and spiralled wrack (*Fucus spiralis*), with frequent occurrences of serrated wrack (*Fucus serratus*). The abundance of serrated wrack and egg wrack (*Ascophyllum nodosum*) cover increased further down along the lower shore. Heavy accumulations of ephemeral green seaweeds (*Ulva* and *Cladophora* spp.) and occurrences of ephemeral red seaweeds (*Porphyra* spp.) were evident across this shore (see following Plate 22). A list of seaweed species encountered can be seen in Table 6. Epifaunal cover increased towards the lower shore with increased rock cover, with barnacles and evidence of common mussel (*Mytilus edulis*) and limpets (*Patella* spp.).



Plate 22. Mixed substrata shore with heavy accumulations of ephemeral green seaweeds (*Ulva* and *Cladophora* spp.).

Sand Shore (LS2)

Sand shores can be sheltered to exposed shores of coarse, medium or fine-grained sand, typically with a very small proportion of gravel and mud (<10%). Sediment particles range from 0.063-4 mm in diameter. A stretch of sandy shore can be seen along the lower shore to the northwest of the 0-60 metre mark of the site location and along other patches to the northeast (see following Plate 23 and Figures 9 & 10). This area is flat and typically supports scarce occurrences of seaweed, of which the species composition is akin to mixed substrata areas (see Table 6). Lugworm (*Arenicola marina*) casts and holes were frequent throughout the habitat. Lower sand shores may also support communities of amphipod (*Pontocrates* spp., *Bathyporeia* spp., *Haustorius arenarius*) and isopod (*Eurydice pulchra*) crustaceans, along with some polychaete worms (*Scolelepis squamata*, *Nephtys cirrosa*, *Lanice conchilega*).

Table 3. Plant Species identified in CCI – Sea walls, Piers Jetties Habitat at Proposed Coastal Protection Works Site at Ballynamoney (Murphy), Ballagan, Greenore, County Louth

Common Name	Taxon Name	Native/Alien/Invasive	Irish Status	Invasive Impact Score	DAFOR
Ribwort plantain	<i>Plantago lanceolata</i>	Native	Not protected	N/A	F
Wild carrot	<i>Daucus carota</i>	Native	Not protected	N/A	O
Common dandelion	<i>Taraxacum officinale</i>	Native	Not protected	N/A	O
Sea radish	<i>Raphanus raphanistrum</i>	Native	Not protected	N/A	F
Common bird's-foot trefoil	<i>Lotus corniculatus</i>	Native	Not protected	N/A	F
Green field speedwell	<i>Veronica agrestis</i>	Alien	Established	Not assessed	R
Sea Beet	<i>Beta vulgaris</i>	Native	Not protected	N/A	F
Bush grass	<i>Calamagrostis epigejos</i>	Alien	Protected	Not assessed	A
False oat grass	<i>Arrhenatherum elatius</i>	Native	Not protected	N/A	F
Wavy hair grass	<i>Avenella flexuosa</i>	Native	Not protected	N/A	F
Common yarrow	<i>Achillea millefolium</i>	Native	Not protected	N/A	O
Lady's bedstraw	<i>Galium verum</i>	Native	Not protected	N/A	O
Curly dock	<i>Rumex crispus</i>	Native	Not protected	N/A	O
Autumn hawkbit	<i>Scorzoneroides autumnalis</i>	Native	Not protected	N/A	O
Hard fescue	<i>Festuca ovina</i>	Native	Not protected	N/A	O
Sheep's sorrel	<i>Rumex acetosella</i>	Native	Not protected	N/A	R
Bitter dock	<i>Rumex obtusifolius</i>	Invasive	Not assessed	Not assessed	O
Common spikerush	<i>Eleocharis palustris</i>	Native	Not protected	N/A	F
Dyer's weed	<i>Reseda luteola</i>	Alien	Established	Not assessed	R
Sea mayweed	<i>Tripleurospermum maritimum</i>	Native	Not protected	N/A	O
Lesser knapweed	<i>Centaurea nigra</i>	Native	Not protected	N/A	O
Common mugwort	<i>Artemisia vulgaris</i>	Alien	Established	Not assessed	O
White clover	<i>Trifolium repens</i>	Native	Not protected	N/A	O
Common sowthistle	<i>Sonchus oleraceus</i>	Native	Not protected	N/A	F
Lyme grass	<i>Leymus arenarius</i>	Native	Not protected	N/A	A
Rough hawkbit	<i>Leontodon hispidus</i>	Native	Not protected	N/A	O
Triangle orache	<i>Atriplex prostrata</i>	Native	Not protected	N/A	F
Sea thrift	<i>Armeria maritima</i>	Native	Not protected	N/A	R
Solidstem burnet-saxifrage	<i>Pimpinella saxifraga</i>	Native	Not protected	N/A	O
Bush vetch	<i>Vicia sepium</i>	Native	Not protected	N/A	O
Perennial sowthistle	<i>Sonchus arvensis</i>	Native	Not protected	N/A	F
Danish scurvy-grass	<i>Cochlearia danica</i>	Native	Not protected	N/A	R
Common plantain	<i>Plantago major</i>	Native	Not protected	N/A	O
Tansy ragwort	<i>Jacobaea vulgaris</i>	Native	Not protected	N/A	R
Silver hairgrass	<i>Aira caryophyllea</i>	Native	Not protected	N/A	O
Dove's-foot crane's-bill	<i>Geranium molle</i>	Native	Not protected	N/A	O
Perennial ryegrass	<i>Lolium perenne</i>	Native	Not protected	N/A	A
Black medick	<i>Medicago lupulina</i>	Native	Not protected	N/A	R
Small geranium	<i>Geranium pusillum</i>	Alien	Occasional	Not assessed	O
Annual meadow-grass	<i>Poa annua</i>	Native	Not protected	N/A	F
Prostrate knotweed	<i>Polygonum aviculare</i>	Native	Not protected	N/A	F
Common velvetgrass	<i>Holcus lanatus</i>	Native	Not protected	N/A	F
Lamsquarters	<i>Chenopodium album</i>	Native	Not protected	N/A	R
Red fescue	<i>Festuca rubra</i>	Native	Not protected	N/A	F
Common stork's-bill	<i>Erodium cicutarium</i>	Native	Not protected	N/A	R
Common chickweed	<i>Stellaria media</i>	Native	Not protected	N/A	R
Tree mallow	<i>Malva arborea</i>	Native	Not protected	N/A	R
Seaside arrowgrass	<i>Triglochin maritima</i>	Native	Not protected	N/A	F
Common groundsel	<i>Senecio vulgaris</i>	Native	Not protected	N/A	O
Orchard grass	<i>Dactylis glomerata</i>	Native	Not protected	N/A	F

Table 4. Plant Species identified in *LSI – Shingle and Gravel Shores* Habitat at Proposed Coastal Protection Works Site at Ballynamony (Murphy), Ballagan, Greenore, County Louth

Common Name	Taxon Name	Native/Alien/Invasive	Irish Status	Invasive Impact Score	DAFOR
Sea beet	<i>Beta vulgaris</i>	Native	Not protected	N/A	A
Narrow-leaved saltbush	<i>Atriplex littoralis</i>	Native	Not protected	N/A	F
Sea sandwort	<i>Honckenya peploides</i>	Native	Not protected	N/A	F
Curly dock	<i>Rumex crispus</i>	Native	Not protected	N/A	O
Prostrate knotweed	<i>Polygonum aviculare</i>	Native	Not protected	N/A	F
Wild carrot	<i>Daucus carota</i>	Native	Not protected	N/A	O
Triangle orache	<i>Atriplex prostrata</i>	Native	Not protected	N/A	F
Common sowthistle	<i>Sonchus oleraceus</i>	Native	Not protected	N/A	F
Sea radish	<i>Raphanus raphanistrum</i>	Native	Not protected	N/A	F
Tree mallow	<i>Malva arborea</i>	Native	Not protected	N/A	O
Spiny sowthistle	<i>Sonchus asper</i>	Native	Not protected	N/A	O
Common mugwort	<i>Artemisia vulgaris</i>	Alien	Established	Not assessed	O
Lyme grass	<i>Leymus arenarius</i>	Native	Not protected	N/A	A
Sun spurge	<i>Euphorbia helioscopia</i>	Alien	Common	Not assessed	R
Sea mayweed	<i>Tripleurospermum maritimum</i>	Native	Not protected	N/A	F
Bush grass	<i>Calamagrostis epigejos</i>	Alien	Protected	Not assessed	O
Dove's-foot crane's-bill	<i>Geranium molle</i>	Native	Not protected	N/A	O
European beach grass	<i>Ammophila arenaria</i>	Native	Not protected	N/A	A
Perennial sowthistle	<i>Sonchus arvensis</i>	Native	Not protected	N/A	F
Small geranium	<i>Geranium pusillum</i>	Alien	Occasional	Not assessed	O

Table 5. Plant Species identified in GS2- Dry Meadows and Grassy Verges Habitat at Proposed Coastal Protection Works Site at Ballynamony (Murphy), Ballagan, Greenore, County Louth

Common Name	Taxon Name	Native/Alien/Invasive	Irish Status	Invasive Impact Score	DAFOR
Orchard grass	<i>Dactylis glomerata</i>	Native	Not protected	N/A	A
White clover	<i>Trifolium repens</i>	Native	Not protected	N/A	F
Annual meadow-grass	<i>Poa annua</i>	Native	Not protected	N/A	O
Common mugwort	<i>Artemisia vulgaris</i>	Alien	Established	Not assessed	F
Spiny sowthistle	<i>Sonchus asper</i>	Native	Not protected	N/A	O
Dove's-foot crane's-bill	<i>Geranium molle</i>	Native	Not protected	N/A	O
Common sowthistle	<i>Sonchus oleraceus</i>	Native	Not protected	N/A	F
Bush grass	<i>Calamagrostis epigejos</i>	Alien	Protected	Not assessed	A
Common yarrow	<i>Achillea millefolium</i>	Native	Not protected	N/A	F
Ribwort plantain	<i>Plantago lanceolata</i>	Native	Not protected	N/A	F
Lyme grass	<i>Leymus arenarius</i>	Native	Not protected	N/A	A
Perennial ryegrass	<i>Lolium perenne</i>	Native	Not protected	N/A	A
Wollyfruit sedge	<i>Carex lasiocarpa</i>	Native	Not protected	N/A	F
Solidstem burnet-saxifrage	<i>Pimpinella saxifraga</i>	Native	Not protected	N/A	O
Wild carrot	<i>Daucus carota</i>	Native	Not protected	N/A	F
Lesser knapweed	<i>Centaurea nigra</i>	Native	Not protected	N/A	O
Hogweed	<i>Heracleum Sphondylium</i>	Native	Not protected	N/A	O
Common chickweed	<i>Stellaria media</i>	Native	Not protected	N/A	O
Birdeye speedwell	<i>Veronica persica</i>	Alien	Established	Not assessed	O
Red fescue	<i>Festuca rubra</i>	Native	Not protected	N/A	F
Black medick	<i>Medicago lupulina</i>	Native	Not protected	N/A	O
Pineapple weed	<i>Matricaria discoidea</i>	Alien	Established	Low 5	R
Poison hemlock	<i>Conium maculatum</i>	Alien	Established	Not assessed	R
Small geranium	<i>Geranium pusillum</i>	Alien	Occasional	Not assessed	O
Common groundsel	<i>Senecio vulgaris</i>	Native	Not protected	N/A	F
Common dandelion	<i>Taraxacum officinale</i>	Native	Not protected	N/A	O
Hedge mustard	<i>Sisymbrium officinale</i>	Alien	Established	Not assessed	R
Wavy hair grass	<i>Avenella flexuosa</i>	Native	Not protected	N/A	A
False oat grass	<i>Arrhenatherum elatius</i>	Native	Not protected	N/A	F
Lesser burdock	<i>Arctium minus</i>	Native	Not protected	N/A	F
European beach grass	<i>Ammophila arenaria</i>	Native	Not protected	N/A	F
Tree mallow	<i>Malva arborea</i>	Native	Not protected	N/A	O

Table 6. Seaweed Species identified in LR4-Mixed Substrata Shores Habitat at Proposed Coastal Protection Works Site at Ballynamony (Murphy), Ballagan, Greenore, County Louth

Common Name	Taxon Name	Group
Bladder wrack	<i>Fucus vesiculosus</i>	Brown
Serrated wrack	<i>Fucus serratus</i>	Brown
Sea lettuce	<i>Ulva</i> spp.	Green
Green branched weeds	<i>Cladophora</i> spp.	Green
Spiraled wrack	<i>Fucus spiralis</i>	Brown
Egg wrack	<i>Ascophyllum nodosum</i>	Brown
Soft feather weed	<i>Plumaria plumosa</i>	Red
Dumont's tubular weed	<i>Dumontia contorta</i>	Red
Purple claw weed	<i>Cystoclonium purpureum</i>	Red
Mermaid's tresses	<i>Chorda filum</i>	Brown
Grape pip weed	<i>Mastocarpus stellatus</i>	Red
Winged weed	<i>Membranoptera alata</i>	Red
Brown fan weed	<i>Dictyota dichotoma</i>	Brown
Wrack siphon weed	<i>Vertebrata lanosa</i>	Red



Plate 23. Sandy shore (LS2) located northwest of the site location along the lower shore

Improved Amenity Grassland (GA2)

This habitat category includes improved grassland areas, excluding farmland, which are usually species poor and regularly managed and mowed to maintain short swards (see Figures 9 & 10). They are rarely grazed by livestock. This category includes grassland areas in gardens, parks, grounds of various buildings or institutions, golf course fairways, grassy sports fields and racecourses. Improved grassland habitats were identified in the surrounding areas. These areas were largely utilised as gardens outside of residential properties. A patch of managed grassland was also noted approximately 50m from the southeast boundary of the works location along the Ballystrasna road. This area included mown swards of St. Augustine grass (*Stenotaphrum secundatum*) and broadleaved herbs such as daisy (*Bellis perennis*), dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*), dove's-foot crane's-bill (*Geranium mole*), creeping buttercup (*Ranunculus repens*) and sea beet (*Beta vulgaris*).

Fish Cages and Rafts (CC2)

This habitat category includes aquacultural areas such as commercial fish and shellfish farms that can occur in coastal waters or freshwater habitats and lagoons at varying distances from the shore. Oyster beds comprised of shellfish rafts are farmed by Cooley Oysters Ltd and are located in the open water to the northeast and east of the site (see previous Plate 7).

5.9.1.4 Bird Survey

During the site assessment, no physical evidence of bird nests was observed within the boundary of the site or in the surrounding area. The species recorded during the dawn bird song survey on the 4th September 2023 with Cornell Lab Merlin Bird ID software are as follows:

- Eurasian curlew (*Numenius arquata*);
- Rook (*Corvus frugilegus*);
- Eurasian wren (*Troglodytes troglodytes*);
- Eurasian jackdaw (*Corvus monedula*);
- Eurasian oystercatcher (*Haematopus ostralegus*);
- Common redshank (*Tringa totanus*);
- White wagtail (*Motacilla alba yarrellii*);
- Water rail (*Rallus aquaticus*);
- Common gull (*Larus canus*);
- European robin (*Erithacus rubecula*);
- Common greenshank (*Tringa nebularia*);
- Meadow pipit (*Anthus pratensis*);
- Carrion crow (*Corvus corone*);
- Little Egret (*Egretta garzetta*);
- European starling (*Sturnus vulgaris*);
- Great crested grebe (*Podiceps cristatus*);
- Sandwich tern (*Sterna sandvicensis*); and
- Eurasian magpie (*Pica pica*).

Bird sightings in the area were also recorded. Several bird species were spotted hunting along the shore or flying in the vicinity; as listed below:

- Common gull (*Larus canus*);
- Rook (*Corvus frugilegus*);
- Eurasian curlew (*Numenius arquata*);
- Grey heron (*Ardea purpurea*);
- Light bellied brent goose (*Branta bernicla hrota*);
- Common wood pigeon (*Columba palumbus*);
- Great black-backed gull (*Larus marinus*).

A summary of the bird species surveyed and their status in Ireland can be seen in Table 7. Most birds recorded above are common resident birds which are widespread across Ireland. Most species listed above have also been allocated a *green* conservation status in Ireland as per the Birds of Conservation Concern in Ireland 2020-2026 traffic light system list (Colhoun & Cummins, 2013). However, species such as the common gull (*L. canus*), sandwich tern (*S. sandvicensis*), light bellied brent goose (*B. bernicla hrota*) and the European starling (*S. vulgaris*) have been assigned an *amber* status. The Eurasian curlew (*H. rustica*), Eurasian oystercatcher (*N. arquata*), common redshank (*T. tetanus*), and

the meadow pipit (*A. pratensis*) species have been designated a *red* conservation status. Amber list species are of medium conservation concern, while red list species are of high conservation concern in Ireland. Three species listed above, the Eurasian wren, sandwich tern and the European starling, are categorised as Annex I species of the Birds Directive (Directive 2009/147/EC), as outlined in the Official Journal of the European Union. For Annex I species, special conservation measures are required to protect their habitat and ensure their survival and reproduction within their distribution. In Ireland, all bird species are protected by Irish National legislation under the Wildlife Act 1976.

Light bellied brent geese are migratory wintering birds and they have been listed as a protected species within the conservation objectives for Carlingford Lough SPA [004078]. *B. bernicla hrota* species winter in Ireland, usually between October and March, and return to breed in northeast Canada via Greenland and Iceland (NIEA, 2023). They typically inhabit farmland, wetland, marine and intertidal habitats. Their distribution is highly reliant on the availability of intertidal Eelgrass (*Zostera* spp.) beds; however, they will also feed on algal blooms and agricultural or amenity grassland. Colonies of brent geese have been observed day-roosting in Carlingford Lough at high tide and night-roosting in areas along Dundalk Bay. They have been recorded following an 18-24km commuting route between these areas along the coast, while they avoid flying over land. They feed on *Zostera* beds in Carlingford Lough and may land to graze on green algae (*Ulva* spp.) throughout their commute or when *Zostera* beds are not available. The green algal blooms which have formed along the mixed sediment shore and on oyster cultivation structures in Ballynamony (Murphy), Ballagan shore provide a feeding habitat for *hrota* brent geese. Speaking to one of the licence holders Kian Louët-Feisser, it is his experience that the geese feed on the *Ulva* spp. that grow on the oyster bags. This species has also been observed to feed on the grassland at Greenore Golf course on occasions. The light-bellied brent goose (*Branta bernicla hrota*) are species of qualifying interest of Carlingford Lough SPA. During winter, this area regularly supports 1% or more of the biogeographic population of this species.

The only migratory birds listed above that have been recorded breeding along Irish coasts are sandwich terns, which visit between March and September. Several rocky islands located off the coast along the mouth of the lough and towards the inner lough, and likely sustain significant habitats for coastal bird species such as terns. A sandwich tern colony has been recorded feeding and nesting on Green Island, which is a member of these rocky islands, and is included within the Northern Ireland Carlingford Lough SPA [UK9020161] designated area. They typically feed on small fish such as spat, herring and sand-eel in shallow waters off the coast, or in more open water areas up to an average 27km radius from the breeding colony. However, they may travel further up to 70km from breeding colonies to feed their chicks. After the breeding season, sandwich terns return to winter in the Mediterranean and western and southern Africa (NIEA, 2023). Increasingly, some birds choose to winter in Galway Bay and Strangford Lough (BirdWatch Ireland, 2023). Both the sandwich tern and the light-bellied brent goose are listed as qualifying interests of this Carlingford Lough SPA [UK9020161] in Northern Ireland.

The NBDC database was also examined as a part of a desk study. Brent geese were the only species recorded in proximity to the site location during the 'Birds of Ireland' survey, which is ongoing and has been carried out since 2011. The site location is within the 1km grid reference J2308, and of species that have not been mentioned above, species of common buzzard (*Buteo buteo*), herring gull (*Larus argentatus*), northern gannet (*Morus bassanus*), and reed bunting (*Emberiza schoeniclus*) have been recorded here as a part of the Birds of Ireland survey. The northern gannet has an amber conservation status, and the herring gull has a red status as per the Birds of Conservation Concern in Ireland 2020-2026 list (Colhoun & Cummins, 2013).

The proposed works are not predicted to disturb bird habitats as sea walls and coastal protection structures already exist within the majority of the allocated works location. However, there will be potential feeding and habitat alteration due to the replacement of a proportion of LS1 vegetation for rock armour installation between the 189 and 240-metre marks to the far southeast of the site location. This proportion of the site includes areas of Annex I habitat, as mentioned above. However, due to the proximity of these habitats to the road, existing vegetation damage due to grass and sediment dumping further southeast, and the fragmentation caused by the concrete slipway, the negative impacts may be lessened. The coast adjacent to the site location is a busy aquacultural area and is located south of Greenore Port. It is also frequented by disturbance from walkers, dogs and people engaging in recreational activity. It is likely that birds in this area have become habituated these everyday disturbances. Other birds may choose to feed and/or nest in undisturbed habitats along the rocky islands off the coast, or in more pristine areas further southwest towards Ballagan Point. The proposed works may slightly increase these disturbance impacts, most notably via noise pollution and increased human presence. To minimise disturbance of migratory bird species, any works which include altering the habitat or clearing an area should take place outside of wintering period, which falls between September and March (NPWS, 2023). The breeding season of sandwich terns (*S. sandvicensis*) also falls between March to August, although due to the significant distance between the site location and the sandwich tern colony located on Green Island, the works are not expected to disturb nesting terns.

Table 7. Bird Species identified at Proposed Coastal Protection Works Site, Ballynamony (Murphy), Ballagan, Greenore, County Louth during Survey on the 4th September, 2023

Common Name	Scientific Name	Resident status	Irish Red List Status	Conservation Status	Wintering	Breeding
Eurasian curlew	<i>Numenius arquata</i>	Not resident	Red	Annex II B	Yes	Occasional
Rook	<i>Corvus frugilegus</i>	Resident	Green	Annex II B	Yes	Yes
Eurasian wren	<i>Troglodytes troglodytes</i>	Resident	Green	Annex I	Yes	Yes
Eurasian jackdaw	<i>Corvus monedula</i>	Resident	Green	Annex II B	Yes	Yes
Eurasian oystercatcher	<i>Haematopus ostralegus</i>	Resident	Red	Annex II B	Yes	Yes
Common redshank	<i>Tringa totanus</i>	Resident	Red	Annex II B	Yes	Occasional
White wagtail	<i>Motacilla alba yarrellii</i>	Resident	Green	N/A	Yes	Yes
Water rail	<i>Rallus aquaticus</i>	Resident	Green	Annex II B	Yes	Yes
Common gull	<i>Larus canus</i>	Not resident	Amber	Annex II B	Yes	Yes
European robin	<i>Erithacus rubecula</i>	Resident	Green	N/A	Yes	Yes
Common greenshank	<i>Tringa nebularia</i>	Not resident	Green	Annex II B	Yes	Occasional
Meadow pipit	<i>Anthus pratensis</i>	Resident	Red	N/A	Yes	Yes
Carrion crow	<i>Corvus corone</i>	Rare	Unknown	Annex II B	Yes	Yes
Little egret	<i>Egretta garzetta</i>	Resident	Green	Annex I	Yes	Yes
European starling	<i>Sturnus vulgaris</i>	Resident	Amber	Annex II B	Yes	Yes
Great crested grebe	<i>Podiceps cristatus</i>	Resident	Amber	N/A	Yes	Yes
Grey heron	<i>Ardea cinerea</i>	Resident	Green	N/A	Yes	Yes
Light bellied brent goose	<i>Branta bernicla hrota</i>	Not resident	Amber	Annex II B	Yes	No
Great black backed gull	<i>Larus marinus</i>	Resident	Green	Annex II B	Yes	Yes
Common wood pigeon	<i>Columba palumbus</i>	Resident	Green	Annex II A, Annex III A, Annex I	Yes	Yes
Sandwich tern	<i>Sterna sandvicensis</i>	Not resident	Amber	Annex I	Occasional	Yes
Eurasian magpie	<i>Pica pica</i>	Resident	Green	Annex II B	Yes	Yes

5.9.1.5 Mammal Survey

During the site assessment, no sightings or physical evidence of mammal activity was found. The NBDC database was also examined as part of the desk study. No mammals were recorded within the site location or adjacent areas during the Mammals of Ireland 2016-2025 survey. The site location is within the 1km grid reference J2308. Two breeding seal species, the harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) were recorded within this 1km square during the Mammal Recording Scheme 1970-1985 (An Foras Forbatha) and Explore Your Shore survey. Harbour seals are more commonly recorded throughout Carlingford Lough (Burrows, 2011). The rocky islands located off the coast along the lough serve as ideal terrestrial haul-out sites for breeding, resting, social interactions, moulting or for rearing young (Ó Cadhla et al., 2013). Green Island is the most significant of these sites for seal populations (Lough Agency, 2023). Open water areas are also utilised by seals as a feeding and commuting habitat. While harbour seals are typically local foragers that feed within 5km of haul-out sites, grey seals forage across a greater distribution. As such, Carlingford Lough serves as foraging or navigation habitat for large Eastern breeding seal colonies and potentially large breeding colonies from the west of Scotland. Seals are most vulnerable during breeding or moulting periods at haul-out sites between June and September for harbour seals, and September to March for grey seals in Ireland (RPS, 2013). Irish seals are designated Annex II and Annex V species under the EC Habitats Directive (92/43/EEC), and their conservation requires the designation of Special Areas of Conservation (SACs). No sightings of this species were recorded while on site.

The European otter (*Lutra lutra*) was also recorded within the 1km grid reference J2308 during the Otter Survey of Ireland 1982. The European otter inhabits both terrestrial and marine areas for feeding, breeding, commuting and resting purposes. Coastline populations of otters require freshwater sources to wash the salt off their coats, and as such, otter holts or couches are likely found in proximity to where freshwater and marine waters converge (NPWS, 2023). As mentioned previously, two ponds are located to the south and southwest of the site location, and two land drains run onto the shore to the southeast and northwest of the site. It is likely that otters inhabit areas adjacent to these freshwater sources and feed on molluscs and marine fish such as eels, sea scorpion, rockling, wrasse, and blenny along the coast. European otters are designated Annex II and Annex IV species under the Habitats Directive (92/43/EEC). No otter sightings or evidence of spraints or footprints were noted while on site.

Moreover, in the open waters to the northeast of the site, sightings of the bottle-nosed dolphin (*Tursiops truncatus*) were recorded within the IWDG Casual Cetacean Sightings dataset (Grid ref. J232093, J234100, J238099, J241098). Bottle-nosed dolphins have been reported in deep waters, but they typically occupy shallower waters along the Irish coast and feed on inshore bottom dwelling fish, cephalopods, and crustaceans. They are social species, and typically travel, feed, and interact in small pods. Bottlenose dolphins are listed as Annex II and Annex IV species under the EC Habitats Directive (92/43/EEC), meaning that this species requires strict protection and conservation actions, including the designation of SAC sites. All species of cetaceans are fully protected in Irish waters by national and

European legislation under the Wildlife Act (1976) Amendment Act (2000). No sightings of this species were recorded while on site.

Based on sightings records and species behaviour and ecology, other marine mammal species which are likely to utilise Ballynamony (Murphy), Ballagan and Carlingford Lough waters include the harbour porpoise (*Phocoena phocoena*), other dolphin species, including Risso's dolphins (*Grampus griseus*), common dolphins (*Delphinus delphis*); and whales such as minke whales (*Balaenoptera acutorostrata*) (Evans, 1992, Berrow et al., 2001, 2002; Ingram, 2000; Ingram et al., 2001, 2003; Rogan et al., 2001; Ó Cadhla et al., 2004; Mackey et al., 2005). Basking sharks (*Cetorhinus maximus*) have also previously been spotted, and a bow head whale (*Balaena mysticetus*) in 2016 (Loughs Agency, 2023). All marine mammals are strictly protected as part of Irish legislation under the Wildlife Acts 1976 to 2012. As of 2023, basking sharks are now protected by law under Section 23 of Ireland's Wildlife Act. Due to the proximity with Northern Ireland borders, Northern Irish conservation laws are also in place in the open waters adjoining Ballynamony (Murphy), Ballagan shore.

6 NATURA 2000 SITES

Natura 2000 Designated sites within 15km of the proposed development (i.e., in the Rep. of Ireland and in Northern Ireland) are shown at various scales in Figures 1, 2, 3, 5 & 6). The documentation published by the NIEA and the NPWS (Site Synopsis, Qualifying Interests, etc) for the most important of these sites are located in Appendix 2. The following table, Table 8 outlines the qualifying interests for each site and identifies whether there are any potential source-pathway-receptor links via which adverse effects to the sites' qualifying interests and conservation objectives could potentially occur. This is vital to identify any potential adverse effects from the proposed development on the qualifying interests of these European sites, or cumulatively with other developments, that may result. Where a potential source-pathway- receptor link is present, an assessment is made as to whether there is a likelihood of significant adverse effects based on a review of the sites qualifying interests and conservation objectives.

As stated previously in Section 5.1, the works site is located within and on the edge of a Special Area of Conservation, Carlingford Shore SAC (002306) and a Special Protected Area, Carlingford Lough SPA (004078) which run along the shore's edge. A review of mapping indicates that the existing sea wall demarcates the western edge of both the SAC and the SPA (see Figure 6).

In the Republic of Ireland, there are 3 Special Areas of Conservation (SACs) within 15km of the site. As stated, the works site is inside the western boundary of Carlingford Shore SAC (002306) (see Figure 5) The other two SACs are Carlingford Mountain SAC (000453) which is 4.46m upgradient and to the northwest of the site, and Dundalk Bay SAC (000455) which is 7.1km southwest of the site (see Table 8).

In Northern Ireland, there is a Special Area of Conservation (SAC), Rostrevor Wood SAC [UK 0030268] which is 9km to the north-northwest of the site and another SAC, Eastern Mourne SAC (UK 0016615) which is 13.47km to the north-northeast of the site (see Table 8).

In Northern Ireland, there is one Special Protection Area, Carlingford Lough SPA [UK9020161] which is 2.08km east-southeast from the site (see Figure 1).

In the Republic of Ireland, outside of Carlingford Lough SPA (004078) there is 1 Special Protection Areas, Dundalk Bay SPA (004026) which is 7.28km southwest of the site (see Figures 1 to 3).

As stated previously, as part of the appropriate assessment process only the potential impact to Special Areas of Conservation and Special Protected Areas (i.e., Natura 2000) sites are assessed. Natural Heritage Areas (i.e., within the Republic of Ireland) and Area of Special Scientific Interests (ASSIs) (i.e., within Northern Ireland) are not regarded as Natura 2000 sites and are not part of this assessment. In Northern Ireland, Areas of Special Scientific Interest are, although important are protected at a lower level. Likewise, Natural Heritage Areas (NHAs) in the Republic of Ireland are not afforded the same

levels of protection as Special Protection Areas (SPAs) or Special Areas of Conservation (SACs) (see Table 8).

Of the 8 sites located within 15km of the Proposed Coastal Protection Works site, 2 No. potential 'source-pathway-receptor linkages' are present, Carlingford Shore SAC [002306] and Carlingford Lough SPA [004078] (see Figures 1 to 5). The proposed coastal protection works site are located within the boundary of this SAC and SPA (see Figure 6).

The Site Synopsis and the Qualifying Interests for Carlingford Shore Special Area of Conservation (SAC) (002306) are located in Appendix 2. The two Conservation Objectives for Carlingford Shore Special Area of Conservation (SAC) (002306) can be summarised as follows:

Objective 1:

[1210] Annual vegetation of drift lines - To maintain the favourable conservation condition of Annual vegetation of drift lines in Carlingford Shore SAC

Objective 2:

[1220] Perennial vegetation of stony banks - To maintain the favourable conservation condition of Perennial vegetation of stony banks in Carlingford Shore SAC

The attributes and targets for the above are presented in the following 2 pages.

TABLE 8. NATURE CONSERVATION SITES WITHIN 15 KM OF PROPOSED COASTAL PROTECTION WORKS, BALLYNAMONY (MURPHY), BALLAGAN, GREENORE, CO. LOUTH (INFORMATION OBTAINED FROM WWW.NPWS.IE IN & WWW.DAERA-NI.GOV.UK IN SEPTEMBER 2023)

SITE NAME, SITE CODE, DISTANCE AND DIRECTION FROM SITE	HABITAT OR SPECIES OF QUALIFYING INTEREST AND THE ASSOCIATED CODE ACCORDING TO INTERPRETATION MANUAL OF EUROPEAN UNION HABITATS	THE POTENTIAL SOURCE-PATHWAY-RECEPTOR LINKS BETWEEN THE WORKS LOCATION AND THE ECOLOGICALLY DESIGNATED SITE
SPECIAL AREAS OF CONSERVATION (SACs)		
<p>Carlingford Shore SAC [002306] 0m (E)</p>	<ul style="list-style-type: none"> ▪ [1210] Annual vegetation of drift lines ▪ [1220] Perennial vegetation of stony banks <p>Source: <i>NPWS. (2013). Conservation Objectives: Carlingford Shore SAC [002306]. Version 1.0. National Parks and Wildlife Service Department of Culture, Heritage and the Gaeltacht.</i></p>	<p>Any impacts would be regarded as short-term and just during the Construction Phase. The works area in the vicinity of the new rock armour installation between Chainage 189m and 229m needs to be fenced off prior to the commencement of construction works under the supervision of an appointed Ecological Clerk of Works to minimise any potential impact on those areas adjacent to it that have Annex 1 1210 and 1220 habitat plant species. If the contractor's machinery (i.e., excavator, dumper, etc) is required to access the foreshore for the delivery of materials to the works area, only the existing aquaculture licensed slipway and oyster farm haul road should be used by the appointed contractor with no traffic permitted on the wider foreshore during the construction works.</p> <p>The highest risk posed to the foreshore is calcite runoff from the newly created concrete sea wall and capping either coming in contact with seawater at high tide and/or heavy rainfall creating calcite contaminated stormwater which will run onto the foreshore.</p> <p>Daily monitoring of works by an Ecological Clerk of Works is required during the construction stage. A site-specific Construction Environmental Management Plan (CEMP) needs to be drawn up by the applicant, approved by the EcOW, and then reviewed and accepted by the appointed contractor. Provided mitigation measures are put in place, damage to any Annex 1. 1210 and 1220 habitat plant species and any contamination of the foreshore and the water body itself is unlikely e.g., construction during suitable tidal conditions, correct placement of spillage booms, etc.</p>
<p>Carlingford Mountain SAC [000453] 4.46km (W) (Rep. of Ireland)</p>	<ul style="list-style-type: none"> ▪ [4060] Alpine and Boreal heaths ▪ [4030] European dry heaths ▪ [8110] Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) ▪ [8210] Calcareous rocky slopes with chasmophytic vegetation ▪ [8220] Siliceous rocky slopes with chasmophytic vegetation ▪ [4010] Northern Atlantic wet heaths with <i>Erica tetralix</i> ▪ [6230] Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) ▪ [7140] Transition mires and quaking bogs ▪ [7230] Alkaline fens <p>Source: <i>NPWS. (2018). Conservation Objectives for Carlingford Mountain SAC [000453]. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.</i></p>	<p>Due to distance and the absence of any hydrological or other potential impact pathways between the proposed development and the European site, there are no potential ecological impacts.</p>

TABLE 8. NATURE CONSERVATION SITES WITHIN 15 KM OF PROPOSED COASTAL PROTECTION WORKS, BALLYNAMONY (MURPHY), BALLAGAN, GREENORE, CO. LOUTH (INFORMATION OBTAINED FROM WWW.NPWS.IE IN & WWW.DAERA-NI.GOV.UK IN SEPTEMBER 2023) (CONTINUED)		
SITE NAME, SITE CODE, DISTANCE AND DIRECTION FROM SITE	HABITAT OR SPECIES OF QUALIFYING INTEREST AND THE ASSOCIATED CODE ACCORDING TO INTERPRETATION MANUAL OF EUROPEAN UNION HABITATS	THE POTENTIAL SOURCE-PATHWAY-RECEPTOR LINKS BETWEEN THE WORKS LOCATION AND THE ECOLOGICALLY DESIGNATED SITE
SPECIAL AREAS OF CONSERVATION (SAC)		
Dundalk Bay SAC [000455] 7.1km (SSW)	<ul style="list-style-type: none"> ▪ [1130] Estuaries ▪ [1220] Perennial vegetation of stony banks ▪ [1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) ▪ [1310] <i>Salicornia</i> and other annuals colonizing mud and sand ▪ [1140] Mudflats and sandflats not covered by seawater at low tide ▪ [1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) <p>Source: <i>NPWS. (2011). Conservation Objectives: Dundalk Bay SAC [000455]. Version 1.0. Department of Culture, Heritage and the Gaeltacht.</i></p>	Due to distance and the absence of any hydrological or other potential impact pathways between the proposed development and the European site, there are no potential ecological impacts.
Rostrevor Wood SAC [UK 0030268] 9km (NNW) (Northern Ireland)	<p>European interest(s):</p> <ol style="list-style-type: none"> 1. Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles for which this is considered to be one of the best areas in the United Kingdom. <p>Source: <i>NIEA. (2014). Rostrevor Wood SAC Conservation Objectives. Version 2.0. Department of Agriculture, Environment and Rural Affairs.</i></p>	Due to distance and the absence of any hydrological or other potential impact pathways between the proposed development and the European site, there are no potential ecological impacts.
Eastern Mourne SAC [UK 0016615] 13.47km (NNE) (Northern Ireland)	<p>European interest(s):</p> <ol style="list-style-type: none"> 1. European dry heaths 2. Northern Atlantic wet heaths with <i>Erica tetralix</i> 3. Active blanket bogs 4. Alpine and boreal heaths 5. Siliceous alpine and boreal grasslands 6. Siliceous rocky slopes with chasmophytic vegetation 7. Siliceous scree of the montane to snow levels <p>Source: <i>NIEA. (2017). Eastern Mourne - Conservation Objectives. Version 2.1. Department of Agriculture, Environment and Rural Affairs.</i></p>	Due to distance and the absence of any hydrological or other potential impact pathways between the proposed development and the European site, there are no potential ecological impacts.

TABLE 8. NATURE CONSERVATION SITES WITHIN 15 KM OF PROPOSED COASTAL PROTECTION WORKS, BALLYNAMONY (MURPHY), BALLAGAN, GREENORE, CO. LOUTH (INFORMATION OBTAINED FROM WWW.NPWS.IE IN & WWW.DAERA-NI.GOV.UK IN SEPTEMBER 2023) (CONTINUED)

SITE NAME, SITE CODE, DISTANCE AND DIRECTION FROM SITE	HABITAT OR SPECIES OF QUALIFYING INTEREST AND THE ASSOCIATED CODE ACCORDING TO INTERPRETATION MANUAL OF EUROPEAN UNION HABITATS	THE POTENTIAL SOURCE-PATHWAY-RECEPTOR LINKS BETWEEN THE WORKS LOCATION AND THE ECOLOGICALLY DESIGNATED SITE
Special Protection Areas (SPA)		
<p>Carlingford Lough SPA [004078] 0km (E) (Rep. of Ireland)</p>	<ul style="list-style-type: none"> ▪ Light-Bellied Brent Goose (<i>Branta bernicla hrota</i>)* ▪ Wetlands & Waterbirds [A999] <p>* denotes wintering birds at Dundalk Bay.</p> <p><u>Source:</u> NPWS. (2011). <i>Conservation Objectives: Carlingford Lough SPA [004078] Version 1.0. Department of Culture, Heritage and the Gaeltacht.</i></p>	<p>Any impacts would be regarded as short-term and just during the Construction Phase. The works area in the vicinity of the new rock armour installation between Chainage 189m and 229m needs to be fenced off prior to the commencement of construction works under the supervision of an appointed Ecological Clerk of Works to minimise any potential impact on those areas adjacent to it that have Annex 1 1210 and 1220 habitat plant species. If the contractor's machinery (i.e., excavator, dumper, etc) is required to access the foreshore for the delivery of materials to the works area, only the existing aquaculture licensed slipway and oyster farm haul road should be used by the appointed contractor with no traffic permitted on the wider foreshore during the construction works.</p> <p>The highest risk posed to the foreshore is calcite runoff from the newly created concrete sea wall and capping either coming in contact with seawater at high tide and/or heavy rainfall creating calcite contaminated stormwater which will run onto the foreshore.</p> <p>Daily monitoring of works by an Ecological Clerk of Works is required during the construction stage. A site-specific Construction Environmental Management Plan (CEMP) needs to be drawn up by the applicant, approved by the EcOW, and then reviewed and accepted by the appointed contractor. Provided mitigation measures are put in place, damage to any Annex 1. 1210 and 1220 habitat plant species and any contamination of the foreshore and the water body itself is unlikely e.g., construction during suitable tidal conditions, correct placement of spillage booms, etc.</p>
<p>Carlingford Lough SPA [UK9020161] 2.08km (ENE) (Northern Ireland)</p>	<p>SPA SELECTION FEATURES</p> <ul style="list-style-type: none"> ▪ Light-Bellied Brent Goose (<i>Branta berniclahrota</i>)* ▪ Common Tern (<i>Sterna hirundo</i>)* ▪ Sandwich Tern (<i>Thalasseus sandvicensis</i>)* <p>ADDITIONAL ASSI SELECTION FEATURES</p> <ul style="list-style-type: none"> ▪ Great Crested Grebe (<i>Podiceps cristatus</i>)* ▪ Shelduck (<i>Tadorna tadorna</i>)* ▪ Scaup (<i>Aythya marila</i>)* ▪ Red-Breasted Merganser (<i>Mergus serrator</i>)* ▪ Oystercatcher (<i>Haematopus ostralegus</i>)* ▪ Dunlin (<i>Calidris alpina</i>)* ▪ Redshank (<i>Tringa totanus</i>)* <p><u>Source:</u> NIEA <i>Carlingford Lough Special Protection Area (SAP) UK9020160. Conservation Objectives – Including Conservation Objectives for Carlingford Lough ASSI</i></p>	<p>Due to distance and the absence of any hydrogeological, hydrological or other potential impact pathways between the proposed development and the European site, there are no potential ecological impacts.</p>

TABLE 8. NATURE CONSERVATION SITES WITHIN 15 KM OF PROPOSED COASTAL PROTECTION WORKS, BALLYNAMONY (MURPHY), BALLAGAN, GREENORE, CO. LOUTH (INFORMATION OBTAINED FROM WWW.NPWS.IE IN & WWW.DAERA-NL.GOV.UK IN SEPTEMBER 2023) (CONTINUED)

SITE NAME, SITE CODE, DISTANCE AND DIRECTION FROM SITE	HABITAT OR SPECIES OF QUALIFYING INTEREST AND THE ASSOCIATED CODE ACCORDING TO INTERPRETATION MANUAL OF EUROPEAN UNION HABITATS	THE POTENTIAL SOURCE-PATHWAY-RECEPTOR LINKS BETWEEN THE WORKS LOCATION AND THE ECOLOGICALLY DESIGNATED SITE
Special Protection Areas (SPA)		
<p>Dundalk Bay SPA [004026] 7.28km (SSW) (Rep. of Ireland)</p>	<ul style="list-style-type: none"> ▪ Curlew (<i>Numenius arquata</i>)* ▪ Redshank (<i>Tringa totanus</i>)* ▪ Black-Headed Gull (<i>Chroicocephalus ridibundus</i>)* ▪ Common Gull (<i>Larus canus</i>)* ▪ Herring Gull (<i>Larus argentatus</i>)* ▪ Great Crested Grebe (<i>Podiceps cristatus</i>)* ▪ Greylag Goose (<i>Anser anser</i>)* ▪ Light-Bellied Brent Goose (<i>Branta berniclahrota</i>)* ▪ Pintail (<i>Anas acuta</i>)* ▪ Common Scoter (<i>Melanitta nigra</i>)* ▪ Red-Breasted Merganser (<i>Mergus serrator</i>)* ▪ Oystercatcher (<i>Haematopus ostralegus</i>)* ▪ Ringed Plover (<i>Charadrius hiaticula</i>)* ▪ Golden Plover (<i>Pluvialis apricaria</i>)* ▪ Grey Plover (<i>Pluvialis squatarola</i>)* ▪ Lapwing (<i>Vanellus vanellus</i>)* ▪ Knot (<i>Calidris canutus</i>)* ▪ Dunlin (<i>Calidris alpina</i>)* ▪ Black-Tailed Godwit (<i>Limosa limosa</i>)* ▪ Bar-Tailed Godwit (<i>Limosa lapponica</i>)* ▪ Shelduck (<i>Tadorna tadorna</i>)* ▪ Teal (<i>Anas crecca</i>)* ▪ Mallard (<i>Anas platyrhynchos</i>)* ▪ Wetlands & Waterbirds [A999] <p>* denotes wintering birds at Dundalk Bay.</p> <p><u>Source:</u> NPWS. (2011). <i>Conservation Objectives: Dundalk Bay SPA [004026]. Version 1.0.</i> Department of Culture, Heritage and the Gaeltacht.</p>	<p>Due to distance and the absence of any hydrogeological, hydrological or other potential impact pathways between the proposed development and the European site, there are no potential ecological impacts.</p>

Objective 1 - [1210] Annual vegetation of drift lines - To maintain the favourable conservation condition of Annual vegetation of drift lines in Carlingford Shore SAC

Objective 1 is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Current area unknown, but thought to occur in a mosaic with perennial vegetation of stony banks (1220). Habitat is very difficult to measure in view of its dynamic nature, which means that it can appear and disappear within a site from year to year. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes	Current distribution unknown, but thought to occur in a mosaic with perennial vegetation of stony banks (1220). See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Accumulation of organic matter in tidal litter is essential for trapping sand. Rock armour is present at Ballagan Point and Greenore. These physical barriers will affect sediment supply. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Thought to occur in a mosaic with perennial vegetation of stony banks (1220). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket (<i>Cakile maritima</i>), sea sandwort (<i>Honckenya peploides</i>), prickly saltwort (<i>Salsola kali</i>) and orache (<i>Atriplex</i> spp.)	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and Gaynor (2008). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details

Objective 2 - [1220] Perennial vegetation of stony banks - To maintain the favourable conservation condition of Perennial vegetation of stony banks in Carlingford Shore SAC

Objective 2 is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Current area unknown. Habitat recorded during the National Shingle Beach Survey (NSBS) (Moore and Wilson, 1999) from three sub-sites: Whitestown to Cooley Point, Ballagan Point and Greenore. Although extent was not mapped, these contiguous sites extend for 3.5km along the coastline. Area of vegetated shingle is estimated to cover 130ha. NB Further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 3 for mapped locations	Based on data from Moore and Wilson (1999). Exact current distribution unknown, although the habitat has been recorded along a 3.5km stretch of coastline from Greenore, extending south to Cooley Point (Moore and Wilson, 1999). See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Moore and Wilson (1999). West of Cooley Point there has been a lot of development at Templetown beach, including the installation of a car park. The NSBS noted two areas of coastal defences (rock armour), one in an area south of Ballagan Point and another in an area south of Greenore (approx. 200m in length). A number of tourism-related developments, including a promenade protected with rock armour, have been constructed at Greenore. Shingle features are relatively stable in the long term. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Moore and Wilson (1999). At Ballagan Point the shingle vegetation is backed by cobble-based grassland. Elsewhere along the Carlingford shore, gradations to inland habitats are disrupted by a road. Habitat is thought to occur in a mosaic with annual vegetation of drift lines (1210). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones	Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Moore and Wilson (1999). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details

The Site Synopsis and the Qualifying Interests for Carlingford Lough Special Protection Area (SPA) (004078) are also located in Appendix 2. The two Conservation Objectives for Carlingford Lough Special Protection Area (SPA) (004078) can be summarised as follows:

Objective 1:

[A046] Light-bellied Brent Goose (Branta bernicla hrota) - To maintain the favourable conservation condition of Light-bellied Brent Goose in Carlingford Lough SPA

Objective 2:

[A999] Wetland and Waterbirds - To maintain the favourable conservation condition of the wetland habitat in Carlingford Lough SPA as a resource for the regularly occurring migratory waterbirds that utilise it

The attributes and targets for the above are presented in the following 2 pages.

Objective 1:

[A046] Light-bellied Brent Goose (Branta bernicla hrota) - To maintain the favourable conservation condition of Light-bellied Brent Goose in Carlingford Lough SPA

Objective 1 is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation	Waterbird distribution from survey work undertaken in 2010/2011 is discussed in part five of the conservation objectives supporting document

Objective 2:

[A999] Wetland and Waterbirds - To maintain the favourable conservation condition of of the wetland habitat in Carlingford Lough SPA as a resource for the regularly occurring migratory waterbirds that utilise it

Objective 2 is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 595 hectares, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 595ha using OSI data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document

As can be seen in Figure 6, the proposed coastal works site is located within the boundary of the Carlingford Shore SAC and Carlingford Lough SPA which are Natura 2000 sites. Therefore, they are within the likely zone of impact of the proposed coastal works site. As stated previously, there are no surface water bodies either within or on the boundaries of the proposed coastal works site. As such, there is no discharge of stormwater from the site to Carlingford Shore SAC or Carlingford Lough SPA.

Characteristics of Potential Impacts

The potential impact of the proposed development must be considered in terms of the construction works required to construct the concrete sea wall, capping and the rock armour and after its construction (i.e., during operation).

Construction Impacts

As stated in Section 1, Introduction, there is a requirement to carry out the following groundworks:

- 0-4 metres – repointing of stonework;
- 4-15 metres – concrete crack repair;
- 15-35 metres – In situ concrete to fill voids of the existing sea wall;
- 35-75 metres – Break up damaged section of existing coastal defences and compact down. The sea wall is then to be replaced with composite concrete and boulders;
- 75-100 metres – In situ concrete infill to voids of existing sea wall;
- 100-144 metres – concrete crack repair;
- 144-150 metres – repointing of stonework;
- 150-159 metres – no works proposed;
- 159-164 metres – In situ concrete infill to voids of existing sea wall; and
- 189-229 metres – install rock armour.

To construct the above-mentioned rock armour on the south-eastern end of the coastal protection works site, the existing soil and subsoil within a 120m² area (i.e., 40m x 3m) will need to be dug by excavator to a depth of 1m below ground level and removed offsite (see Plate 23 below).

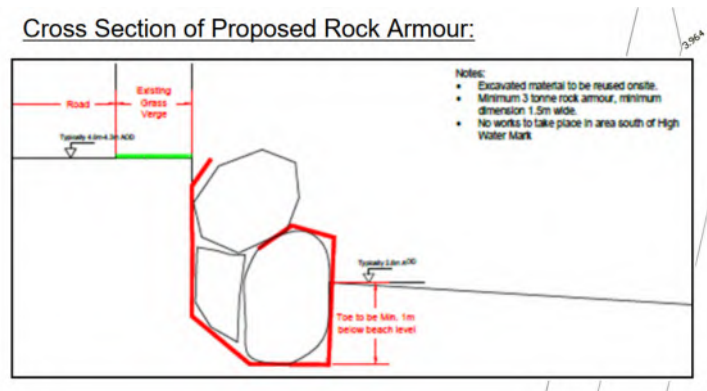


Plate 23. Extract of civil engineering drawings for proposed Coastal Works at Ballynamony (Murphy), Ballagan showing section through proposed rock armour

It is proposed to recycle any suitable boulders excavated as part of the groundworks. Any materials removed from the site which may be found to be suitable for the rock armour will be sorted and placed in a temporary stockpile at a suitable location upgradient of the site and outside of the designated Natura 2000 areas.

Following the completion of the excavation, a geotextile membrane will be placed in the excavation and spread on the bottom and side walls of the excavation. Following this, select boulders will be placed into the rock armour. Then the previously excavated suitable material will be used to fill void spaces within the emplaced boulders.

Smaller cracks in the existing wall are to be repaired using Crack Repair epoxy repair/mix mortar. Cracks and gaps are to be cleaned out thoroughly prior to application. Larger voids are to be repaired by cleaning out loose and broken concrete from the previous installation and adding in situ concrete: (30N lean mix concrete infill to voids) to the existing sea defence wall. The largest void infill will be no more than sections 300mm x 700mm in dimension.

These impacts would be regarded as short-term. The highest risk posed to the foreshore is calcite runoff from the newly created concrete sea wall either coming in contact with seawater at high tide and/or heavy rainfall creating calcite contaminated stormwater which will run onto the foreshore.

In order for this not to happen, a tarpaulin should be put in place to prevent rainfall making contact with the concrete while it is setting. These works will be carried out during a suitable time of the year to allow the concrete to cure properly (i.e. when the highest tides will not reach the proposed works).

In order to carry out the coastal works, a 30-tonne excavator and site dumper will be required to excavate the ground for the rock armour and to place suitable boulders. Given the risk posed by the leakage of hydrocarbons from the excavator and dumper (e.g. hydraulic fluid from leaking cables, leaking diesel, lube oil, etc), a sufficiently floating long spill boom will need to be put in place on the foreshore to prevent the spread of any hydrocarbons in the event that a leakage of hydrocarbons occurs. The floating spill boom will be required to completely encircle the entire works area with the boom being tethered to posts installed upgradient of the high-water mark.

In order to minimise the length of the haul road and any potential impact to the foreshore, it is proposed to create a new access ramp from the road on to the foreshore at chainage 187m to 191m (see Figures 11 to 14). A 4-5m wide haul road will be located immediately adjacent and to the north of the proposed works area. This haul road will extend along the full 229m length of the proposed works area and a further 11m as far as the 240m chainage mark. The purpose of the haul road is to facilitate the movement of plant and transfer of materials to and from the works area. The purpose of the extra 11m on the eastern side of the works area is to facilitate the turning of plant and the temporary storage of materials.

Given that the route of the haul road consists mostly of shingle and gravel with minimal vegetation, it will not be necessary to put any temporary surfacing down along its path. It is anticipated that any compaction on the shingle and gravel will be minimal and temporary and will be reversed through wave action at high tide.

It is not proposed to use the licensed slip way and haul road used by the oyster farmers in the area.

Operational Impacts

Designated Areas for Nature Conservation

The majority of the proposed coastal protection works involve the replacement and repair of an existing concrete sea wall. However, the proposed coastal protection works require approximately 51m of new rock armour to be constructed on the southeastern end of the works area. Therefore, there is a required land take of 153m² for the additional rock armour.

Once the civil works are complete, the sea wall will effectively be identical to the previous sea wall (i.e., albeit a more robust construction). However, there will be an additional 153m² of rock armour and as such, there will be a change in the physical state of the SAC and the SPA.

The introduction of the rock armour will result in a permanent change from its current habitat which is a mixture of *LS1- Shingle & Gravel Shores* and *GS2-Dry Meadows and Grassy Verges*, to *CCI- sea walls, piers, and jetties* (see Figures 9 and 10). As such, there will be a slight change in the physical state of the SAC.

In order to enhance recolonisation by *LS1- Shingle & Gravel Shores* habitat plant species, it is proposed that during the final stages of the rock armour construction, the topsoil removed from the excavation will be used as 'packing' in around the larger boulders. It is expected that these steps will enhance the ecosystem on the foreshore as the rock armour type proposed for Ballynamony (Murphy), Ballagan typically provides refuge to invertebrates and acts as a surface area for marine plant life.

At the Post-Construction Phase, there are no viable source-pathway-receptor linkages which can affect the Carlingford Shore SAC and/or Carlingford Lough SPA given the nature of the proposed coastal protection works. There will be no stormwater discharge or calcite leachate run-off to surface water emanating from the site. Concrete used on site will be to EN 206 and BS8500 standards, suitable for a marine environment. As such, there will be negligible risk of run-off from concrete once construction is complete.

7 IDENTIFICATION AND EVALUATION OF LIKELY SIGNIFICANT EFFECTS

7.1 Other Plans or Projects Adjacent or in the Vicinity of the site which could act in Combination with potential impacts from the Proposed Coastal Protection Works

7.1.1 Consideration of Potential 'In-Combination' Effects

In-combination effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM, 2018). Different types of actions can cause cumulative impacts and effects. As such, these types of impacts may be characterised as:

- *Additive/incremental* – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space (CIEEM, 2018); and
- *Associated/connected* – a Development activity 'enables' another Development activity e.g. phased Development as part of separate planning applications. Associated Developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess impacts of the 'project' as a whole and not ignore impacts that fall under a separate consent process (CIEEM, 2018).

In-combination effects are required to be considered at Screening for Appropriate Assessment Stage, and within an Appropriate Assessment itself. The scope of plans or projects considered for 'in-combination' effects includes plans and projects that are completed, approved or proposed to take into account effects that occur over time (EC, 2002). According to the European Commission (2006):

"[...] any element of a plan or project that has the potential to affect the conservation objectives of a Natura 2000 site, including its structure and function, should be considered significant"

7.1.2 Potential Additive/Incremental Impacts

A review was undertaken to identify any planning permissions granted within the last 5 years and within 500m of the proposed coastal works which could hypothetically result in '*in-combination impacts*' on Carlingford Shore SAC and/or the Carlingford Lough SPA. A review of the Louth County Council planning application database did not reveal any planning applications which fitted this criteria.

It is understood that if planning permission is obtained that the proposed Ballynamony (Murphy), Ballagan Coastal Protection Works, that construction will commence at the earliest in April 2024. As such, the potential for cumulative or '*Potential Additive/Incremental Impacts*' resulting from the

Construction Phase of the Proposed Coastal Protection works and another project happening at the same time is negligible.

The European Pollutant Release and Transfer Register (E-PRTR) was reviewed to determine if any EPA licensed facilities are located within the vicinity of the site. There are no EPA licensed facilities with the potential for additive effects near the development site.

For both the proposed Coastal Protection Works, using the 'Source-Pathway-Receptor' risk assessment methodology, there does not appear to be viable pollutant linkages from these works to the principle receptors of concern, Carlingford Shore SAC and Carlingford Lough SPA.

As such, with best practice construction techniques combined with the mitigation measures proposed for these projects, there does not appear to be any significant 'in-combination' hydrological or other types of impacts in combination with the proposed Coastal Protection Works on the Carlingford Shore SAC.

7.2 Evaluation of potential impacts from the Proposed Coastal Protection Works on the Natura 2000 Sites

The proposed works are located within the boundary of Carlingford Shore SAC and Carlingford Lough SPA, and as such there is the potential for direct impacts upon Carlingford Shore SAC and Carlingford Lough SPA (i.e., Natura 2000 sites) from the proposed coastal protection works (see Table 9 below and Table 10 following). There is, therefore, a direct S-P-R linkage between the site works and these Natura 2000 sites. As Carlingford Shore SAC and Carlingford Lough SPA are dependent on water quality, a reduction in water quality or changes to local hydrology could negatively impact upon the conservation status of the SAC and/or SPA with regard to habitat quality and size and with regard to the ecological integrity of those species occurring within it. The proposed area for the rock armour between the 189 and 229-metre chainage is in proximity to Annex 1 habitats which are of qualifying interest for Carlingford Shore SAC. These areas may be impacted during construction if mitigation measures are not taken during the construction phase.

Table 8 lists Natura 2000 sites in the Republic of Ireland and Northern Ireland within 15km of the proposed site and the potential impacts associated with the proposed site activity.

Table 9. The Potential for Impacts (Alone or in Combination with other Plans/Projects) on Natura 2000 Sites within 15km of the Proposed Coastal Works at Ballynamony (Murphy), Ballagan

SITE NAME	DIRECT IMPACTS	INDIRECT / SECONDARY IMPACTS	RESOURCE REQUIREMENTS (WATER ABSTRACTION ETC).	EMISSIONS (TO LAND, WATER OR AIR)	EXCAVATION REQUIREMENTS	DURATION OF CONSTRUCTION AND OPERATION
Carlingford Shore SAC [002306]	Potential	Potential	None Predicted	Potential	Potential	None Predicted
Carlingford Lough SPA [004078]	Potential	Potential	None Predicted	Potential	Potential	None Predicted
Carlingford Lough SPA [UK9020161]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Carlingford Mountain SAC [000453]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Dundalk Bay SAC [000455]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Dundalk Bay SPA [004026]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Rostrevor Wood SAC [UK 0030268]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Eastern Mournes SAC [UK 0016615]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Slieve Gullion SAC [UK 0030277]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted

Table 10. Potential Changes to Natura 2000 Sites within 15km of the of the Proposed Coastal Works at Ballynamony (Murphy), Ballagan

SITE NAME	REDUCTION OF HABITAT AREA	DISTURBANCE TO KEY SPECIES	HABITAT / SPECIES FRAGMENTATION	REDUCTION IN SPECIES DENSITY	CHANGES IN KEY INDICATORS OF CONSERVATION VALUE	CLIMATE CHANGE
Carlingford Shore SAC [002306]	Potential	Potential	Potential	Potential	Potential	None Predicted
Carlingford Lough SPA [004078]	Potential	Potential	Potential	Potential	Potential	None Predicted
Carlingford Lough SPA [UK9020161]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Carlingford Mountain SAC [000453]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Dundalk Bay SAC [000455]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Dundalk Bay SPA [004026]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Rostrevor Wood SAC [UK 0030268]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted
Eastern Mourne SAC [UK 0016615]	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted	None Predicted

7.3 Screening Assessment Conclusions

In order to determine the potential impacts, if any, of the proposed coastal works on nearby Natura 2000 sites, a screening process was completed. This identified 8 no. different Natura 2000 sites within a 15km radius, which are designated as either as an SAC or SPA in both the Republic of Ireland and Northern Ireland. It has been determined that, of the 8 sites, only 2 are potentially impacted by the proposed coastal protection works (i.e., Carlingford Shore SAC (002306) and Carlingford SPA (004078)).

It has been determined that there is a potential risk to water quality/benthic biota within the Carlingford Shore SAC and the Carlingford SPA (004078)) should contaminated surface water enter the foreshore as a consequence of site-based runoff or other ongoing operations. Therefore, a full Stage 2 Appropriate Assessment has been conducted for the site, with an assessment of the potential mitigation of the afore-mentioned impacts.

8 APPROPRIATE ASSESSMENT

Screening identified potential impacts on Carlingford Shore SAC and Carlingford Lough SPA and therefore a Stage 2 - Appropriate Assessment was carried out to determine if the project will adversely affect the integrity of this Natura 2000 site. It involves the identification of the habitats and species within the site, and an assessment of the significance of impacts on their conservation status. An assessment of impacts is carried out, and mitigation measures proposed for potential impacts. Any negative impacts on the integrity of structure, function or conservation objectives of these sites will require the implementation of avoidance or mitigation measures to avoid progression to Stages 3 and 4 of the Appropriate Assessment process.

It should be noted that it is the goal of National Parks and Wildlife Services (NPWS) to draw up conservation plans for all areas designated for nature conservation, and that these plans will, among other things, set clear objectives for the conservation of the features of interest within a site. The NPWS have provided a site synopsis, Conservation Objectives and a Natura 2000 data form for Carlingford Shore SAC and Carlingford Lough SPA, from which information is sourced (see Appendix 2).

8.1 Description of the Qualifying Interests, Vulnerabilities and Conservation Status of Natura 2000 Sites Potentially Impacted upon by the Proposed Coastal Protection Works

8.1.1 Carlingford Shore SAC (002306)

The Carlingford Shore SAC site comprises the entire southern shoreline of Carlingford Lough and continues round the tip of the Cooley Peninsula to just west of Cooley Point. While the principal conservation interests lie in the perennial vegetation of shingle banks and the annual vegetation of drift lines, the site also has intertidal sand and mudflats, patches of saltmarsh, some areas of dry grassland, and an area of mixed deciduous woodland. The site is flanked by Carlingford Mountain to the south-west. The underlying rock within the SAC is mainly carboniferous limestone. This outcrops in places in the form of bedrock shore or reefs. Granite boulders are occasionally found. Intertidal mudflats and sand/gravel banks also occur. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive: [1210] *Annual Vegetation of Drift Lines* and [1220] *Perennial Vegetation of Stony Banks*. Evidence of these habitats were identified in some areas within the site location. In Carlingford Shore SAC the shingle and drift line habitats extend more or less continuously from Greenore to west of Cooley Point. They occur as a strip of varying width, from only a few metres in places, to up to about 50 m. One of the best developed areas is south of Ballagan Point. The substrate varies from stones and cobbles to gravels and coarse sands. The exposure level of this shoreline is high.

8.1.2 Carlingford Lough SPA (004078)

Carlingford Lough SPA comprises parts of the south side of Carlingford Lough, Co. Louth, between Carlingford Harbour and Ballagan Point. The predominant habitats present are intertidal sand and mud flats. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special

conservation interest for Light-bellied Brent Goose. This species was recorded in proximity to the site during the bird survey. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

In winter the site supports an internationally important population of Light-bellied Brent Goose (253 – all figures are five-year mean peaks for the period 1995/96 to 1999/2000). A range of other waterfowl species occurs within the site, including Wigeon (107), Oystercatcher (289), Dunlin (392), Bar-tailed Godwit (33), Redshank (108) and Turnstone (29). The intertidal flats provide feeding areas for the wintering birds. The sub-tidal areas outside the SPA support a range of species including Great Crested Grebe, Cormorant and Red-throated Diver. Carlingford Lough SPA is of international importance for its Light-bellied Brent Goose population. Of note is the occurrence of Bar-tailed Godwit, a species that is listed on Annex I of the E.U. Birds Directive.

9 IMPACT ASSESSMENT

9.1 Identified Impacts

Given the position of the site within and on the edge of the SAC and the SPA, an S-P-R linkage between the proposed Coastal Protection Works and Carlingford Shore and Lough can be completed. Any impacts by the proposed Coastal Protection Works on the water quality of Carlingford could have negative impacts on sites downstream. Also, the proposed area for the rock armour between the 189 and 229-metre chainage includes Annex 1 habitats which are of qualifying interest for Carlingford Shore SAC. These areas may be impacted if the required mitigation measures are not implemented during the construction phase. Although these are Annex I habitats, they are not listed as one of the 16 *priority* habitats in Ireland, as outlined in the *Interpretation manual of European Union habitats* (European Commission, 1996), which acts as a guide to habitats in Annex I of the Habitats Directive (Directive 92/43/EEC, amended by Directive 97/62/EC). It is based on the hierarchical classification of European habitats that was developed as part of the CORINE Biotopes Project (Commission of the European Communities, 1991). Minor losses of non-priority Annex I habitats can be allowed once they are not assessed as significant.

There is also the possibility of secondary impacts, with any impact on Carlingford Shore SAC or Carlingford Lough SPA having an impact on any sites/species linked physically or ecologically to Carlingford Lough SPA (UK9020161).

10 PROPOSED MITIGATION MEASURES

The proposed works will be carried out by contractors who can meet the requirements of the standard best practice measures outlined below. The relevant appointed contractor shall have regard to measures to be implemented during the construction phase of the proposed works. The purpose of these measures is to ensure the strict protection of water quality in the freshwater environment and by extension the protection of the nearby designated European Sites. The appointed contractor shall be vigilant in ensuring that no activities, listed or otherwise, give rise to pollution of the nearby Carlingford Lough SPA or Carlingford Shore SAC protected habitats with suspended solids or other pollution related material having due regards to the following measures outlined below:

Construction Mitigation Measures

- A site-specific Construction and Environmental Management Plan (CEMP) will be prepared for the development in advance of the works by the appointed Contractor with a draft CEMP submitted to Louth County Council's representative for approval prior to commencement of the works;
- In order to minimise any impact to Annex I / II ([1210] *Annual Vegetation of Drift Lines* and [1220] *Perennial Vegetation of Stony Banks*) in the vicinity of the area proposed for the new rock armour, it is proposed that daily supervision by an Ecological Clerk of Works (EcOW) is provided. Those areas on the foreshore identified as potential Annex I habitats should be fenced off prior to construction works commencing with daily monitoring carried out before, during and after the completion of the construction works;
- Construction of coastal protection works should only take place outside of the winter migratory bird period between September and March;
- In order to minimise the length of the haul road and any potential impact to the foreshore, it is proposed to create a new access ramp from the road on to the foreshore at chainage 187m to 191m. A 4-5m wide haul road will be located immediately adjacent and to the north of the proposed works area. This haul road will extend along the full 229m length of the proposed works area and a further 11m as far as the 240m chainage mark. The purpose of the haul road is to facilitate the movement of plant and transfer of materials to and from the works area. The purpose of the extra 11m on the eastern side of the works area is to facilitate the turning of plant and the temporary storage of materials. Given that the route of the haul road consists mostly of shingle and gravel with minimal vegetation, it will not be necessary to put any temporary surfacing along its path;
- During periods of heavy precipitation and run-off, works will be halted or working surfaces/pads will be provided to minimise soil disturbance;
- Any bulk fuel storage tank should be a sufficient distance from the foreshore and properly bunded with a bund capacity of at least 110% of that of the fuel tank. No refuelling or storage of fuel will take place within the works area;
- Limit disturbance when excavating - Retain as much of the vegetated areas as possible. By limiting land disturbance, erosion hazards are reduced;

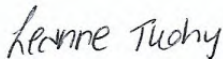
- The pouring of concrete for the project shall be completed during dry weather to avoid seepage to the groundwater environment;
- Temporary fills or stockpiles will be covered with tarpaulin to avoid sediment release associated with heavy rainfall;
- All fuels, lubricants and hydraulic fluids for equipment used on the construction site should be stored a sufficient distance from the foreshore in a roofed and bunded hazardous liquids container. These liquids should be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment in accordance with current best practice;
- A wheelie bin type hydrocarbon spill kit will be required and should be positioned close to the works area at the foreshore to deal with any leakage from plant working within the coastal protection works site; and
- Given the risk posed by the leakage of hydrocarbons from the excavator and dumper (e.g., hydraulic fluid from leaking cables, leaking diesel, lube oil, etc), a sufficiently long floating spill boom with a suspended curtain will need to be put in place on the foreshore to prevent the spread of any hydrocarbons in the event that a leakage of hydrocarbons occurs. The floating spill boom will be required to completely encircle the entire works area with the boom being tethered to posts installed upgradient of the high-water mark. The integrity of the boom will require checking twice a day.

11 CONCLUSIONS

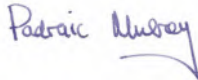
Provided the afore-mentioned mitigation measures are applied to ensure that no contaminants enter the foreshore area and hence the SAC and SPA and provided these measures are enforced during the construction period, it is considered that the proposed Coastal Protection Works will have no adverse impacts on the integrity of any of the species or habitats of the Carlingford Shore SAC and/or Carlingford Lough SPA or on any other Natura 2000 site within a 15km radius of the site.

On the basis of the findings of this Natura Impact Statement, it is concluded that the proposed Coastal Protection Works will not have a significant effect on the Natura 2000 network and neither a Stage 3. Assessment of Alternative Solutions or a Stage 4. Assessment Where Adverse Impacts Remain is required.

Yours sincerely,



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**MULROY ENVIRONMENTAL LTD.
SERVICE CONSTRAINTS**

1. This report and the AA Screening Assessment carried out in connection with the report (together the "Services") were compiled and carried out for Louth County Council (the "client") in accordance with the terms of an emailed fee proposal agreement Fee Proposal PRP524.18.04.2023 between Mulroy Environmental Ltd. and the "client" dated the 18th April, 2023. Mulroy Environmental Ltd. received permission to proceed by email (i.e., a 'Letter of Acceptance') on the 29th May, 2023. The Services were performed by Mulroy Environmental Ltd. with the skill and care ordinarily exercised by a reasonable Environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by Mulroy Environmental Ltd. taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between Mulroy Environmental Ltd. and the client.

2. Other than that expressly contained in paragraph 1 above, Mulroy Environmental Ltd. provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed the Services were performed by Mulroy Environmental Ltd. exclusively for the purposes of the client. Mulroy Environmental Ltd. is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, Mulroy Environmental Ltd. does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and Mulroy Environmental Ltd. disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.

4. It is Mulroy Environmental Ltd.'s understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without Mulroy Environmental Ltd. be requested to review the report after the date hereof, Mulroy Environmental Ltd. shall be entitled to additional payment at the then existing rates or such other terms as agreed between Mulroy Environmental Ltd. and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Mulroy Environmental Ltd. In the absence of such written advice of Mulroy Environmental Ltd., reliance on the report in the future shall be at the client's own and sole risk. Should Mulroy Environmental Ltd. be requested to review the report in the future, Mulroy Environmental Ltd. shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Mulroy Environmental Ltd. and the client.

6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and Mulroy Environmental Ltd. Mulroy Environmental Ltd. has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and Mulroy Environmental Ltd.. Mulroy Environmental Ltd. is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Mulroy Environmental Ltd. did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon Mulroy Environmental Ltd.'s observations of existing physical conditions at the Site gained from a walk-over survey of the site together with Mulroy Environmental Ltd.'s interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which Mulroy Environmental Ltd. was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by Mulroy Environmental Ltd. and the observations possible at the time of the walk-over survey. Further Mulroy Environmental Ltd. was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. Mulroy Environmental Ltd. is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Mulroy Environmental Ltd. and including the doing of any independent investigation of the information provided to Mulroy Environmental Ltd. save as otherwise provided in the terms of the contract between the client and Mulroy Environmental Ltd..

8. The environmental monitoring aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Mulroy Environmental Ltd.] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features

