Carcur Park Residential Development

Natura Impact Statement

Produced for William Neville and Sons

by

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MSc Ecological Assessment ACIEEM

With contributions from
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Contents

1 Introduction

Background

This report contains information required for the competent authority (An Bord Pleanála) to undertake Stage 2 Appropriate Assessment (AA) in respect of the proposed development at Carcur in Wexford. The report considers the potential for the development to have significant effects, either individually or in combination with other plans or projects, on Natura 2000 sites. The information in this report forms part of, and should be read in conjunction with, the documentation accompanying the application for permission for the proposed development.

Deborah D'Arcy was commissioned by William Neville & Sons to prepare an Appropriate Assessment Screening and Natura Impact Statement (NIS) in relation to the proposed residential development at Carcur Park Co. Wexford.

A NIS is required in respect of the proposed development located directly adjacent to the Slaney River Valley SAC (site code 000781) and Wexford Harbour and Slobs SPA (site code: 004076) and the Raven SPA (site code: 004019). This NIS is informed by assessment and reports commissioned by William Neville and Sons including a detailed ornithological assessment carried out by Dr Tom Gittings and a detailed otter assessment carried out by Ross Macklin.

1.1 About the authors

Deborah D'Arcy is an Ecologist with a MSc in Ecological Assessment and 8 years' experience working in ecological consultancy. Deborah also holds a B.A. in Natural Sciences and a MSc in Environmental Resource Management. Deborah is competent in habitat classification, botanical surveying and general ecology surveys and has previous experience of appropriate assessment and ecological assessments for a range of development types including residential, quarry, and solar farm developments.

Ross Macklin is a freshwater and fisheries ecological consultant. He studied a Bachelors Degree in Environmental Science at U.C.C. and later completed a higher diploma in Geographical Information Systems and Integrated Pest Management. He is currently completing his PhD in U.C.C. in the area of fisheries ecology. Ross has an in depth knowledge of all freshwater ecosystems and riparian corridors. He has undertaken river habitat, lake habitat, wetland habitat and fisheries assessments in professional work for 15

years. His specialist freshwater experience lies in biological and physiochemical water quality analysis, fisheries ecology, riparian habitat assessments, habitat mapping, protected species translocation, otter surveys, geographical information systems, ecological design and invasive species. He routinely undertakes Natura Impact Screening, Natura Impact Statements, Pollution Audits, Fisheries Assessments, Protected Species Surveys, Invasive Species Surveys, Habitat & Surface Water Management Plans, EcIA, EIAR, EIA reporting.

Dr Tom Gittings is an ecologist with 24 years' experience in ecological consultancy and research. He has been carrying out professional bird survey and assessment work since 1989 and has carried out academic research and consultancy work on a wide range of bird species and their habitats. Since 2010, he has been working on a variety of projects for the Marine Institute relating to the Appropriate Assessment of aquaculture and shellfisheries in coastal SPAs. This has included developing and implementing research programmes studying the interactions between waterbirds and aquaculture and fisheries activities in coastal SPAs to provide the information base required for the assessments. As part of this work, he has also written Appropriate Assessment reports for eight coastal SPAs, including Wexford Harbour.

This report has been produced using all reasonable skill and care. As members of the Chartered Institute of Ecology and Environmental Management, the chief professional body for Ecologists in Ireland, Deborah, Tom and Ross are bound by their professional code of conduct.

1.2 Legislative context

In accordance with Article 6(3) of the EU Habitats Directive (92/43/EEC), the potential impacts of any project on the conservation objectives of a Natura 2000 site of European conservation importance, including Special Areas of Conservation (SACs) and Special Protection Areas for birds (SPAs), are to be assessed by means of Appropriate Assessment (AA). The Habitats Directive is transposed into Irish Law by the European Communities (Birds and Natural Habitats) Regulations S.I. No. 477 of 2011. The purpose of AA is to assess the impacts of projects in combination with the effects of other plans and projects against the conservation objectives of a Natura 2000 site and to ascertain whether they would adversely affect the integrity of that site. In the context of development planning, AA is carried out under the provisions of the Planning and Development Acts 2000 to 2011**.**

The Natura 2000 network provides an ecological infrastructure for the protection of sites that are of particular importance for rare, endangered or vulnerable habitats and species within the EU. The Natura 2000 network in Ireland is made up of European Sites which include:

- Special Areas of Conservation (**SAC**)
- Special Protection Areas (**SPA**)

This NIS report has been compiled in accordance with Article 6(3) of the Habitats Directive 92/43/EEC which establishes the requirement for Appropriate Assessment.

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

2 Stage 1 Screening for Appropriate Assessment

Stage 1 Screening for AA is undertaken without the consideration of any mitigation measures, unless potential impacts can be clearly avoided through modification or re-design of the project (DoEHLG, 2009). If significant effects on Natura sites cannot be ruled out then a Natura Impact statement is required.

The first test is to establish whether, in relation to a particular plan or project, appropriate assessment is required. This is termed AA screening. Its purpose is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site's conservation objectives. The need to apply the precautionary principle in making any key decisions in relation to the tests of AA has been confirmed by European Court of Justice case law. Therefore, where significant effects are likely, uncertain or unknown at screening stage, AA will be required.

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

a) whether a plan or project is directly connected to or necessary for the management of the site, and
b) 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.

It is clear from the nature of the proposed project, a residential development, that the project is not directly connected to or necessary for the management of the adjacent Natura site. Due to the nature, size and location of the proposed development adjacent to the Slaney River Valley SAC and Wexford Harbour Slobs SPA and the overlapping Raven SPA, the potential for impacts on Natura sites from the development could not be ruled out therefore a Stage 2 Appropriate Assessment and Natura Impact Statement is required. Therefore, it is necessary to determine whether the project, alone or in combination with other plans and projects, is likely to have a significant impact on the integrity of the Natura 2000 sites with respect to the conservation objectives of the sites and the structure and function of the sites. Stage 2 AA includes consideration of the specific mitigation measures that will be implemented to avoid adverse effects on the integrity of European sites.

3 Stage 2 Appropriate assessment

3.1 Methodology

This Natura Impact Statement has been carried with reference to the following guidelines:

- Appropriate Assessment of Plans and Projects in Ireland. Guidelines for Planning Authorities. DoEHLG, 2009.

- Circular NPWS 1/10 & PSSP 2/10 Appropriate Assessment under Article 6 of the Habitats Directive: guidance for Planning Authorities
- Managing Natura 2000 sites – The provisions of Article 6 of The Habitats Directive 92/43/EEC. European Commission, 2000.
- Commission Notice "Managing Natura 2000 sites The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC" C92018) 7621 final. European Commission, 2018
- Circular L8/08 Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments 2 September 2008
- Assessment of Plans and Projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission, 2002).
- CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.

The scope of this assessment to inform the Natura Impact Statement was determined by a combination of consultations with National Parks and Wildlife Service (NPWS), Inland Fisheries Ireland, desktop research and ecological field surveys.

3.1.1 Desktop Research/data sources

A desk study was carried out to gather information on the ecology of the site and surrounding areas. References reviewed are named where appropriate. The National Parks and Wildlife Service were consulted via a formal request to the Department of Arts, Heritage and the Gaeltacht Development Applications Unit to obtain information on the ecology of the site. Existing ecological records for the site and surrounding area were reviewed including data from the National Biodiversity Data Centre, NPWS protected species database and botanical records from the Botanical Society of Britain and Ireland (BSBI) provided by Paul Green, BSBI vice-county recorder for Wexford. A detailed review of waterbird data from the 2009/10 Waterbird Survey Programme (WSP) was also carried out (see Appendix C). Irish Wetland Bird Survey data (I-WeBS) was not reviewed because of the very patchy coverage of Wexford Bay (Gittings and O'Donoghue, 2016) and the difficulties in interpreting the data for the subsite adjacent to the proposed development (see Appendix C).

Locations and boundaries of all Natura 2000 sites potentially impacted by the proposed development were identified using the National Parks and Wildlife Service (NPWS) online map viewer. The current boundary shapefiles (SAC 2019/12, SPA 2019/12) were downloaded from the NPWS website. Site-specific conservation objectives datasets were downloaded and reviewed in a QGIS mapping project for the development. Other online mapping reviewed included OSI maps, aerial photography and EPA maps (https://gis.epa.ie/EPAMaps/).

Information on the conservation objectives, conditions and threats of the Natura 2000 sites was obtained from conservation objectives documents, site synopses and Standard Natura 2000 data forms.

3.1.2 Consultations

Consultations were made with Inland Fisheries Ireland (IFI) and the National Parks and Wildlife (NPWS) service. Their response and advice has been taken into consideration in assessing the potential impact of the development and in the design of mitigations measures for this development. Copies of the response letters from Inland Fisheries Ireland and the NPWS are provided in Appendix A.

3.1.3 Ecological Field Surveys methodology

Habitat surveys were carried out on the 2nd and 19th September 2015 by Deborah D'Arcy assisted by graduate botanist Kane D'Arcy-Cusack. The weather was dry and sunny. **H**abitats were classified according to Fossitt (2000) and mapped following the Heritage Council's publication Best Practice Guidance for Habitat Survey and Mapping (Smith *et al.* 2011). Account was taken of the general ecology of the site and particular attention was paid to any ecological features that may be of relevance to the assessment of impacts on the adjacent Natura sites.

A preliminary mammal survey was carried out on 24th November by Deborah D'Arcy and Dr Tom Gittings in view of the sites suitability as a habitat for otters, a qualifying interest of the Slaney Valley SAC. Ecological field signs of the presence of otters including spraints, tracks, potential holts and couching sites were recorded. A further detailed otter survey was commissioned and carried out by Ross Macklin during January and February 2016. A detailed report arising from this survey work is provided in Appendix B.

A survey of the shoreline was undertaken by Deborah D'Arcy on 13th July 2020 to survey the locations of the outfall pipes. A survey for otter signs was also undertaken along the shoreline and at the pond to assess if there was any change in the level of activity recorded during surveys in 2015 and 2016. The proposed development site was walked over to access if there had been any substantial change in the habitats or flora since the previous habitat and flora surveys in 2015 and 2016.

A detailed bird survey and assessment was carried out in view of the potential impacts on wintering waterbirds of the adjacent Wexford Harbour and Slobs SPA. The report arising from this assessment is provided in Appendix C.

3.1.4 Ornithological survey methodology

The Wexford Harbour and Slobs SPA is a large site extending from Enniscorthy along the River Slaney to Wexford Harbour and including the North and South Slobs (Fig. 1). Within the SPA, the area between Wexford Bridge and Ferrycarrig Bridge forms a discrete unit of estuarine habitat, which can be

distinguished from the main harbour downstream of Wexford Bridge (dominated by open sandflats) and the tidal river habitat upstream of Ferrycarrig Bridge. This area is recognised as a distinct subsite for the purposes of waterbird monitoring (the Ferrycarrig subsite). The development site is in the middle of the southern shore of the Ferrycarrig subsite. Therefore, the Ferrycarrig subsite was defined as the main study area for this assessment. The Ferrycarrig subsite was divided into 13 sectors for the purposes of this study to allow assessment of waterbird distribution patterns within the subsite (Fig. 2). Two sectors (S4 and S5) covered the sections adjoining the proposed development site, and a further two sectors (S3 and S6) covered adjacent areas.

The purpose of the waterbird counts carried out for this assessment was to establish the total numbers of waterbirds using the Ferrycarrig subsite at low tide, and to record the waterbird usage of the areas adjoining the development site at various tidal stages (low, ebb/flood and high tide). Counts were carried out on eight dates over the period September 2015-January 2016. On each count date, a full low tide count of the Ferrycarrig subsite was carried out. In addition, flood/ebb tide and high tide counts of the sectors adjacent to the development site were also carried out.

Disturbance recording was also carried out to assess the existing levels of human disturbance within the Ferrycarrig subsite and to obtain information on the sensitivity of the waterbird species to disturbance impacts. On each visit, a detailed record was kept of human activities with the potential to cause disturbance to waterbirds in the study area. On most visits, the responses were recorded of waterbirds in intertidal habitat in the sectors adjoining the development site to disturbance caused by the surveyor's presence, and/or by other human activity.

Notes were made on the extent of intertidal exposure at low tide on each survey day and these, combined with aerial imagery, were used to map the approximate extent of intertidal habitat exposed under moderate spring low tide conditions. It should be noted that the extent of intertidal habitat shown in Ordnance Survey mapping of Wexford Harbour, and used by NPWS in mapping for their conservation objectives, is based on historical data and bears no relationship to the current situation. Full details of the survey methodology are provided in Appendix C.

Figure 1. Wexford Harbour and Slobs SPA and the location of the Ferrycarrig subsite.

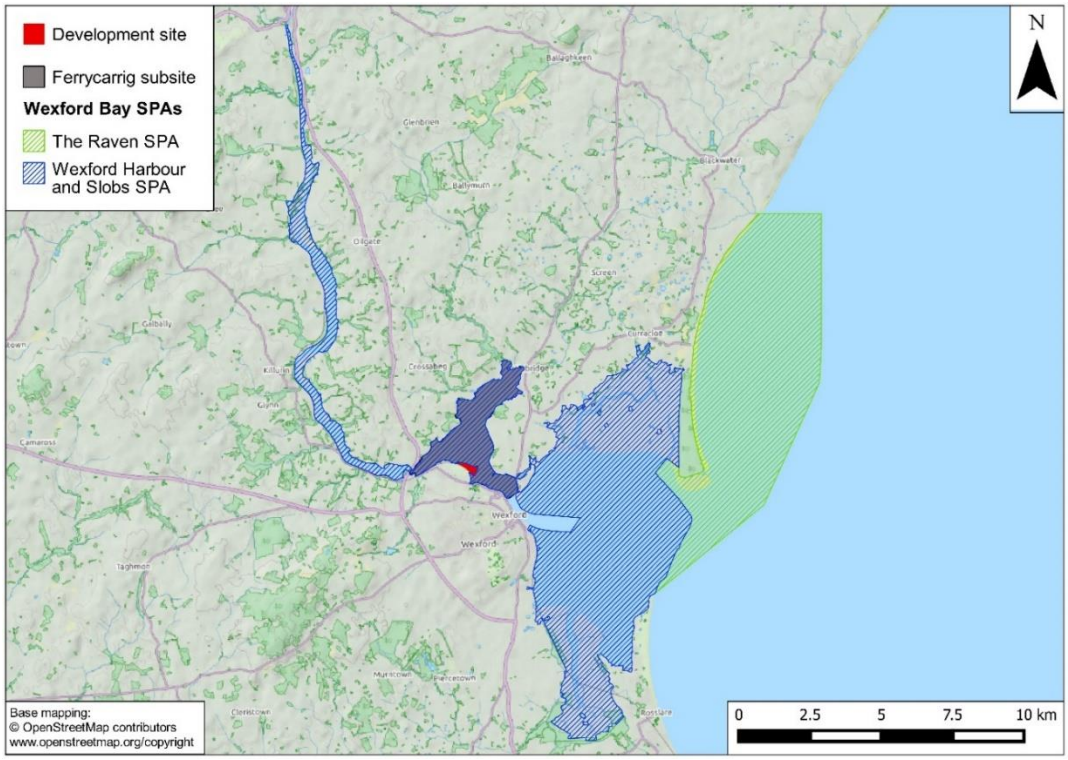
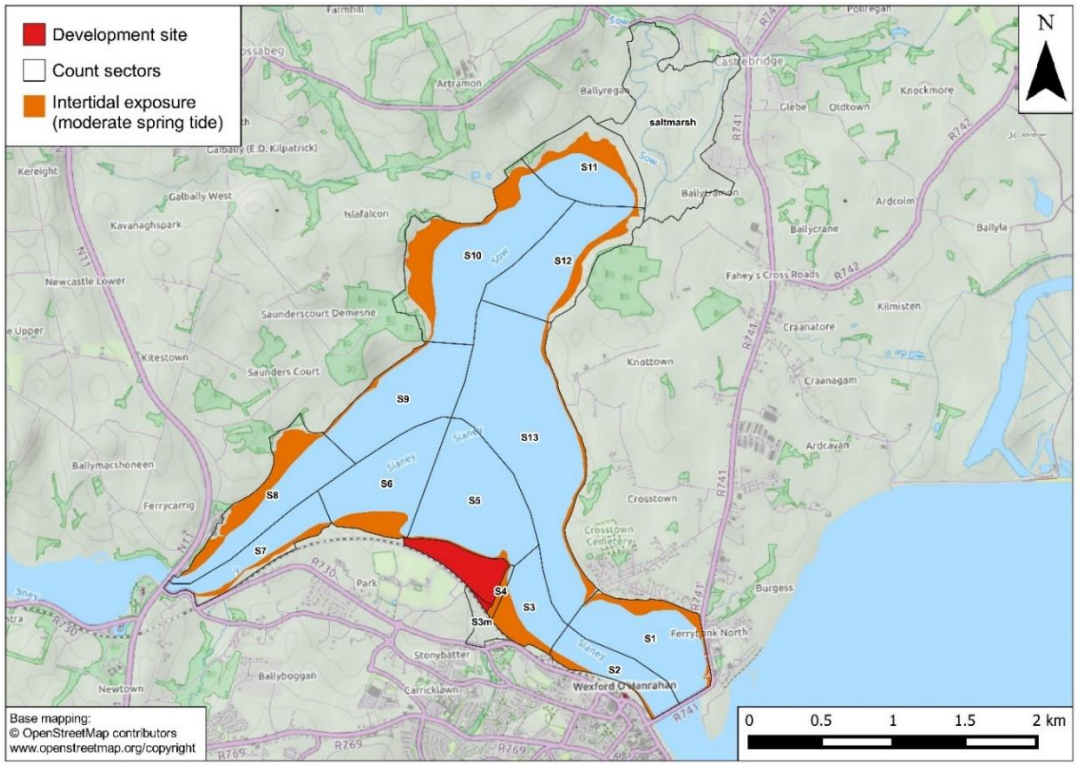


Figure 2. Count sectors used for waterbird monitoring counts, September 2015-January 2016



3.1.5 Otter survey methodology

During the autumn and winter of 2015 preliminary surveys identified otter spraints along the shoreline of the development site. Furthermore, detailed surveys were undertaken by Ross Macklin during January through March 2016. These included a walkover survey and subsequent camera surveys under Section 23 (b) licence.

The walkover survey followed the best practice survey methodology as recommended by Chanin (2003) and Bailey & Rochford (2006). The full extent of the site was surveyed along the coast and along any freshwater habitats, areas of scrub and areas of known otter activity. Holt sites were mapped relative to the extent of adjoining areas of cover (i.e. scrub/ woodland/ treelines etc.) to define the breadth of the habitat to establish the current extent of otter habitat cover. Otter activity was monitored over three periods between January and February 2016 to establish patterns of otter usage of the site. Following the identification of patterns of otter usage of the site including validation of potential natal holt sites (as identified during preliminary site surveys), four cameras (Browning special ops XTR 10MP, infrared cameras) were positioned at strategic locations including access points to holt areas. Full details of the survey methodology are included in Appendix B.

3.1.6 Validity of field surveys

Guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM) on the lifespan of ecological reports and surveys (CIEEM, 2016) indicates that when more than three years have elapsed since survey work has been carried out, "surveys are likely to need to be updated (subject to an assessment by a professional ecologist)". The survey work for this assessment was carried out in 2015-2016. Therefore, in the light of the CIEEM guidance, the need for updating the surveys has been considered.

A walkover survey of the site in July 2020 confirmed as expected that there was no noticeable change in the type of habitats present over the proposed development site except for general overall increased height and spread of scrub vegetation. A survey of the sand and gravel pit for the uncommon plant common cudweed (*Filago vulgaris*) revealed that there were far less plants present with only a few specimens evident. This reason for this change in the population was not evident.

The survey of the shoreline and otter pond confirmed the presence of otter with spraint noted along the northern shoreline and at the otter pond. Sprainting activity appeared less than that noted in previous surveys with just one spraint noted along the northern shoreline and one recorded at the otter pond. No new potential holts sites were noted.

The results of these surveys in July 2020 indicates that there has been no significant change in the baseline habitats, flora and otter activity since 2015/16 that would effect the validity of the impact assessment based on comprehensive surveys carried out in 2015/16.

In the case of the waterbird surveys, the impact assessments are based on the percentage occurrence in areas adjacent to the development site. As there have been no major changes to the overall extent of

waterbird habitats in Wexford Harbour, or to the extent and quality of the waterbird habitats adjacent to the development site, the relative usage patterns derived from the 2015-2016 waterbird surveys are likely to remain valid. Therefore, it is considered that the data from the 2015-2016 waterbird surveys provide an adequate basis for this assessment despite the time that has elapsed since these surveys.

3.1.7 Impact assessment methodology

Assessment of the likely effects direct and indirect of the proposed project was undertaken by carrying out an ecological field survey of the proposed site, desktop review and consideration of the information pertaining to the conservation objectives of the Natura sites, the ecology of the designated habitats and species and known or perceived sensitivities of the habitats and species. The significance of impacts to the adjacent Natura sites was assessed with reference to the conservation objectives and targets for the Natura sites. There are no site specific conservation objectives for two of the Annex 1 habitats (saltmarsh habitats 1330, 1410) of the Slaney River Valley SAC. Assessment of potential effects on these habitats was made using reference to conservation objectives and targets set for Annex I saltmarsh habitats for the Ballyteigue Burrow SAC as guidance 000696.

4 Description of the project

The development site of 13.84 ha is located along the south bank of the River Slaney estuary in the townland of Park, Wexford (ITM centre coordinate points: 703456, 623244) and is adjacent to the Slaney River Valley SAC (site code: 000781) and Wexford Harbour and Slobs SPA (site code: 004076) as shown in Fig. 3 below.

Planning is sought for a total of 413 residential units consisting of 175 houses (12 four bedroom detached houses + garages, 20 four bedroom semi-detached houses, 2 four bedroom corner detached houses, 80 three bedroom semi detached houses, 20 three bedroom terraced houses, 7 three bed end of terrace houses, 4 three bedroom corner houses, 20 two bedroom terraced houses, 6 two bedroom end of terrace, 4 semi-detached houses) and 7 apartment blocks with a total of 238 apartments together with two crèche facilities (Crèche A: 346.4 sqm floor area. Crèche B 395.3sq.m floor area). A total of 767 car parking spaces (248 private parking spaces, 501 public spaces and 18 creche spaces) and all associated site works.

The proposed masterplan layout is provided in drawing no. RAU-ZZ-ZZ-DR-A-31006 submitted with the planning application.

The proposal shall be delivered over four phases of development. An EIAR (Environmental Impact Assessment Report) and a SSFRA (Site Specific Flood Risk Assessment) have been prepared as part of the planning application.

Flood Risk Design

It is proposed to raise the existing ground levels within the site area to a minimum level of 2.95m OD, which is equal to the predicted 1 in 1000 year (0.1% AEP) High End Future Scenario tidal flood level in the vicinity of the site. This level of 2.95m OD is 1m above the 1 in 1000 year tidal flood level for the Current Scenario.

The Flood Risk Analysis Report provided by IE Consulting accompanies the planning application (Document number IE1297-1979).

A retaining wall will be built along the northern and eastern boundaries to retain soils on site as per the Construction Management Plan on the Importation of Fill (Drawing PL10, PL11 Arthur Murphy & Co.) provided in Appendix D.

Construction phasing

The development will be built in four phases (Drawing no. RAU-ZZ-ZZ-DR-A-31012) with the eastern portion of the site developed first and development extending westwards. (Phase 1: 42904 m^2, Phase 2: 27680 m^2; Phase 3: 30448m^2; Phase 4: 37368 m^2).

Wastewater design

The foul sewage from the development will be pumped to the Wexford town and environs sewage system. Twin force mains 80mm and 150mm diameter have already been installed, in 2010, with the agreement of Wexford Council for this purpose along the access road to the proposed railway bridge site. The 80mm pipe is to be used initially to avoid septic conditions arising in the force main. As the site is developed further the 150mm pipe will be used. Irish Water has agreed to the installation of 12 hours emergency storage at the pump station together with a facility for backup power generation. All elements are to be designed to recently issued Irish Water details and specifications.

Stormwater design

Storm water has been designed by Arthur Murphy & Co. Civil and Structural Engineering Consulting and the outline description below is extracted from the Storm Water Report which accompanies the planning application (Murphy, 2020).

It is proposed to install a standard gravity storm water collection system based on the Department of Environment “Recommendations for Site Development Works for Housing Areas”. The system includes the oil interceptors, silt traps and attenuation stores designed to attenuate the 100 year storm.

Surface water runoff generated within the site will be attenuated to Greenfield Runoff rates in accordance with the Greater Dublin Strategic Drainage Study to protect the hydrological regime of the area including the River Slaney and the Estuary.

There are five attenuation stores proposed within the development site, which have been designed to attenuate the 1 in 100 year rainfall event. The discharge from each of these attenuation systems is limited

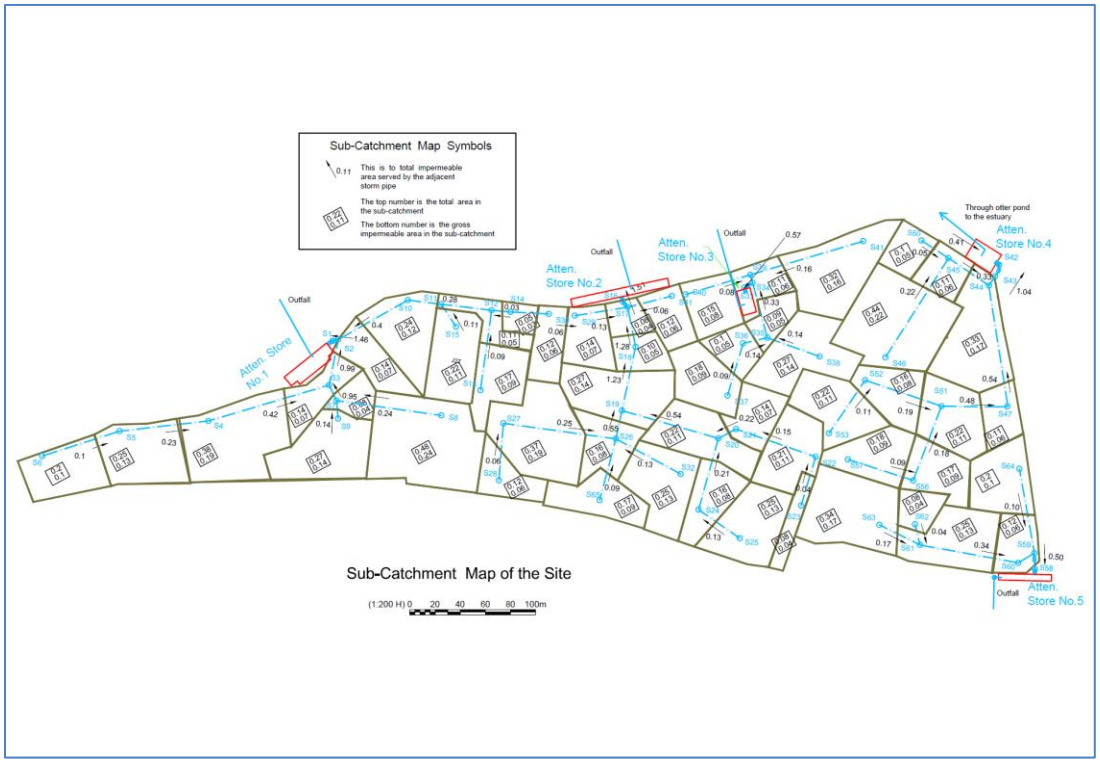
to Greenfield Runoff rates using a 'Hydrobrake or other approved flow control device. The discharge pipes are to be fitted with tidal flaps and shall discharge to the estuary below the lowest low water level. One of the attenuation stores, Store No. 4, discharges to the estuary through the otter pond at the reduced attenuated flow rate of 11.4 litres per second. Store No. 5 discharges to the estuary through the marsh at the eastern end of the site close to the railway line, at the reduced attenuated flow rate of 7.2 litres per second.

Stores 1, 2 and 3 discharge directly, after the treatments and attenuation, at rates of 16.9, 18.2 and 7.5 litres per second respectively.

It is not proposed to use the otter pond as an attenuation store as this would involve undesirably large fluctuations in water level in the pond. For that reason the flow is first attenuated in Store No. 4. because the site is very flat it is not practicable to drain other stores through the otter pond as the pipe gradients would be too flat to guarantee self-cleansing of the pipes.

The discharge pipes discharge to the estuary and are buried under the shore with concrete protection to below the low tide mark. Each outfall is to be fitted with a non-return tidal flap. Each attenuation store is preceded by an oil interceptor and a silt trap as indicated on the layout plans These proposals are set out in Engineering Drawings PL 01, 02, 03, 06 and 09.

Foreshore licences will be applied for on grant of planning for the stormwater outfalls.



Landscape design

The landscaping proposals (P. Nolan and D. Wildes, Landscape Planning and Design Consultancy) for the proposed development retains the scrub and hedgerow habitats at the shoreline and incorporates additional native vegetation screening along the development boundary. There is also provision for a replacement pond habitat. Landscaping of amenity areas within the development has taken a naturalistic approach including native and non-native tree species, wildflower meadow verges, gravel pathways and natural stone and timber hard landscaping materials to provide resources for wildlife.

Lighting design

The lighting for this development was designed in accordance with BS5489:2003 and "Secured by Design" principles and determined to be within lighting class S3 (Douglas Carroll Consulting Engineers W1810 - External Lighting Design Carcur Park Housing Development). Lighting class S3 calls for both horizontal (standard) and semi-cylindrical (face detection) lux levels. The light fittings proposed are Veelite 101 Tech Series 36 W LED streetlight mounted on 6 m poles with a 5 degree tilt. The design uses 60 No. standard street optics for the road lighting and 41 No. with forward throw optics for the car park areas**.** The use of LED and low tilt angle allows for directional lighting to avoid excessive illumination of the habitats along the boundary of the development site**.**

Construction management plan

A construction management plan has been drawn up by Arthur Murphy Civil & Structural Engineer for the proposed development including provisions for the construction of a temporary 1 m high berm to retain for the full extent of the site to prevent escape of silt laden water to the estuary (See Drawing PL 12 Arthur Murphy & Co.).

A permanent retaining wall will be built for each phase of the development along the line of the retained otter habitat at the shoreline boundaries of the site to retain imported infill soils required to raise the level of the site.

The construction management plan also incorporates security fencing to secure construction sites for each phase of the development preventing access by people and dogs to the construction sites or shoreline habitats during phased construction of the development.

A preliminary outline construction management plan produced by William Neville & Sons is also submitted with the planning application outlining additional measures and standard best practice construction site management measures to avoid pollution of groundwater or surface water and to reduce noise and dust emissions during the construction phase.

5 Appropriate Assessment Screening

The development site of 13.84 ha is located along the south bank of the River Slaney estuary in the townland of Park, Wexford (ITM centre coordinate points: 703456, 623244) and is adjacent to the Slaney River Valley SAC (site code: 000781) and Wexford Harbour and Slobs SPA (site code: 004076) as shown in Fig. 3 below.

Figure 3. The location of the proposed development site in relation to the adjacent SAC and SPA.

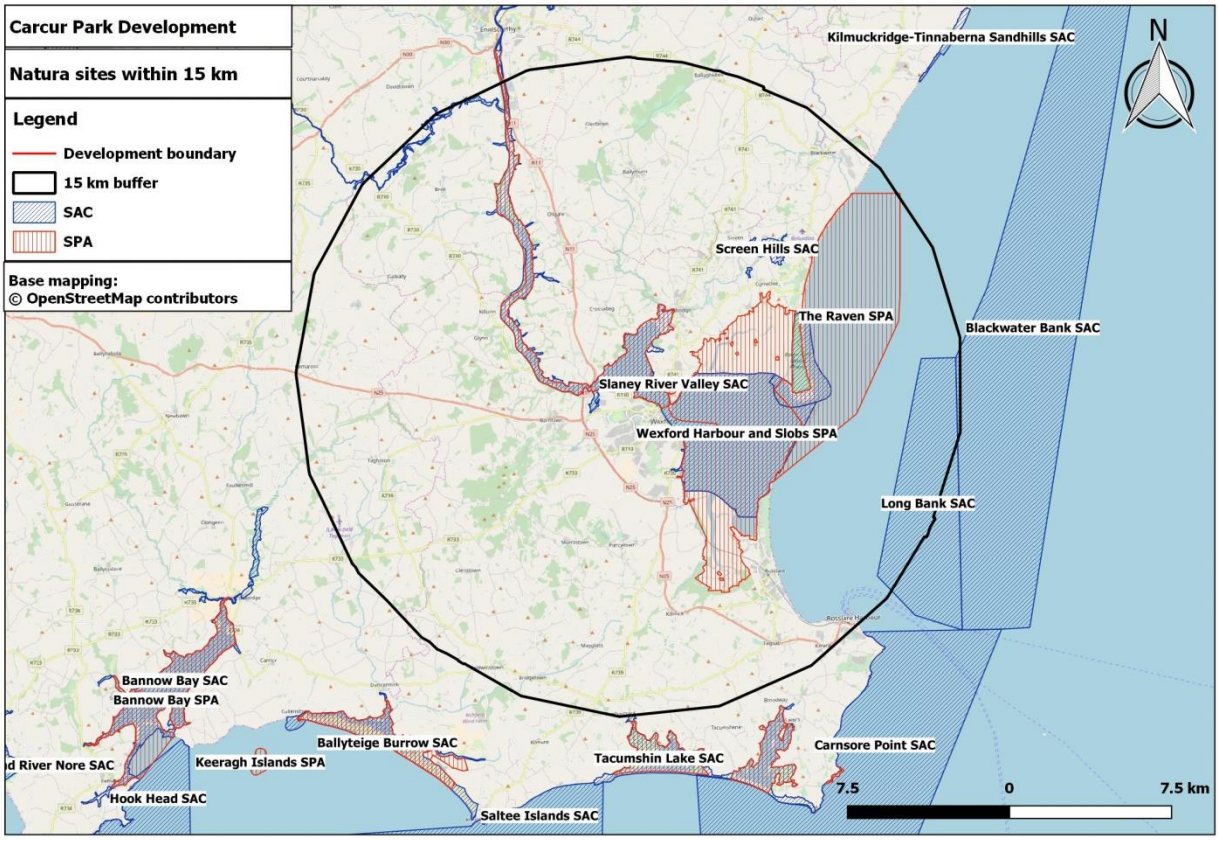
5.1 Identification of relevant Natura Sites

The qualifying interests and conservation objectives for each Natura site within 15 km of the development site (see Fig. 4) were considered with regard to the potential for the development to have a negative impact on the conservation objectives and integrity of the Natura sites (Table 1). Only Natura sites that were considered to be within the zone of influence of this proposed development were subject to further assessment.

Other Natura sites outside the 15 km buffer were also considered, but none of these were considered to have potential for linkages with the proposed development.

The development site is adjacent to the Slaney River Valley SAC and Wexford Harbour and Slobs SPA. Preliminary review indicated that there were potential for impacts from the proposed development to these Natura sites. Therefore, these sites were screened in for stage 2 assessment.

Figure 4 Natura sites located within 15 km of the proposed development site



The Raven Point SPA forms an ecological unit with the Wexford Harbour and Slobs SPA. Some of the Special Conservation Interest (SCI) species listed for the Raven Point SPA occur within the section of the Wexford Harbour and Slobs SPA that is adjacent to the proposed development site. Therefore, this site was screened in for stage 2 assessment.

Given the nature, size and location of this proposed development, no other Natura sites were considered to be potentially sensitive to impacts from the proposed development.

Table 1 Determination of Natura sites within the zone of influence of the proposed development				
Natura Site	**Site Code**	**Distance from development (km)**	**Within zone of influence**	**Comment**
Wexford Harbour and Slobs SPA	004076	Adjacent	Yes	Impacts possible
The Raven SPA	004019	6.2	Yes	Impacts possible
Slaney River Valley SAC	000781	Adjacent	Yes	Impacts possible
Raven Point Nature Reserve SAC	000710	6.0	No	Considered too far from the development site to be subject to impacts
Screen Hills SAC	000708	7.3	No	Considered too far from the development site to be subject to impacts
Long Bank SAC	002161	12.6	No	Considered too far from the development site to be subject to impacts
Blackwater Bank	002953	14.6	No	Considered too far from the development site to be subject to impacts

Therefore, the Natura sites included in this assessment are

- **Slaney River Valley SAC (site code: 000781)**
- **Wexford Harbour and Slobs SPA (site code: 004076)**
- **The Raven SPA (site code: 004019)**

6 Characteristics of the Natura 2000 Sites

6.1 Slaney River Valley SAC

A summary of the characteristics of the Natura 2000 site is given below. A complete site synopsis is available from https://www.npws.ie/protected-sites.

This site comprises almost the entire Slaney system, from the headwater streams in the Wicklow Mountains to the extensive estuarine area of Wexford Harbour. The main river tributaries included are the Bann, Glasha, Clody, Derry, Derreen, Douglas and Carrigower Rivers. The tidal influence extends upriver as far as Enniscorthy. The river is often fringed by woodland and/or swamp vegetation. Other habitats which occur alongside the river include wet grassland, scrub and, in higher areas, heath and bog. Improved grassland and arable land is included alongside the river for water quality reasons. Salt marshes are a feature of the lower estuarine area of the site.

Estuaries and intertidal sand and mud flats are particularly well represented in this site, with salinity ranging from full freshwater to full seawater. The quality of these habitats is generally good. The Slaney River and its tributaries display good examples of floating river vegetation. An important area of alluvial forest is found at Macmine, while old oak woodlands occur at Tomnafinnoge, the latter being a remnant of the ancient oak woods of Shillelagh. The site is of high importance for the conservation of fish species, notably Salmon (*Salmo salar*), Lamprey species (*Petromyzon marinus*, *Lampetra fluviatilis*, *L. planeri*) and the very localised Twaite Shad (*Alosa fallax fallax*). Otter (*Lutra lutra*) is well distributed throughout, while a significant population of the Freshwater Ppearl Mussel (*Margaritifera margaritifera*) occurs on the Derreen River in the north of the site. The site provides year-round haul-out habitat for the Annex II species Harbour Seal (*Phoca vitulina*), and includes regionally significant breeding and moulting sites.

The site has high ornithological importance (see Section 6.2). A range of flora and fauna species listed as Red Data Book species occur within the site.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* priority), numbers in brackets are Natura 2000 codes):

[1130] Estuaries
[1140] Tidal Mudflats and Sandflats
[1330] Atlantic salt meadows
[1410] Mediterranean salt meadows
[3260] Floating River Vegetation
[91A0] Old Oak Woodlands
[91E0] Alluvial Forests*
[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*),

[1095] Sea Lamprey (*Petromyzon marinus*)
[1096] Brook Lamprey (*Lampetra planeri*)
[1099] River Lamprey (*Lampetra fluviatilis*)
[1103] Twaite Shad (*Alosa fallax*)
[1106] Atlantic Salmon (*Salmo salar*)
[1355] Otter (*Lutra lutra*)
[1365] Common (Harbour) Seal (*Phoca vitulina*).

6.2 Wexford Harbour and Slobs SPA

A summary of the characteristics of the Wexford Harbour and Slobs site is given below. A complete site synopsis is available from https://www.npws.ie/protected-sites.

Wexford Harbour is the lowermost part of the estuary of the River Slaney, a major river that drains much of the south-east region. The site is divided between the natural estuarine habitats of Wexford Harbour, the reclaimed polders known as the North and South 'Slobs', and the tidal section of the River Slaney. Shallow marine water is a principal habitat, but at low tide extensive areas of intertidal flats are exposed. Salt marshes fringe the intertidal flats, especially in the sheltered areas such as Hopeland and towards Castlebridge. The Slobs are two flat areas of farmland, mainly arable and pasture grassland, empoldered behind 19th century seawalls. The river section of the site is extensive, extending to Enniscorthy, a distance of almost 20 km from Wexford town. It is noticeably tidal as far as Edermine Bridge but with tidal influence right up to Enniscorthy. In places, such as the Macmine marshes, it is several hundreds of metres wide and here reed swamp is well developed.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the species listed in Table 5.1 below. These species are referred to hereafter as Special Conservation Interests (SCIs) of the SPA.

The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. Of particular importance is that it is one of the two most important sites in the world for Greenland White-fronted Goose. The geese feed almost entirely within the Slobs and roost at The Raven (a separate SPA).

The site is important for Little Tern as it has can hold a nationally important breeding colony (175 pairs were recorded in 2014). Hen Harrier are regular visitors in small numbers to the Slobs during winter. Of particular note is the presence of the Hen Harrier communal roost site.

Table 2 - Special Conservation Interests of the Wexford Harbour and Slobs SPA

Natura code/Common name	Scientific name	Nature of population
A004 Little Grebe	*Tachybaptus ruficollis*	wintering
A005 Great Crested Grebe	*Podiceps cristatus*	wintering

Table 2 - Special Conservation Interests of the Wexford Harbour and Slobs SPA		
Natura code/Common name	**Scientific name**	**Nature of population**
A017 Cormorant	*Phalacrocorax carbo*	wintering
A028 Grey Heron	*Ardea cinerea*	wintering
A037 Bewick's Swan	*Cygnus columbianus*	wintering
A038 Whooper Swan	*Cygnus cygnus*	wintering
A046 Light-bellied Brent Goose	*Branta bernicla hrota*	wintering
A048 Shelduck	*Tadorna tadorna*	wintering
A050 Wigeon	*Anas penelope*	wintering
A052 Teal	*Anas crecca*	wintering
A053 Mallard	*Anas platyrhynchos*	wintering
A054 Pintail	*Anas acuta*	wintering
A062 Scaup	*Aythya marila*	wintering
A067 Goldeneye	*Bucephala clangula*	wintering
A069 Red-breasted Merganser	*Mergus serrator*	wintering
A082 Hen Harrier	*Circus cyaneus*	post-breeding/roost
A125 Coot	*Fulica atra*	wintering
A130 Oystercatcher	*Haematopus ostralegus*	wintering
A140 Golden Plover	*Pluvialis apricaria*	wintering
A141 Grey Plover	*Pluvialis squatarola*	wintering
A142 Lapwing	*Vanellus vanellus*	wintering
A143 Knot	*Calidris canutus*	wintering
A144 Sanderling	*Calidris alba*	wintering
A149 Dunlin	*Calidris alpina*	wintering
A156 Black-tailed Godwit	*Limosa limosa*	wintering
A157 Bar-tailed Godwit	*Limosa lapponica*	wintering
A160 Curlew	*Numenius arquata*	wintering
A162 Redshank	*Tringa totanus*	wintering
A179 Black-headed Gull	*Chroicocephalus ridibundus*	wintering
A183 Lesser Black-backed Gull	*Larus fuscus*	wintering
A195 Little Tern	*Sterna albifrons*	breeding
A395 Greenland White-fronted goose	*Anser albifrons flavirostris*	wintering
A999 Wetlands		

6.3 The Raven SPA

The Raven SPA extends from north of Rosslare Point to Blackwater Harbour on the coast of Co. Wexford. The seaward boundary of the site extends a maximum distance of approximately 4.5 km from the shoreline to encompass important areas of shallow water utilised by some of the species of special conservation interest.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the species and habitat listed in Table 3 below.

The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the wetlands at the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The Raven is an important bird site, being part of the Wexford Slobs and Harbour complex. Of critical significance is that it forms the principal night roost for the internationally important Wexford Harbour population of Greenland White-fronted Goose. Various other waterfowl species are also attracted to the site during winter, both for feeding and roosting.

The Raven SPA was formerly a breeding site for Little Tern. A number of pairs of Ringed Plover also breed on the sandy beaches.

Raven Point is a statutory Nature Reserve and a Ramsar Convention site.

Table 3 - Special Conservation Interests of the Raven SPA		
Natura code/Common name	**Scientific name**	**Nature of population**
A001 Red-throated Diver	*Gavia stellata*	wintering
A017 Cormorant	*Phalacrocorax carbo*	wintering
A065 Common Scoter	*Melanitta nigra*	wintering
A141 Grey Plover	*Pluvialis squatarola*	wintering
A144 Sanderling	*Calidris alba*	wintering
A395 Greenland White-fronted goose	*Anser albifrons flavirostris*	wintering
A999 Wetlands		

Zone of influence

EC guidance (EC 2000) states that the identification of impacts upon the Natura 2000 site will require a characterisation of the site as a whole or of the areas where impacts are most likely to fall.

6.3.1 Slaney River Valley SAC zone of influence

Due to the location, nature and scale of the proposed development, features of the Slaney River Valley SAC which are potentially at risk have been identified as the nearby river estuary and associated habitats and species. This includes marine dependent habitats and species:

Therefore, potential impacts of the development are assessed with respect to the following features of conservation interest of the Slaney River Valley SAC:

[1130] Estuaries
[1140] Tidal Mudflats and Sandflats
[1330] Atlantic Salt Meadows
[1410] Mediterranean salt meadows

[3260] Floating river vegetation
[1095] Sea Lamprey (*Petromyzon marinus*)
[1099] River Lamprey (*Lampetra fluviatilis*)
[1103] Twaite Shad (*Alosa fallax*)
[1106] Atlantic Salmon (*Salmo salar*)
[1355] Otter (*Lutra lutra*)
[1365] Common (Harbour) Seal (*Phoca vitulina*)
All other Annex I habitats or species which are qualifying interests for the site are not considered to be within the zone of influence of this development.

The designated population of Freshwater Pearl Mussel in the Slaney River Valley is located in the Derreen River Catchment in the north of the Natura site. This population is upstream and too far from the site to be at risk from this development. There are other extant populations of freshwater pearl mussel located near Enniscorthy approximately 25-30 km upstream of the development. This population were considered too far to be at risk of negative effects from this development due to the distance and volume of tidal waters between the proposed development site and Enniscorthy.

Brook Lamprey (*Lampetra planeri*) is a freshwater species with a distribution upstream of the development. Therefore there is no spatial overlap or pathway for transmission of effect to this species.

The closest Annex 1 alluvial woodland recorded (as identified from NPWS Conservation Objectives mapping) occurs 6 km upstream of the site at Newtown lower. The closest old oak woodland occurs at Bree 13 km north of the development site (CO_woodland_habitats.shp). Other areas of Annex I woodlands may occur within the SAC however there were none recorded local to the site. Annex I woodlands are not considered to be subject to potential impacts from the development as there is no change in the hydrological regime of the River Slaney anticipated as a result of the development and the risk of spread of invasive plant species upstream is considered to be extremely low.

6.3.2 Wexford Harbour and Slobs and The Raven SPA– sensitive species

The occurrence of the SCI species in the area of Wexford Harbour adjacent to the proposed development site was assessed by reviewing the existing waterbird data, and analysing the results of the waterbird surveys carried out for this assessment. The following SCI species regularly occur in this area and are the main focus of this assessment: Cormorant, Grey Heron, Little Grebe, Oystercatcher, Curlew, Black-tailed Godwit, Redshank and Black-headed Gull. Other SCI species, which occur within the Ferrycarrig subsite but do not regularly occur in the vicinity of the development site, are also considered within the Stage 2 assessment. The following SCI species have not been recorded in the Ferrycarrig subsite, either during the 2009/10 WSP counts, or during the survey work carried out for this assessment, and are not considered further: Bewick's Swan, Whooper Swan, Greenland White-fronted Goose, Pintail, Scaup, Common Scoter, Red-throated Diver, Coot, Golden Plover and Sanderling.

Two of the Wexford Harbour and Slobs SCI species were not covered by the above analysis: Hen Harrier and Little Tern. Hen Harrier was screened in for further assessment as it could potentially occur in the vicinity of the development site. The Little Tern breeding colonies in Wexford Harbour are on the outer sandbanks around 6-7 km from the development site. The mean foraging range for Little Tern from their breeding colonies is 2.1 km, and the mean maximum foraging range is 6.3 km (Thaxter et al., 2012). However, there is a low degree of confidence in these assessments of Little Tern foraging ranges (Thaxter et al., 2012). Therefore, while the area of Wexford Harbour upstream of Ferrybridge is likely to be only a peripheral part of, or completely outside, the likely core foraging range of birds from the Wexford Harbour breeding colonies, Little Tern has been screened in for further assessment on a precautionary basis.

Wetlands are listed as a SCI for both the Wexford Harbour and Slobs and the Raven SPAs. The Conservation Objectives for both SPAs define the favourable conservation condition of the wetlands SCIs purely in terms of habitat area. The proposed development will not cause any change in the permanent area occupied by wetland habitat in either SPA. Therefore, these SCIs have been screened out from further assessment.

7 Conservation objectives

7.1 Slaney River Valley SAC

Table 1 below lists the qualifying interests and summarises the conservation objectives and targets for the Slaney River Valley SAC for those species and habitats identified as being potentially effected (i.e. that are screened in for impact assessment). There are no conservation objectives or targets set for saltmarsh habitats (1330, 1410) for the Slaney River Valley SAC. Assessment of potential effects on these habitats is made with reference to the conservation objectives for saltmarsh habitats for the Ballyteigue Burrow SAC (site code: 000696).

The overarching conservation objective for the Slaney River Valley SAC is to ensure that populations and habitats are maintained at, or restored to, favourable conservation condition.

For fish species including Lamprey species, Salmon and Twaite Shad, conservation objectives include no barriers to migration and clean gravels for fish spawning. Threats identified in the literature to these fish species include sedimentation of watercourses and pollution due to various activities related to agriculture, forestry, urbanization and development activities.

The conservation objectives for Otter include: no significant decline in the distribution of the species or the extent Otter habitat in the terrestrial, freshwater and marine environment; no significant decline in feeding resources or habitats for resting (couch sites), breeding or shelter (holts); and no increase in barriers to connectivity.

The conservation objectives for the Harbour Seal include no decline in the area/range used by the seals. The habitats for breeding, moulting and resting should be maintained in a natural condition and human activities should not occur at levels that cause disturbance to the Harbour Seal.

Table 4 - Conservation objectives and targets for the sensitive habitats and species of the Slaney Valley SAC		
Conservation objectives[1, 2]	**Attribute**	**Target**
[1130] Estuaries To maintain the favourable conservation condition of Estuaries in the SAC, which is defined by the attributes and targets listed opposite:	Habitat area	The permanent habitat area is stable or increasing, subject to natural processes.
	Community distribution	The following community types should be maintained in, or restored to, a natural condition: Mixed sediment community complex; Estuarine muds dominated by polychaetes and crustaceans community complex; and sand dominated by polychaetes community complex.
[1140] Tidal Mudflats and Sandflats To maintain the favourable conservation condition of mudflats and sandflats not covered by seawater at low tide in the SAC which is defined by the attributes and targets listed opposite:	Habitat area	The permanent habitat area is stable or increasing, subject to natural processes.
	Community distribution	The following community types should be maintained in a natural condition: Estuarine muds dominated by polychaetes and crustaceans community complex; and Sand dominated by polychaetes community complex
[1330] Atlantic Salt Meadows No conservation objectives set for 00781 reference is made to 000696).	Habitat area:	Area stable or increasing, subject to natural processes, including erosion and succession.
	Habitat distribution:	No decline or change in habitat distribution, subject to natural processes.
	Physical structure: sediment supply	Maintain natural circulation of sediments and organic matter, without any physical obstructions
	Physical structure: creeks and pans	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
	Physical structure: flooding regime	Maintain natural tidal regime
	Vegetation structure:	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession Maintain structural variation within sward

Table 4 - Conservation objectives and targets for the sensitive habitats and species of the Slaney Valley SAC		
Conservation objectives[1, 2]	**Attribute**	**Target**
		Maintain more than 90% area outside creeks vegetated Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009) No significant expansion of common cordgrass (Spartina anglica), with an annual spread of less than 1% where it is known to occur
[1410] Mediterranean salt meadows No conservation objectives set for 00781 reference is made to 000696).	Habitat area:	Area stable or increasing, subject to natural processes, including erosion and succession.
	Habitat distribution:	No decline, subject to natural processes.
	Physical structure: sediment supply	Maintain natural circulation of sediments and organic matter, without any physical obstructions
	Physical structure: creeks and pans	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
	Physical structure: flooding regime	Maintain natural tidal regime
	Vegetation structure:	Maintain range of saltmarsh habitats including transitional zones, subject to natural processes including erosion and succession Maintain structural variation in the sward Maintain more than 90% of area outside creeks vegetated Maintain range of subcommunities with characteristic species listed in SMP (McCorry and Ryle, 2009) No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1% where it is already known to occur.
3260 Floating river vegetation	Occurrence	No decline in occurrence or habitat area

Table 4 - Conservation objectives and targets for the sensitive habitats and species of the Slaney Valley SAC		
Conservation objectives[1, 2]	**Attribute**	**Target**
To maintain the favourable conservation condition of 3260 water courses in the Slaney River Valley SAC	Hydrological regimes Substratum composition Flood plain connectivity Water quality Typical species of the habitat.	Maintenance of appropriate hydrological regimes (natural tidal regime and high flows) Substratum dominated by sand and gravel The area of active floodplain at and upstream of the habitat must be maintained. Water quality should be WF good status Typical species of the subtype reach favourable status
[1095] Sea Lamprey *Petromyzon marinus* To restore the favourable conservation condition of Sea lamprey in the SAC which is defined by the attributes and targets listed opposite:	Distribution	Greater than 75% of main stem length of rivers accessible from estuary
	Population structure of juveniles	At least three age/size groups present
	Juvenile density in fine sediment	Juvenile density at least 1/m²
	Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds. Improved dispersal of spawning beds into areas upstream of barriers.
	Availability of juvenile habitat	More than 50% of sample sites positive (in third order channels and greater downstream of spawning areas)
[1099] River Lamprey *Lampetra fluviatilis* To restore the favourable conservation condition of River lamprey in SAC, which is defined by the attributes and targets listed opposite:	Distribution: extent of anadromy	Greater than 75% of main stem and major tributaries down to second order accessible from estuary
	Population structure of juveniles	At least three age/size groups of river/brook lamprey present
	Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m²
	Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds
	Availability of juvenile habitat	More than 50% of sample sites positive
[1103] Twaite Shad *Alosa fallax*	Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary

Table 4 - Conservation objectives and targets for the sensitive habitats and species of the Slaney Valley SAC		
Conservation objectives[1, 2]	**Attribute**	**Target**
To restore the favourable conservation condition of Twaite shad in the SAC, which is defined by the attributes and targets listed opposite:	Population structure- age classes	More than one age class present
	Extent and distribution of spawning habitat	No decline in extent and distribution of spawning habitats
	Water quality oxygen levels	No lower than 5 mg/l
	Spawning habitat quality: Filamentous algae; macrophytes; sediment	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth
[1106] Atlantic Salmon *Salmo salar* (only in fresh water) To restore the favourable conservation condition of Salmon in SAC, which is defined by the attributes and targets listed opposite:	Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary
	Adult spawning fish	Conservation Limit (CL) for each system consistently exceeded
	Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling
	Out-migrating smolt abundance	No significant decline
	Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes
	Water quality	At least Q4 at all sites sampled by EPA
[1355] Otter *Lutra lutra* To restore the favourable conservation condition of Otter in the Slaney River Valley SAC, which is defined by the attributes and targets listed opposite:	Distribution	No significant decline
	Extent of terrestrial habitat	No significant decline. Area mapped and calculated as 64.7 ha above high water mark (HWM); 453.4 ha along river banks/ around ponds
	Extent of marine habitat	No significant decline. Area mapped and calculated as 534.7 ha
	Extent of freshwater (river) habitat	No significant decline. Length mapped and calculated as 264.1 km
	Extent of freshwater (lake/lagoon) habitat	No significant decline. Area mapped and calculated as 0.4 ha
	Couching sites and holts	No significant decline
	Fish biomass available	No significant decline
	Barriers to connectivity	**No significant increase**

Table 4 - Conservation objectives and targets for the sensitive habitats and species of the Slaney Valley SAC		
Conservation objectives[1, 2]	**Attribute**	**Target**
[1365] Harbour Seal To maintain the favourable conservation condition of Harbour Seal in the SAC, which is defined by the following list of attributes and targets listed opposite:	Access to suitable habitat	Species range within the site should not be restricted by artificial barriers to site use.
	Breeding behaviour	The breeding sites should be maintained in a natural condition.
	Moulting behaviour	The moult haul-out sites should be maintained in a natural condition.
	Resting behaviour	The resting haul-out sites should be maintained in a natural condition.
	Disturbance	Human activities should occur at levels that do not adversely affect the harbour seal population at the site.

[1]NPWS (2011) Conservation Objectives: Slaney River Valley SAC 000781. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

[2] NPWS (2014) Conservation Objectives: Ballyteige Burrow SAC 000696. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. (Used as guidance in the absence of conservation objectives set for saltmarsh habitats for the Slaney River valley SAC)

7.2 Wexford Harbour and Slobs SPA

The conservation objectives for the SCI species of the Wexford Harbour and Slobs SPA and the Raven Point SPA are to maintain their favourable conservation. The favourable conservation condition of the SCI species that have been selected for their wintering populations are defined by the attributes and targets in Table 5 below. The favourable conservation condition of the post-breeding/roost Hen Harrier population of the Wexford Harbour and Slobs SPA is defined by the attributes and targets in Table 6 below. The favourable conservation condition of the breeding Little Tern population of the Wexford Harbour and Slobs SPA is defined by the attributes and targets in Table 7 below.

Table 5 - Conservation objectives for the wintering waterbird SCI species of the Wexford Harbour and Slobs SPA and The Raven SPA

Attribute	Measure	Target
Population trend	Percentage change	Long term population trend stable or increasing
Distribution	Number and range of areas used by waterbirds	There should be no significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation

Table 6 - Conservation objectives for the post-breeding/roost Hen Harrier population of the Wexford Harbour and Slobs SPA

Attribute	Measure	Target
Roost attendance: individual Hen Harriers	Number	No significant decline
Suitable foraging habitat	hectares	No significant decline
Roost site: condition	Area (hectares); structure	The roost site should be maintained in a suitable condition
Disturbance at the roost site	Level of impact	Human activities should occur at levels that do not adversely affect the Hen Harrier winter roost population

Table 7 - Conservation objectives for the breeding Little Tern population of the Wexford Harbour and Slobs SPA

Attribute	Measure	Target
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline
Productivity rate: fledged young per breeding pair	Mean number	No significant decline
Distribution: breeding colonies	Number; location; area (hectares)	No significant decline
Prey biomass available	Kilogrammes	No significant decline
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the Little Tern population

8 Conservation status

8.1 Conservation status of the Slaney River Valley SAC

Table 8 and 9 below show the conservation status of the qualifying habitats and species for the Slaney River Valley that are potentially at risk from this development and the main pressures that are considered to be impacting on their conservation status. The overall conservation status is based on the recent Article 17 assessment of habitats and species at a national level (NPWS, 2013).

Table 8 - Conservation status of habitats screened in for assessment

Code	Qualifying Interest	Overall status at national level[1]	Status at site level[2]	General pressures[1]
1130	Estuaries	Inadequate (Declining)	Good	Pollution including domestic wastewater, agriculture and marine aquaculture. Alien invasive species.
1140	Tidal Mudflats and Sandflats	Inadequate (Declining)	Good	Pollution from agricultural, forestry and wastewater sources and impacts associated with marine aquaculture, alien invasive species
1330	Atlantic Salt Meadows	Inadequate (Declining)	Excellent	Mainly pressures from agriculture including unsuitable grazing regimes and land reclamation. Invasive plant species –*Spartina* anglica
1410	Mediterranean salt meadows	Inadequate (Declining)	Good	Pressures associated with agriculture, including overgrazing, undergrazing and land reclamation
3260	Vegetation of flowing waters	Inadequate (Declining)	Good	Damage through hydrological and morphological change, eutrophication and other water pollution. Agriculture and municipal and industrial discharges are the most significant sources of nutrient and organic pollution

[1]NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland

[2] Natura Standard Data Form Slaney River Valley SAC 2018-09 update

Table 9 - Conservation status of species screened in for assessment				
Code	**Qualifying Interest**	**Overall Status at national level[1]**	**Status at site level[2]**	**General presssures[1],[3]**
1099	River lamprey	Unknown	Good	The inability to distinguish between river lamprey and brook lamprey larvae, and the challenges associated with sampling for adult river lamprey, means that an evaluation of their actual range and population size cannot be undertaken. Artificial barriers to upstream migration. Bait digging / collection, point source pollution, dredging/ removal of limnic sediments, diffuse pollution to surface waters due to agricultural and forestry activities, siltation rate changes, dumping, depositing of dredged deposits, invasive species.
1095	Sea lamprey	Bad (unchanged)	Good	Barriers to upstream migration (e.g. weirs) are considered the major impediment to good conservation status for sea lamprey as these limit access to spawning beds and juvenile habitat. Bait digging/collection, pollution to surface waters (limnic & terrestrial, marine and brackish), canalization.
1103	Twaite shad	Bad (unchanged)	Good	Concerns about habitat quality at spawning sites in particular. A number of pressures were identified, mainly relating to pollution, alteration of flow patterns, and habitat disturbance. Introduced alien species (Asian clam in River Barrow) Barriers to upstream migration (e.g. weirs) impeding or prevent access to spawning habitat and increase the potential for hybridisation with Allis shad.
1106	Atlantic Salmon	Inadequate (unchanged)	Good	The survival of salmon during the marine phase of its lifecycle has been identified as the key determinant of trends in population size in natal rivers. Known pressures include exploitation at sea in commercial fisheries, interceptory fisheries in coastal waters, aquaculture and predation. In addition, the negative influence of climate change on food prey structure and abundance has increasingly been attributed to the declines observed in stocks at sea. Within river systems, variation in individual stock abundance can be influenced by a variety of factors, notably alterations in physical habitat, water quality, environmental factors, predation, and angling and commercial fisheries exploitation pressure. Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, hydroelectric schemes, predation and sea lice. Artificial barriers can block salmons' upstream migration. Intensive fish farming, poaching, diffuse pollution to surface waters due to agricultural and forestry activities, household sewage and waste waters. Invasive non-native species, modification of hydrographic functioning, water

				abstractions from surface waters, management of aquatic and bank vegetation for drainage purposes, predation.
1355	Otter	Favourable (Improving)	Excellent	The main threats to the otter include pollution, particularly organic pollution resulting in fish kills; and accidental deaths (road traffic and fishing gear). Although recent studies on territory overlaps and animal movements suggest that refinements to the population estimation formula are needed, the otter population (estimated at between 7,000 and 10,000 breeding females) is considered to be increasing and none of the threats or pressures identified is considered likely to impact significantly on the species. Subject to pressures on land and in water (freshwater and marine). Impacts that reduce the availability or quality of, or cause disturbance to, their terrestrial or aquatic habitats are likely to affect otters. The main threats to otters in Ireland are thought to be: habitat destruction (including river drainage and the clearance of bankside vegetation); pollution, particularly organic pollution resulting in fish kills; and accidental deaths (road traffic and fishing gear).
1365	Harbour seal	Favourable (Unchanged)	Good	Pressures on this species in Irish waters mainly involve commercial vessel-based activities such as local/regional prey removal by fisheries or by-catch in fisheries, or geophysical seismic exploration; other possible impacts may occur from coastal tourism and localised human disturbance at haul-out sites. None of these pressures are considered to be of sufficient magnitude to adversely impact on populations of harbour seals in Irish waters**.** Disturbance by human activities, accidental entanglement in fishing gear, competition for prey resources, disease, illegal killing, pollution and other habitat degradation.

[1]NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland

[2] Natura Standard Data Form Slaney River Valley SAC 2015-12 update

[3]Information from NPWS (2011) Conservation Objectives: Slaney River Valley SAC 000781. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

8.2 Conservation Status Wexford Harbour and Slobs SPA

The conservation condition and trends of the wintering SCI species of the Wexford Harbour and Slobs and the Raven SPAs are summarised in Table 10. It should be noted that these trends are based on analysis of the data from the Wexford Bay I-WeBS site only. Therefore, they do not include any data from the section of the Wexford Harbour and Slobs SPA upstream of Ferrycarrig Bridge. In addition, due to the limited coverage of the Wexford Bay I-WeBS site, the reliability of some of these trends may be limited. In particular, the positive long term trend reported for Scaup is not reflected in the raw count data, with the latter showing the frequent occurrence of flocks of 100s of birds in the 1990s, compared to a maximum count of 65 in the last ten winters.

NPWS have not assessed the conservation condition of the post-breeding/roost Hen Harrier, or breeding Little Tern, populations of the Wexford Harbour and Slobs SPA.

Table 10 - Conservation condition and population trends of the screened-in wintering SCI species in the Wexford Harbour and Slobs and the Raven SPAs.

Special Conservation Interests (SCIs)	Site Conservation Condition	12 year site population trend[1]	5 year site population trend[2]	Current all-Ireland Trend[3]	Current inter-national trend[4]
Light-bellied Brent Goose	Favourable	+50	+24.2	+58	Increase
Shelduck	Intermediate (Unfavourable)	-15.6	+26.7	+4.46	Stable
Wigeon	Intermediate (Unfavourable)	-7.8	-15.5	-20.1	Stable
Teal	Favourable	+69.8	+6.5	+11.28	Increase
Mallard	Intermediate (Unfavourable)	-16.6	+0.3	-16	Decline/ Stable
Common Scoter	Intermediate (Unfavourable)	-23	n/c	n/c	Stable
Goldeneye	Unfavourable	-42.3	-30.1	-50.7	Stable
Red-breasted Merganser	Intermediate (Unfavourable)	-15	+9	-11	n/c
Little Grebe	Intermediate (Unfavourable)	-13.1	+5.8	-5.5	Stable
Great Crested Grebe	Intermediate (Unfavourable)	-8.8	-13	-18	Decline
Cormorant	Favourable	+45	+5	+31.5	Increase
Grey Heron	Favourable	+45.4	-3.4	+29.2	Increase
Oystercatcher	Favourable	+5	+10.5	+23.5	Decline
Grey Plover	Unfavourable	-45.5	-6	-33.1	Decline
Lapwing	Unfavourable	-31	-5	-40.12	Decline
Knot	Unfavourable	-39.9	+47.3	-2.91	Decline

Table 10 - Conservation condition and population trends of the screened-in wintering SCI species in the Wexford Harbour and Slobs and the Raven SPAs.					
Special Conservation Interests (SCIs)	**Site Conservation Condition**	**12 year site population trend[1]**	**5 year site population trend[2]**	**Current all-Ireland Trend[3]**	**Current inter-national trend[4]**
Sanderling	Intermediate (Unfavourable)	-2	+37	+109.3	Stable/ Increase
Black-tailed Godwit	Favourable	+72.1	+13.7	+70.2	Increase
Bar-tailed Godwit	Intermediate (Unfavourable)	-6	-1	+1.5	Stable
Curlew	Unfavourable	-30	-9	-25.7	Decline
Redshank	Favourable	+18.4	-7.4	+22.7	Decline/ Stable
Black-headed Gull	-	n/c	n/c	n/c	n/c
Lesser Black-backed Gull	-	n/c	n/c	n/c	Increase

Source: Tables 4.2 and 4.5 in NPWS (2011d).
n/c = not calculated. [1]site population trend analysis, 12 yr = 1995/96–2007/08, 5 yr = 2002/03–2007/08; [3]all-Ireland trend calculated for period 1994/95 to 2008/09; [4] international trend after Wetland International (2006).

9 Baseline ecological conditions

9.1 Local site characteristics

Current access to the site is via a bridge over the rail line leading to the centre of the site. The Rosslare to Dublin rail line runs adjacent to the southern boundary of the site which is composed of a treeline (WL2), Hedgerow (WL1) and narrow band of oak-ash-hazel woodland (WN2) and south of the rail line are located the sports fields. East of the sport grounds and east of the proposed access route into the development, there is an historic landfill site.

The western boundary of the site is adjacent to oak-ash-hazel woodland (WN2) which is within the adjacent Slaney River Valley SAC and Wexford Harbour and Slobs SPA. The south eastern boundary is adjacent to a reed bed (FS1) also included within the adjacent SAC and SPA boundaries. Elsewhere the boundary of the site is demarcated by treelines (WL2), hedgerows (WL1) and scrub (WS1).

A habitat map for the site is shown in Figure 5 and a summary of the habitats present on site in presented in Section 10.3 below

A concrete batching plant was previously operated on the site and the remains of that activity are evident including a cement tower and two small buildings (a small cottage and storage sheds). Quarry pits and spoil heaps associated with aggregate extraction and mining activities are evident on site. Review of OSI

aerial photography for the site between 1995 and 2005 shows the extent of the previous quarrying activity being concentrated at the centre of the site to the east and west of the existing access track to the site. A number of tracks and possible further areas of extraction also occur throughout the central area of the site. Latest OSI aerial imagery captured between 2005 and 2012 shows these tracks were bordered by areas of scrub. These scrub areas have since been cleared and what remains in the central area of the site is a combination of gravel pits and spoil heaps with natural regeneration of vegetation to varying degrees of succession depending on the nature of the substrate and time since disturbance.

9.2 Desktop study

9.3 Geology

The bedrock is classified as Ballysteen Formation (dark muddy limestone shale) at the centre of the site. The southeastern corner of the site is underlain by Shelmaliere Formation bedrock (white, purple quartzites with slates). Eastern areas of the sites are underlain by the Ballymartin Formation (limestone and dark grey calcareous shale) and the Porters gate Formation (sandstone, shale and thin limestone).
The soil association is fine loamy drift with siliceous stones. Soil types are luvisols, surface and groundwater gleys with brown earths. The site is located on a Locally Important Aquifer (Lm) moderately productive bedrock. Groundwater vulnerability is classified as high.

9.4 Water quality

9.4.1 Transitional and coastal waters

The EPA Water Quality maps indicate that the trophic status of the transitional water quality (2010-2012) for the Lower Slaney Estuary is potentially eutrophic, while the transitional water quality for the Upper Slaney estuary is classified as intermediate. The Wexford Harbour coastal water quality (2010-2012) is also potentially eutrophic. River water quality measured north of Enniscorthy in 2019 is good (Slaney; just west of Salsborough Bridge; Station code: RS12S022220). The River Slaney (Slaney _170) WFD status 2013-2018 is good.

The WFD status (2013-2018) for the upper Slaney estuary is good. The WFD status for Lower Slaney Estuary (2013-2018) is poor. The WFD coastal water Status (2013-2018) for Wexford Harbour is good.

9.4.2 Groundwater

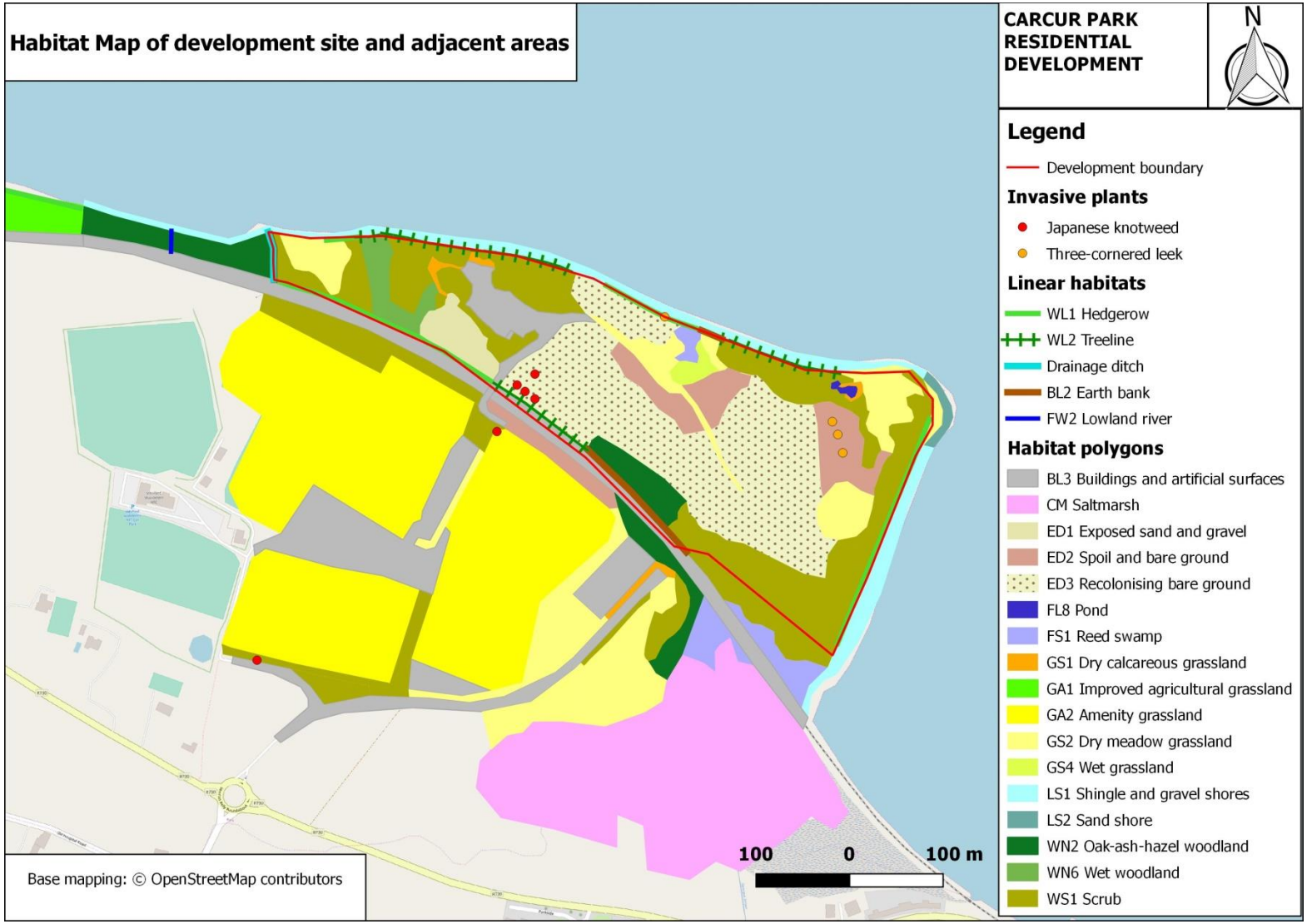
Groundwater plays an essential role in the hydrological cycle and is critical for maintaining river levels and surface water ecosystems (EPA 2013). In many Irish rivers, more than 30% of the flow is derived from groundwater, rising to 90% in periods of low flow. Therefore, the quality of groundwater can have a major impact on the quality of a river water.

The ground waterbody WFD status (2013-2018) for Castlebridge North is good. The WFD groundwater risk assessment indicates that the groundwater body Castlebridge North is not at risk.

9.4.3 Pressures on water quality

The SERBD is predominantly rural and diffuse pollution from agriculture combined with other small point sources such as domestic waste water treatment systems (DWWTS) and farmyards are significant pressures. The main pressures in the urban areas tend to be point source pressures such as discharges from wastewater treatment plants, industrial discharges and storm water overflows.

Figure 5 Habitat Map of the development site at Carcur



9.5 Habitats and map

A habitat map of the development site and immediate surrounding area is provided in Figure 5. Detailed habitat descriptions are provided in the flora and fauna section of the EIAR that accompanies this planning application. A short summary is provided here.

9.5.1 Habitats on site

Exposed gravel (ED1), Spoil (ED2) and Recolonizing bare ground (ED3)

A substantial area of the development site has been subject to disturbance from previous quarry activities and clearance of scrub and the dominant habitat at least in the centre of the site is recolonising bare ground (ED3) where disturbed ground and spoil heaps have been recolonized by native and non-native annual and ruderal plant species with cover approaching 100% in most areas. The area of this habitat on site is approximately 4.2 hectares. The invasive plant species winter heliotrope (*Petasites fragrans*), butterfly bush (*Buddliea davidii*), and Japanese knotweed (*Fallopia japonica*) were present in some areas of this habitat.

Some areas of the disturbed ground persist as spoil or bare ground (ED2) as the vegetation cover in these areas is sparse either due to more recent disturbance or due to the sandy nature of the substrate. The area of this habitat was approximately 9887 m^2 (approx. 1 ha). The invasive species three-cornered leek was present in one area of recently disturbed ground in the east of the site.

An old quarry pit on the site has a sparse covering of plants and is best classified as exposed sand, gravel or till (ED1). The area of this habitat on site is approximately 2500m^2 (0.25 ha). A range of calcicolous plants including the uncommon species common cudweed (*Filago vulgaris*) were recorded in this area along with willow and birch saplings.

Buildings and artificial surfaces (BL3)

There are three buildings on site. A small derelict cottage with the roof partly destroyed and two storage sheds. An area of hard surfacing occurs around the buildings.

Hedgerows (WL1), treelines (WL2) and scrub (WS1)

Hedgerows (WL1) and treelines (WL2) delineate the boundary of the development site and that of the adjacent SAC and SPA on the northern and eastern side. Hedgerows are tall and unmanaged and are dominated either by gorse or hawthorn and blackthorn, with occasional sessile oak, elderberry (*Sambucus niger*) and holly. Bramble and bracken also occur in parts.

Areas of scrub (WS1) occur along the margins of the site and the margins of the grassland areas, woodland and the disused quarry pit (the ED1 habitat). These areas are dominated by gorse or bramble (*Rubus fruticosus* agg.) with willow species also being frequent and other species occurring occasionally including

ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*) and bracken (*Pteridium aquilinum*).

Grasslands (GS1, GS2) and swamp (FS1)

There are small areas of dry calcareous grassland (GS1) and dry meadows (GS2). Lack of management has resulted in the proliferation of grass species and limited the herb species diversity in the dry meadow (GS2) habitat.

There is a small area of reed swamp (FS1) dominated by common reed (*Phragmites australis*) located adjacent to the northern boundary of the site. There was no standing water present in the reed bed at the time of survey in September 2015 and after heavy rain in December 2015. The reed bed may have developed in a shallow depression in the land or borrow pit and the habitat appears to drying out.

Woodlands (WN6, WN2)

There is a small area (0.36 ha) of young wet woodland (WN6) surrounded by scrub adjacent to the old quarry pit. This woodland is located in a shallow depression creating damp conditions. The canopy is composed of grey willow *(Salix cinerea*) and silver birch (*Betula pendula*). Holly (*Ilex aquilinum*) and hawthorn are present in the sparse under storey. Ground flora included abundant ivy which clads the trees also. This woodland does not correspond to the Annex I woodland Alluvial Forests 91E0 as it does not appear to be hydrologically linked to a watercourse and only two of the positive indicator species for that classification (*Angelica sylvestris* and *Urtica doicia*) were present in the woodland. The woodland does not meet the criteria for classification as Annex I Alluvial forest 91E0 (O'Neill & Barron, 2013) which requires at least 6 positive indicator species to be present

An area (0.33 ha) of semi-natural woodland with closest affiliation to oak-ash-hazel woodland (WN2) occurs on an earth bank (BL 2) at the southern boundary of the site adjacent to the railway line. The woodland is a narrow linear feature with areas of dense scrub (WS1) occurring through it. The woodland is dominated by grey willow with some alder and birch (*Betula* sp.). Ground flora is characteristic of the dry earth bank including abundant ivy and bramble, with hogweed and soft shield fern occasional.

Pond (FL8)

There is a small pond (FL8) in the north east corner of the development site. It is approximately 300 m^2 in area. Sea rush (*Juncus maritimus*) is growing in the pond and indicates that the pond may be brackish. The origin of the pond is not clear. It may have resulted from excavations from the previous mining activities on site. It is not present on the historic 6" maps for the area. It is just visible on aerial photography captured in 2005 and 2000. Evidence of mining activity close to the pond is also visible on the maps. Otter sprainting activity was frequent at the pond and it is thought that the pond is used as a source of brackish/freshwater for otters to wash their coats.

9.5.2 Adjacent habitats

Oak-ash-hazel woodland (WN2) occurs adjacent to the western boundary of the development site and within the boundary of the SAC. The woodland appears to be above the zone of inundation.

There is a reed swamp (FS1) dominated by common reed (*Phragmites australis*) located in the southeast corner of the site within the boundary of the SAC.

Shingle and gravel shores (LS1) occur adjacent to the northern and eastern boundaries of the development site. Strandline vegetation includes species such as many-seeded goosefoot (*Chenopodium polyspermum*), sea beet (*Beta vulgaris*), sea aster (*Aster tripolium*), spear-leaved orache (*Atriplex prostrata*) and annual sea blite (*Sueda maritima*). Seaweed covering the shoreline included *Fucus vesiculosus* and *Ascophyllum nodosum*. There is also a small area of sand shore habitat (L2). Shingle and gravel shores (LS1) may contain examples of the annexed habitat 'annual vegetation of drift lines' (1210).

To the north and east of the development site mud shores (LS4) (not mapped in habitat map) occur which are covered by water at high tide. This habitat corresponds to the Annex 1 habitat mudflats and sand flats not covered by sea water at high tide (1140). The community complex present is estuarine muds dominated by polychaetes and crustaceans (NPWS 2011c).

The estuary (MW4) corresponds to the Annex I habitat Estuaries (1130). The estuary habitat of the Natura site extends from the inner Wexford Harbour area north to Enniscorthy (NPWS 2011c).

9.5.3 Invasive plant species

The invasive plants Japanese knotweed and three-cornered leek (*Allium triquetrum*) are present on site. Japanese knotweed is located along the southern boundary adjacent to the treeline (WL2) bordering the rail line. Three-cornered leek is located on the earthbank (BL2) along the northern boundary and in disturbed ground (ED2 habitat) in the centre the centre of the site. The spread of these species is controlled and subject to regulation under Section 49 of the Birds and Habitats Regulations 2011. The location of these invasive plant species is shown in the Habitat Map in Figure 5. Other medium impact but not legally controlled invasive plant species occur on site including winter heliotrope (*Petasites fragrans*) and butterfly bush (*Buddleia davidii*).

9.6 Summary results of the otter survey

A detailed report on the otter activity adjacent the site is provided in Appendix B. A summary is provided here.

Otter activity in the form of spraints, couches and potential holting areas was concentrated along the intertidal zone. Records were found almost exclusively within 15 m of the high tide mark. Concentrations of spraint were located predominantly in narrow strips of dry grassland (GS2) adjoining the intertidal and scrub areas. While occasional spraint and prints were found on the sand and shingle of the intertidal, these areas are inundated on high tide and such were washed away quickly unless fresh at the time of surveying. Overall, the most regular sprainting sites were concentrated at three areas. These were to the

west of the site at an open grassy embankment adjoining broadleaved woodland, between the pond and point to the north east of the site and between the small track and reed swamp to the south east of the site. The sprainting area to the south east of the site was used with less regularity during the winter and early spring of 2016 than during the autumn and winter of 2015. What remains clear is that areas of dry grassy embankment adjoining the intertidal were the most important sprainting areas. Otter are also thought to use a small pond area to the north east of the site as evidenced by sprainting near the pond. This was likely a functional visit as otters are known to wash their coats up to once a day in freshwater.

Live sightings were recorded on two occasions during bird survey work:

• 29/10/2015 - 1 seen swimming into shore and then going into reeds, carrying a fish, near Castlebridge end of estuary (approx grid ref 304300 125200) at 12:50 pm.

• 10/12/2015 - 2 on eastern shore of site, just up from reedbed, in intertidal zone, close to path into scrub (approx grid ref 303700 122900) at 08:35am.

Several potential holt were located along the northern shoreline. Otter activity near the observed potential holt excavations was limited. Indeed the only potential holt site where otter were recorded with any frequency was a man made holt. This area was located near an overgrown trail into gorse scrub on the northern shoreline where there was a pile of boulders with large crevices between the rocks. This area was considered to be used as an infrequent resting place as <10 triggers were recorded over a 30 day period.

Other otter resting places (couches) in the open were identified. These resting areas were located at three distinct areas in dry grassy verges between the intertidal zone and land boundaries. To the west of the site (near broadleaved woodland strip), between the pond and the point to the north east of the site, and near the junction of a small path and the shoreline at the east of the site. These flattened areas of grassy banks were often accompanied by piles of otter spraint nearby and were above the high tide limit.

Given that the patterns of use were relatively consistent overtime at Carcur, it has been identified that the four important zones of otter activity exist adjacent to the proposed development. They include the following areas:

1. The open grassy embankment adjoining the woodland strip and small point to the north west of the site

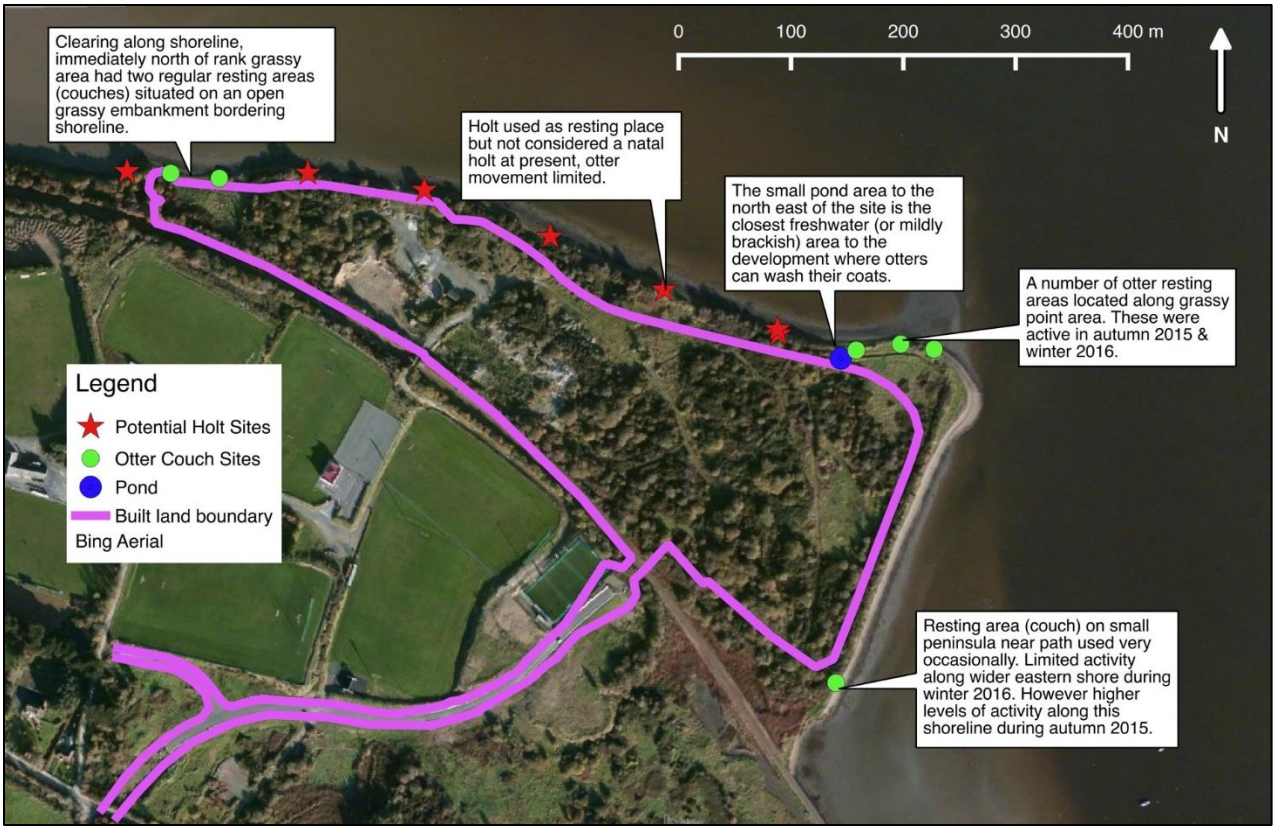
2. The small freshwater pond to the north east of the site

3. The large point and adjoining dry grassy areas to the north east of the site (majority of records detected here)

4. The south eastern extent of the site (near trackway through scrub) and adjoining reed swamp.

These areas are shown in Fig. 6 below.

Figure 6 Areas adjacent to the development site that are used by otter



9.7 Wintering Birds

The full results of the analyses of the existing waterbird data and the waterbird counts carried out for this assessment are presented in Appendix C. The following is a summary of the main findings.

For the purposes of waterbird monitoring Wexford Harbour and Slobs SPA and the Raven SPA have been combined into a single site: Wexford Bay. This site does not include the section of the Wexford Harbour and Slobs SPA upstream of Ferrycarrig Bridge. The Wexford Bay site is divided into a number of subsites. It should be noted that the subsites do not include the middle of the main harbour, and areas of sandbank at the mouth of the harbour are also not covered by the subsites. Therefore, waterbird counts for Wexford Bay will tend to underestimate the total numbers that occur in the harbour. One of the subsites covers the area between Wexford Bridge and Ferrycarrig Bridge (the Ferrycarrig subsite) and includes the area adjacent to the proposed development site.

The extent of intertidal habitat shown in Ordnance Survey mapping of Wexford Harbour, and used by NPWS in mapping for their conservation objectives, is based on historical data and bears no relationship to the current situation. The typical extent of intertidal habitat exposed at low tide on a moderate spring tide in the Ferrycarrig subsite is shown in Figure 2. This is based on mapping of tidal exposure during the 2015/16 waterbird surveys and aerial imagery. The most extensive area of intertidal habitat is in S10 and

S11 at the northern end of the subsite. Other significant areas of intertidal mudflat are regularly exposed in S1, S6 and S8. In S2, S3, S5, S6, S7 and S12 intertidal mudflat tends to only be exposed on the lower tides. The other sectors (S4, S9 and S13) hold shingle shorelines with minimal exposure of intertidal mudflats at low tide.

The 2009/10 waterbird survey programme (WSP) included four low tide counts and one high tide count of Wexford Bay. The numbers of waterbirds recorded in the Ferrycarrig subsite during the 2009/10 WSP low tide counts are compared with the total Wexford Bay count in Table 11. The species that occurred in relatively high numbers in the Ferrycarrig subsite during the low tide counts included Goldeneye, Black-tailed Godwit, Greenshank and Redshank. During the single high tide count (21/01/2010), only six species were recorded in the Ferrycarrig subsite, with a total of 24 counted across all these species. Mapping of high tide roosts by NPWS (2011) shows four high tide roosts within the Ferrycarrig subsite, all located along the northern/eastern shore of the subsite. The SCI species listed as using these roosts are Mallard, Oystercatcher, Black-tailed Godwit, Curlew and Black-headed Gull. No information is provided on the size of these roosts. Observations during the waterbird counts carried out for this assessment indicated that most waders move out of the subsite to roost in the main harbour at high tide.

The survey work carried out for this assessment included eight low tide counts of the Ferrycarrig subsite between September 2015 and January 2016. Across all these low tide counts, 21 of the 32 SCI species of the Wexford Harbour and Slobs SPA and the Raven SPA were recorded in the study area (Table 11). The SCI species that were not recorded included species that mainly occur offshore in the Raven SPA (Common Scoter and Red-throated Diver), species that mainly occur on the slobs (Bewick's Swan, Whooper Swan, Greenland White-fronted Goose, Pintail and Coot), one species that is now rather rare in Wexford Harbour (Scaup), a raptor (Hen Harrier), a wader associated with more sandy sediments (Sanderling), and a breeding tern species (Little Tern). Somewhat more surprising were the absence of any records of the remaining two SCI species: Light-bellied Brent Goose and Golden Plover. However, neither of these species was recorded in the Ferrycarrig subsite during the 2009/10 WSP counts.

Across all counts, the following SCI species were recorded in the sectors adjoining the development site: Shelduck, Mallard, Red-breasted Merganser, Cormorant, Grey Heron, Little Grebe, Oystercatcher, Lapwing, Curlew, Black-tailed Godwit, Bar-tailed Godwit, Redshank, Black-headed Gull, and Lesser Black-backed Gull (Appendix C). The SCI species that occurred regularly (i.e., on 50% or more of the low tide counts) included: Grey Heron, Little Grebe, Oystercatcher, Curlew, Black-tailed Godwit, Redshank, Black-headed Gull. Across all the regularly occurring species there was a general pattern of more regular occurrence, and higher numbers, at low tide compared to the ebb/flood and high tides. Most species also occurred more regularly, and in higher numbers, on the ebb/flood tide compared to at high tide.

The most important areas of low tide habitat in the sectors adjoining the development site are the mudflats in S3 and S6, with the latter area extending into S5 on low spring tides. The gravel spit at the eastern end of S5 can hold small concentrations of waterbirds and may be used as a resting area by flocks moving through the estuary. Small high tide roosts of Oystercatcher and Redshank occur irregularly along the railway line in S3 (about 100-200 m east of the eastern side of the development site) and on the shingle bank at the southern end of S4.

The relative importance of the sectors (S3-S6) adjoining the development site for the regularly occurring SCI species was assessed by calculating the mean percentage of the total Ferrycarrig low tide counts that occurred within these sectors. For most species, the sectors held around 15-30% of the total subsite count Table 11). However, only 2-3% of the Black-tailed Godwit and Curlew counts occurred within these sectors. If the overall distribution of waterbirds during the 2009/10 low tide counts is considered representative, then these sectors may hold 0-5% of the total Wexford Bay population of these species, while Sectors S4-S5 (the sectors directly adjacent to the development site), may hold 0.1-2.2% of the total Wexford Bay population of these species (Appendix C). As the 2009/10 low tide counts probably underestimated numbers in the outer part of Wexford Bay (see above), the above percentages may be overestimates.

Table 11 - Waterbird counts for the Ferrycarrig subsite (0O407) during the 2009/10 and 2015/16 low tide counts.

	2009/10 low tide counts		2015/16 low tide counts	
	Ferrycarrig subsite		Ferrycarrig subsite	S3-S6
Species	mean count	mean % of Wexford Bay total	mean count	mean % of Ferrycarrig total
Shelduck	5	1%	1	33%
Wigeon	0	0%	< 1	0%
Teal	1	1%	6	0%
Mallard	0	0%	46	0%
Goldeneye	7	36%	14	0%
Red-breasted Merganser	4	5%	4	7%
Little Grebe	0	0%	8	34%
Great Crested Grebe	14	19%	6	0%
Cormorant	10	4%	23	15%
Grey Heron	3	12%	16	21%
Oystercatcher	34	8%	81	17%
Grey Plover	2	1%	4	0%
Lapwing	321	10%	153	0%
Knot	0	0%	167	0%
Dunlin	1	0%	416	0%
Black-tailed Godwit	233	34%	1053	2%
Bar-tailed Godwit	5	1%	33	1%
Curlew	59	7%	81	4%
Redshank	156	23%	181	15%
Black-headed Gull	356	12%	778	10%
Lesser Black-backed Gull	6	8%	7	30%

Data source for the 2009/10 low tide counts: 2009/10 Waterbird Survey Programme as undertaken by the National Parks & Wildlife Service.

10 Potential impacts on the Slaney Valley River SAC

The potential impact of the proposed development was assessed with regard to the conservation objectives and targets for those species and habitats considered potentially at risk from this development.

10.1 Potential impacts on the estuary, tidal mudflats and saltmarsh habitats

10.1.1 Habitat loss and disturbance

The stormwater drainage design proposes 5 No. surface water outfalls, 4 of which discharge to subtidal waters to the north of the site and the fifth will discharge to the reed bed adjacent to the southeast corner of the site. Construction of the outfalls is estimated to take approximately 4-8 days. The outfalls will consist of pipes buried in the intertidal mudflats. Construction of these outfalls will involve disturbance to the intertidal mudflat for an approximately 10 m wide strip along the length of each pipe. Outfalls 1 to 3 located along the northern shore will be 17 metres from the high tide line; Outfall 4 (along the northern shore just west of the otter pond) will be 22 metres. This results in 0.073 ha (rounded to approximately 0.08 ha) of intertidal habitat disturbed during the installation of the pipes. As the outfalls will discharge to the subtidal zone no ongoing disturbance due to scour of the intertidal habitat will occur.

NPWS Mapping of benthic community types indicates Estuarine muds dominated by polychaetes and crustaceans community complex within the intertidal area (NPWS datasets: CO Marine Community Types) The estimated area of this community type within the SAC based on spatial interpolation is given as 587ha (NPWS 2011c).

The polychaete *Hediste diversicolor* and the crustacean *Neomysis integer* are commonly present here. The crustaceans *Gammarus locusta* and *Crangon crangon*, the polychaetes *Polydora cornuta* and *Heterochaeta costata* and the oligochaete *Enchytraeidae indet* are also frequently recorded from this complex (NPWS, 2011c)

The installation of the pipes will involve disturbance of 0.08ha of intertidal mudflats containing estuarine muds dominated by polychaetes and crustaceans complex amounting to 0.014% of this community complex.

Conservation targets for the Annex I habitat 1140 Tidal mudflats and sandflats (NPWS, 2011) include:

Target 1. Habitat area: The permanent habitat area is stable or increasing, subject to natural processes.

This target refers to activities or operations that propose to permanently remove habitat from a site, thereby reducing the permanent amount of habitat area. It does not refer to long or short term disturbance of the biology of a site (NPWS 2011c). This target is therefore not considered to be relevant to this assessment as there will be no permanent removal of tidal mudflats sediments.

Target 2. Community distribution: The following community types should be maintained in a natural condition: Estuarine muds dominated by polychaetes and crustaceans community complex; and Sand dominated by polychaetes community complex

NPWS conservation objectives supporting document-marine habitats and species for the Slaney River Valley SAC provides guidance notes on appropriate assessment for marine habitats. This guidance states that:

"It is worth considering at the outset that in relation to Annex I habitat structure and function, the extent and quality of all habitats varies considerably in space and time and marine habitats are particularly prone to such variation."

Anthropogenic disturbance may be considered significant when it causes a change in biotic and/or abiotic variables in excess of what could reasonably be envisaged under natural processes. The capacity of the habitat to recover from this change is obviously an important consideration (i.e., habitat resilience) thereafter.

In relation to Target 2 the guidance states that:

"*Significant continuous or ongoing disturbance of communities should not exceed an approximate area of 15% of the interpolated area of each community type, at which point an inter-Departmental management review is recommended prior to further licensing of such activities*."

"*Proposed activities or operations that cause significant disturbance to communities but may not necessarily represent a continuous or ongoing source of disturbance over time and space may be assessed in a context-specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site"*

A study by Lewis et al. (2002, 2003) found temporary impacts on benthic fauna from pipeline construction in Clonakilty Bay, with good recovery 6-12 months after the impact. Results showed that initially the impacted area suffered complete defaunation, followed by a gradual recolonization by the polychaete *Hediste diversicolor with good recovery after 6 months*. Other species in particular the bivalve *Scrobicularia plana* took longer to recolonise but had recovered to such an extent one year after the construction impact that there were no significant differences amongst the impacted and control sites.

It is estimated that 0.14% of the Estuarine muds dominated by polychaetes and crustaceans community complex will be subject to temporary disturbance over 4-8 days. This is considered a very small proportion of the mudflats, which would be anticipated to make good recovery over the short term of 6-12 months and therefore will not result in any significant effect.

Therefore, it is concluded that there will be no significant negative effect on the tidal mudflats as a result of habitat disturbance due to the installation of the outfall pipelines.

Mitigations measures will be required to avoid any pollution of the tidal mudflats during the construction of these pipelines. This are outlined in section 10.1.3 below.

10.1.2 Saltmarsh physical structure

There are no conservation objectives set for the Annex I saltmarsh habitats of the Slaney River Valley SAC. Annex I saltmarsh habitats as identified during the Saltmarsh Monitoring Survey (McCorry and Ryle, 2009) occur at Castlebridge and Rosslare with small patches of Annex I saltmarsh at Ferrycarrig. Other areas of potential Annex I saltmarsh habitats identified in the saltmarsh monitoring survey by desktop survey only occur to the south of the development site on the southern side of the rail line. Potential Atlantic saltmarsh was also identified east of Ferrybank Bridge in Wexford Harbour.

NPWS, following consultation, raised the concern of potential effects on patterns or erosion and deposition as a result of raising the level of the land for flood management. The maintenance of a natural tidal regime and natural circulation of sediments (subject to natural processes) is a conservation objective for saltmarsh habitats.

This issue was investigated and reported on in the Site Specific Flood Risk Analysis carried out by IE Consulting (2017) and submitted with the planning application. The main results of the assessment carried out by IE Consulting are summarised below.

The analysis and flood zone delineation undertaken as part of this Site Specific Flood Risk Assessment (SSFRA) indicates that areas of the proposed development site may be susceptible to flood inundation during an extreme fluvial or tidal event in the River Slaney and Slaney Estuary. In order to enable a sustainable development of the site and to reduce the risk of flood inundation to the site, it is proposed to raise the existing ground levels within the site area to a minimum level of 2.95m OD, which is the predicted 1 in 1000 year (0.1% AEP- Annual Exceedance Probability) High End Future Scenario tidal flood level in the vicinity of the site.

The volume of flood waters that may have inundated the existing site during a 1 in 1000 year (0.1% AEP) fluvial event has the potential to result in a displacement of approximately 20,073m^3 of floodwaters as a result of raising the site to a minimum ground level of 2.95m OD. The estimated 0.1% AEP fluvial flood conveyance volume in the River Slaney in the vicinity of the proposed development site is approximately 739.19m^3/s therefore a volume of 20,073m^3 would equate to 27 seconds of the 1 in 1000 year (0.1% AEP) flood conveyance flow in the River Slaney.

IE Consulting conclude "*In consideration of the Current Scenario, the volume of tidal flood waters that may be displaced by the proposed development site are negligible in consideration of the occurrence of an extreme 0.5% AEP or 0.1% AEP tidal flood event in the Slaney Estuary. Displacement of these negligible volumes of flood waters from the area of the proposed development site would simply be attenuated within the vast volume of flood waters within the Slaney Estuary and would have an imperceptible impact on the hydrological regime of the area".*

Furthermore IE consulting state that "*In consideration of the predicted 0.1% AEP flow rate in the River Slaney in the vicinity of the site the volume of fluvial flood waters that may be displaced by the proposed development site are negligible in consideration of the occurrence of an extreme 1 % AEP or 0.1% AEP fluvial flood event in the River Slaney. Displacement of these negligible volumes of flood waters from the area of the proposed development site would simply be attenuated within the vast volume of flood waters within the River Slaney and would have an imperceptible impact on the hydrological regime of the area."*

The potential for the proposed development to alter sediment transport with the River Slaney Estuary was also investigated by IE Consulting. The site was examined for the deposition of sediment from the estuary by carrying out a high resolution aerial survey and a detailed walkover survey by a hydrological engineer from IE Consulting. This assessment demonstrated that the entire site is completely covered in dense and well established vegetation (excluding the immediate shoreline). There is no evidence to suggest any area of the site forms part of the natural sediment transportation and deposition regime of the Slaney Estuary. There was also no evidence to indicate any significant erosion within or along the boundary of the proposed development site. Development of the site is therefore not expected to have an adverse impact on the existing hydromorphological regime and sediment transport of the Slaney Estuary.
IE Consulting also considered the hydrological impact of the proposed surface water drainage system.

"There are five attenuation systems proposed within the development site, which have been designed for no flooding up to the 1 in 100 year rainfall event. The discharge from each of these attenuation systems shall be limited to Greenfield Runoff rates using a flow control device such as a 'Hydrobrake'. The discharge pipes shall be fitted with tidal flaps and shall discharge to the estuary."

The proposed surface water management system shall not result in any displacement of flood waters in the area. As such there will be no increase in runoff from the site beyond the 'greenfield' runoff rate and therefore the development as proposed will not pose an increased flood risk to the area.

Given that surface water runoff rate will be attenuated to the greenfield run off rate it is concluded that there will be no significant change to the hydrological regime of the Slaney estuary and therefore **no negative effect on the physical structure of saltmarsh habitats as a result of changes in patterns of erosion and deposition is anticipated.**

10.1.3 Pollution/deterioration in water quality

Potential impacts from this development to the estuary, tidal mudflats and saltmarsh habitats primarily relate to potential effects on estuarine and transitional water quality as a result of the construction activities or storm water discharges arising from the development into the estuary waters.

Transitional water quality for the Lower Slaney is classified as potentially eutrophic with WFD status of poor, and estuarine waters of Wexford Harbour are potentially eutrophic with WFD status of moderate.

Any further deterioration as a result of this development could contribute to cumulative impacts of poor water quality on the Annex I habitats and Annex II species for which the site is designated.

Potential construction impacts on water quality

During construction, pollution of surface or groundwater could arise as a result of fuel leakages from machinery and inappropriate use or disposal of hazardous chemicals including concrete, paints, solvents etc. Inadequate control of surface water run-off during infilling of the site and during construction earthworks could result in sediment transfer to the estuary.

Mitigation of potential construction impacts to water quality

- It is proposed to construct a retaining wall to retain the infill soils on site (Arthur Murphy Drawing PL11)
- A construction management plan including a specific methodology with associated drawings to contain soil and sediments on site and prevent construction site runoff has been drawn up for all phases of the development and is provided in Appendix D. It is proposed to construct a temporary 1 m high berm with 1 in 3 side slope along the full length of the eastern and northern boundary of the site to prevent escape of silty water to the estuary and guide it to temporary siltation ponds as outlined in engineering drawing PL12.
- The appointed contractors both for infilling the site and for construction will be required to develop and implement site-specific construction method statements for the protection of water quality which will be approved by Inland Fisheries Ireland and/or the NPWS.
- A Project Ecologist will be appointed for the duration of the construction phase to monitor the implementation of the construction management plan (CMP) and the construction method statements. Compliance with the CMP and construction method statements will be mandatory for all contractors and personnel employed on the construction phases of the project.
- Measures to protect watercourses from pollution by fuels or concrete will be incorporated into works method statements following guidelines including:
    - IFI (2016*) Guidelines on Protection of Fisheries During Construction Works In and Adjacent to Water.* Inland Fisheries Ireland, 2016.
    - CIRIA C532 Control *of Water Pollution from Construction sites*.
- All oils and fuels shall be stored in secure bunded areas and care and attention taken during refuelling and maintenance operations. Particular attention will be paid to gradient and ground conditions which could increase the risk of discharges to waters.
- Refuelling of machinery etc. will be carried out in bunded areas.
- Runoff from machine service and concrete mixing areas will not be permitted to enter watercourses.
- When cast in place concrete is required, all work must take place in the dry and effectively isolated from any flowing water (or water that may enter streams and rivers) for a period sufficient to ensure no leachate from concrete.
- Designated impermeable cement washout areas must be provided.

- Stockpile areas for soils, sands and gravel will be kept to minimum size, compacted and situated well away from watercourses.
- Runoff from the above will only be routed to the watercourse via the temporary silt ponds as outlined in drawing PL12.
- Site, surface drainage and silt control measures will be established prior to commencing site infilling or earthworks.
- Run-off from the working site or any areas of exposed soil will be channelled and intercepted at regular intervals for discharge to the silt ponds .
- Settlement ponds and silt traps will be inspected daily and maintained regularly.
- A maintenance schedule and operational procedure will be established by the contractor for silt and pollution control measures during the construction period. This will be undertaken in consultation with the relevant statutory authorities.
- Temporary oil interceptor facilities shall be installed and maintained where site works involve discharge of drainage water to receiving rivers and streams.
- There shall be no visible oil film in any discharges from construction works to waters.
- The construction management will include requirements for sensitive construction and security site lighting to avoid light overspill to the boundary vegetation or riparian habitats
- Landscaped areas will be reseeded promptly.

Therefore, with the inclusion of a retaining wall to retain soils on site and the implementation of the site-specific construction method statements incorporating best practice and mitigation measures as outlined above it is anticipated that there is no significant risk of deterioration in groundwater or surface water quality as a result of the construction works for this proposed development.

Operational impacts to water quality

No significant negative effect on estuarine water quality is anticipated as a result of the operational phase of the proposed development. It is considered that there will be no significant negative effects from foul or stormwater discharges as:

- Wastewater from the development will be piped to the Wexford Town Urban Waste Water Treatment plant (UWTP). The pumping station and associated foul sewer networks will be designed and constructed in accordance with the relevant Irish Water Code of Practice and Standard details. A connection agreement has been received from Irish Water. According to information on the EPA maps (**https://gis.epa.ie/EPAMaps/)** Wexford Town WWTP provides secondary treatment for nitrogen and phosphorus and is compliant. The European Union's Urban Waste Water Treatment Directive sets standards for treating urban waste water at large urban areas. The standards are set to protect the environment and people's health from the adverse effects of waste water discharges and the final deadline for Ireland to comply with the standards was 2005 (EPA, 2018).
- Irish Water are responsible for providing water and wastewater services throughout Ireland. In discharging its role as the national water services utility, responsible for water services operations and investment, Irish Water is regulated by the EPA which sets standards and

enforces compliance with EU and National Regulations for drinking water supply and wastewater discharge to water bodies. Irish Water plan, develop and operate their water service functions in line with the requirements of prevailing relevant national and European legislation (https://www.water.ie/about-us/our-company/) including the Birds and Habitats Directives.

- The storm water drainage infrastructure includes oil interceptors, silt traps and attenuation stores designed to attenuate the 100 year storm and will discharge to the subtidal waters of the estuary. Therefore no significant negative impact on water quality is anticipated to result from the surface water discharges to the estuary.

The latter was confirmed by a study undertaken by Aquafact on the dispersion and dilution of storm water from the proposed development (Aquafact, 2020). Th authors concluded that the very high tidal flushing dilutions and large River Slaney freshwater inflows provide ample dilution for the proposed storm water discharge from the proposed development and these will ensure that the water quality status of the estuary will not be impacted. As the storm water will be rainwater runoff that falls within the housing development, the potential for any levels of pollutants *e.g.* heavy metals, organochlorines, coliforms, viruses *etc.* that could be introduced to the River Slaney is extremely low. In addition, they conclude that the impact on salinity within the estuary even at proposed 100 year design storm water discharge will be negligible.

Other potential impacts on water quality and the estuarine environment are associated with increased residential activity in the nearby area and the associated risk of littering or dumping into or adjacent to the estuary habitats. Dumping is discouraged by the design and layout of the development. No residential units back onto the shoreline habitats. A permanent wall and fence line along the shoreline, and retention of scrub and hedgerow habitats along the shoreline coupled with further hedgerow planting, will provide a buffer to the shoreline discouraging access and dumping.

Residual effect

There will be no deterioration in surface water quality and consequently no indirect effects due to a decline in water quality on the associated habitats (estuary, tidal mudflats, saltmarshes) or aquatic/marine species including fish species, harbour seal and otter.

10.1.4 Potential impact of NOx emissions and NO_2 dry deposition

Nitrogen deposition can have a negative impact on semi-natural habitats resulting in nutrient enrichment with consequent loss of plant species richness. Negative impacts from nitrogen deposition are primarily associated with intensive agricultural and industrial N_2 emissions.

Many Annex I habitats are naturally adapted to low nitrogen supply, so that fertilization with nitrogen compounds from the atmosphere alters the natural ecological balance. This results in the loss of the most sensitive species, which are often a priority for protection, and their replacement by invasive species that prefer high rates of nitrogen supply. In addition, the evidence also points to a net loss in the overall number of species (Hicks *et al.*, 2011).

The potential for negative impacts from air pollution specifically in relation to whether there was a requirement to assess potential impacts on Natura sites from NOx emissions and NO_2 dry deposition was examined by AWN Consulting Ltd. in the Air Quality chapter of the EIAR produced for this development

Based on the air quality and modelling studies and following Transport Infrastructure Ireland (TII) guidance it was concluded that the sensitivity of the Natura habitats does not need detailed assessment. This is based on a predicted 1.2 $\mu g/m^3$ increase in NO_x which is below the guidance threshold of 2 $\mu g/m^3$ where potential impacts from NOx emissions on Natura habitats should be assessed. The road contribution to the NO_2 dry deposition rate along a transect within the Slaney River SAC is also detailed in that report. The maximum NO_2 dry deposition rate is 0.05 Kg(N)/ha/yr in 2020 and 0.06 Kg(N)/ha/yr in 2035. This is a negligible increase within the Slaney River SAC and Wexford Slobs and Harbour SPA for NO_2 dry deposition due to the proposed development.

Therefore no significant negative impact from NOx emissions or NO_2 dry deposition on the habitats or species of the Natura sites is anticipated.

10.1.5 Potential impacts of dust deposition

Infilling of the site and earthworks during the construction phases have the potential to generate a considerable amount of dust. Deposition of dust on vegetation can have negative impacts on photosynthesis, respiration, transpiration and allow the penetration of phytotoxic gaseous pollutants leading to decreased productivity. Epiphytic lichen and Sphagnum-dominated communities are the most sensitive (Farmer, 1993). With reference to the Air Quality and Climate assessment for this development (Chapter 8 of the EIAR, AWN Consulting), construction dust tends to be deposited within 200m of a construction site but the majority of the deposition occurs within the first 50m. It I therefore anticipated that the majority of dust deposition will occur at the scrub, hedgerows and woodland habitats marginal to the development site.

No Annex I habitats are expected to be significantly affected by dust. The Annex I saltmarsh habitats are too far away for the vegetation to be effected. There is an area of potential Annex 1 saltmarsh adjacent to the rail line south of the development site where there is potential for dust deposition as a result of construction traffic accessing the site. Estuaries and tidal mudflats are not anticipated to significantly effected by dust.

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a dust minimisation plan (Chapter 8 of the EIAR, AWN Consulting). Due to the sensitivity of the current residential receptors to the site additional mitigation measures recommended in the Institute of Air Quality Management *Guidance on the Assessment of Dust from Demolition and Construction* (2014) for sensitive receptors have been included (Awn Consulting, 2018).

In summary, the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.

- Furthermore, any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

The implementation of these dust amelioration measures during construction will help reduce dust deposition on the marginal habitats and saltmarsh south of the site. Inundation of the tide will help to mobilise any dust deposited on the saltmarsh south of the site. Dust deposition effects on vegetation are expected to be temporary and no significant impact to the productivity, growth or density of the marginal habitats or saltmarsh is anticipated in the long term.

10.1.6 Potential impact on floating river vegetation

According to the conservation objectives documentation (NPWS, 2011) the distribution of Annex 1 Floating River vegetation and its sub-types in this site is currently unknown. The basis of the selection of the SAC for the habitat is the presence of an excellent example of the vegetation assemblage associated with tidal reaches of the Slaney River between Enniscorthy and Pollader. This is a tidal sub-type of the vegetation community. The typical species of the tidal sub-type present in the Slaney include short-leaved water-starwort (*Callitriche truncata*), opposite-leaved pondweed (*Groenlandia densa*), spiked water-milfoil (*Myriophyllum spicatum*), other pondweeds (*Potamogeton* spp.). Short-leaved water-starwort in addition to needle spike-rush (*Eleocharis acicularis)* are pioneer species in areas of bare mud on the tidal reaches of the Slaney. Maintenance of a natural flow regime is important with high flows being important for maintenance of the substratum necessary for the characteristic species. The floating river vegetation habitat is known to be sensitive to nutrient enrichment and invasive aquatic plants can outcompete the habitat for space. Water quality should reach Water Framework Directive good status, in terms of nutrient

standards, and macroinvertebrate and phytobenthos quality elements. The known occurrence of the habitat is upstream of the development. While the habitat may occur in other areas it is not anticipated to occur in the estuary region close to the development site.

Therefore there will be no negative effect on the Annex I habitat - Floating River Vegetation as a result of this development as:

- As outlined in Section 10.1.2 above there will be no change in accretion or deposition and therefore no change in the flow regime or river water flow.
- As outlined in Section 10.1.3 there will be no deterioration in water quality as a result of the construction or operational phase of the proposed development and therefore there will be no negative effect on this habitat due to deterioration of water quality.

10.2 Potential impacts on Annex I fish species

Construction of the outfall pipes will take place at low tide. Installation of the pipe a will lead to localised disturbance of the sediments and potentially lead to localised increased suspended particles and turbidity of the waters of the rising tide. Due to the vast quantities of seawater and the tidal movements these mobilised sediments are anticipated to disperse widely and very quickly and no significant negative effect on fish species is anticipated as a result of these works.

Any deterioration in water quality as a result of this development could consequently have an impact on the Annex II fish species for which the site is designated. These include sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), twaite shad (*Alosa fallax*) and Atlantic salmon (*Salmo salar).* However, regular breeding of twaite shad has not been confirmed in the River Slaney in recent years (King and Roche, 2008).

A possible but very unlikely potential impact is direct fish kill from catastrophic point source pollution as a result of fuel or chemical leakage. Deterioration in estuarine water quality could present a barrier to accessing spawning habitats but the significance of polluted estuarine waters as a barrier to spawning is not confirmed (King and Linanne, 2004). Deterioration in water quality could affect feeding resources as a result of point or diffuse pollution. Spawning habitats for the lamprey species, salmon and twaite shad are located upstream in the freshwater stretches of the River Slaney and are not at risk of potential impacts from this development.

As outlined in Section 10.1.3 above there is no significant risk of deterioration in water quality as a result of the construction or operational phase of the proposed development due to the implementation of the construction management plan including specific measures to avoid construction site run off or pollution of groundwater or surface waters and appropriate design of the wastewater and surface water infrastructure for the proposed development. As impacts to water quality will be avoided through the implementation of mitigation measures as outlined in Section 10.1.3 above, there will be no significant negative impact on the Annex II fish species.

Therefore there is no significant risk of negative impact to fish species as a result of the proposed development.

10.3 Potential impacts on common (harbour) seal (*Phoca vitulina*)

With reference to the conservation objectives for the harbour seal, potential impacts on the harbour seal considered in this assessment include:

- Direct or indirect interference with breeding, moulting or haul out sites used by the harbour seal
- Disturbance to the population of harbour seals
- Effect on feeding resources due to changes in water quality

Harbour seals in the Slaney River Valley SAC occupy both aquatic habitats and intertidal shorelines that become exposed during the tidal cycle. The area of habitat within the Natura site used by the species includes the estuary and the tidal stretches of the Slaney River (NPWS, 2011c). The species is present at the SAC throughout the year during all aspects of its annual life cycle which includes breeding (May-July approx.), moulting (August-September approx.) and non-breeding foraging and resting phases. In acknowledging the limited understanding of aquatic habitat use by the species within the SAC, it should be noted that all suitable aquatic habitat is considered relevant to the species' range and ecological requirements at the SAC and is therefore of potential use by harbour seals. Harbour seals are vulnerable to disturbance during periods in which time is spent ashore, or in shallow waters, by individuals or groups of animals. This occurs immediately prior to and during the annual breeding season (May-July), and during the annual moult (August-September), at haul out sites. While there may be outliers in any year, specific established locations tend to be used annually for breeding-associated behaviour by adult males, adult females and their newborn pups. Current sites are broadly as follows: "Tern Island" off Rosslare Point and sandbanks within the central and eastern areas of Wexford Harbour. Known moulting haul out sites are also located in these areas. The resting sites may differ from traditional breeding or moulting sites. Such habitats are critical to the maintenance of the species within any site. Current information on resting locations selected by harbour seals in Wexford Harbour outside the breeding and moulting seasons is comparatively limited. Known and suitable habitats for resting by the species as described in Slaney River Valley SAC marine supporting document (NPWS, 2011c) are also located near "Tern Island" off Rosslare Point and sandbanks within the central and eastern areas of Wexford Harbour (NPWS, 2011c).

No significant disturbance of harbour seal is anticipated. The breeding, moulting and haul sites are approximately 5 km from the development site. At this distance, it is not anticipated that there would be any disturbance to the harbour seal population due to construction activities or due to ongoing residential activity at the site.

The range of habitat used by the harbour seals extends past the boundary of the SAC, and they were frequently seen adjacent to the development site during bird survey work. Harbour seals may use the transitional waters and travel upstream for feeding. Harbour seals are most vulnerable to disturbance during time spent ashore or in shallow waters (NPWS, 2011c).

Construction of the outfall pipes for the proposed development will create temporary disturbance to harbour seal commuting or feeding in the subtidal waters off the site. This work is anticipated to take between 4-8 days and will be carried out during the summer season to avoid overlap with the presence of wintering birds. Due to the short term nature of the disturbance of commuting and feeding activity only this disturbance is not anticipated to have a significant negative effect on the harbour seal population. The seals are also likely to habituated to a certain level of human activity disturbance in the harbour area. The activity will not result in any disturbance to the breeding or haul out resting sites of the harbour seal where they are most vulnerable as these sites are located approximately 5km from the development site.

As outlined in Section 10.2 localised mobilisation of sediments on installation of the outfall pipelines are anticipated to disperse widely and very quickly with the rising tide and are not anticipated to negatively impact on harbour seal.

Construction activities on land or the ongoing residential activities on built are not anticipated to cause disturbance to seals using the transitional waters adjacent to the development site. The boundary vegetation will serve to shield the construction activities to some extent. Use of the shoreline by residents will be discouraged or prevented by the fence line and retained scrub and therefore activities along the shoreline are not anticipated to significantly increase from the baseline situation.

As there will be no deterioration in water quality as a result of this development as outlined in Section 10.1.3 there will be no negative impact to feeding resources for the harbour seal.

Therefore it is concluded that there will be no significant negative impact on the population of harbour seals as a result of the construction or operational phase of this development.

10.4 Potential impacts on Otter (Lutra lutra)

The results of the detailed otter survey identified that four important zones of otter activity exist adjacent to the proposed development. These were described and illustrated in Fig. 6 in Section 9.6 above and the detailed otter report is provided in Appendix B. Couch sites and one holt site was identified at the margins of the development site, on the river bank around the pond in the northeast corner of the site and along the shoreline near the reed bed in the south east corner of the site. The pond is thought to be important for otters to wash their coats.

10.4.1 Otter habitat loss during construction

The development will result in the infilling of the pond used by otters for washing their coats. The pond is located in the northeast corner of the site and is thought to have developed in a previous quarry pit. This pond appears brackish, as indicated by the presence of abundant sea rush (*Juncus maritimus*) growing in the pond. The pond also appears quite stagnant. NPWS were consulted regarding the removal of the existing pond and their comments (see Appendix A) have been incorporated into mitigation measures.

The site will be infilled to raise levels and a retaining wall will be constructed at the otter boundary along the eastern and northern development site boundary. The construction of the retaining wall will result in removal of approximately 2m depth of the existing vegetation within the otter boundary during the

construction. However as the vegetation is approximately 10 m deep along most of the shoreline and will be replaced immediately with new planting of hedgerow/scrub native plant species this is not anticipated to have a significant effect.

Construction of the surface water outfalls will require removal of vegetation and excavation along the line of each pipeline though the otter boundary at 5 locations. Outfall 1 (at western end of the development) is located where there is an existing gap in the hedgerow. Outfall 2 and 3 will require localized (up to 10 m width) removal of vegetation. Outfall 3 is also located close to (approximately 10-20m) from a resting holt within the hedgerow along the northern shorelines. This holt is "manmade" as it is located in a cavity created by rubble (large concrete blocks) which have become overgrown with vegetation. Outfall 4 does not required scrub vegetation removal as it is coated near the otter pond where the shoreline boundary is composed of meadow grassland. Outfall 5 requires a 2m pipeline into the reedbed surrounded by scrub vegetation at the SE of the development site.

10.4.2 Otter habitat loss mitigation measures

To compensate for the loss of the existing pond, a new pond of similar area (293 m^2) will be constructed in the north east of the development site near the original pond. This new pond will be constructed prior to infilling of the original pond and its use by otters monitored to ensure acceptance of the new habitat. The existing pond will not be filled in until it has been established that otters are using the new pond through monitoring. Monitoring of otter activity at the new pond will be conducted by the detection of prints, spraints and by means of trail cameras if necessary to confirm use of the new pond. The pond will have scrub and hedgerow species (gorse, hawthorn and willow species) planted around it to provide privacy, shelter and screening from the development. Detailed design of the new pond is provided in Appendix E.

Vegetation removal to facilitate the construction of the retaining wall and the construction of the outfall pipes will be replaced immediately with hedgerow planting of native species including hawthorn, blackthorn and/or gorse.

10.4.3 Operational impacts on otter

In the absence of mitigation measures the development could lead to habitat loss for otter due to deterioration in habitat quality by disturbance to the habitat by people, dogs or illumination of the habitat by development associated lighting.

The marginal grassland, hedgerow and scrub habitats used by the otters will be retained with any breaches of the habitat to facilitate construction of the retaining wall and outfall pipes as outlined above replaced with native planting. The terrestrial habitat target for the otters outlined in the conservation objectives for otters (NPWS, 2011a) indicates that a 10 m buffer zone along the shoreline (above the high water mark) is crucial for otters. The design of this development has incorporated a minimum of 10 m buffer from the bank line along the shoreline within which the vegetation (hedgerow, scrub and grass areas) will be retained and replaced/enhanced with supplemental native planting where needed. There are some areas where more than 10 m is available to otters: e.g. around the new pond area, the area

adjacent to the reed bed in the south east of the development and around the proposed new sand/gravel embankment at the western end of the site.

This otter habitat area along the entire shoreline is to be fenced off from the built development. A gated entrance will be provided for maintenance by authorised personal only. The fencing is designed to discourage incursion on to the shoreline habitat by people and stray dogs. The fencing design includes a low wall (575mm in height) with a fence on top 1525 mm high. The total height of the combined wall and fence will be 2100 mm and will be planted with extensive planting of hawthorn. (See drawing no. RAU-ZZ-ZZ-DR-A-33016 for illustration). This fencing design will prevent dogs digging under the fencing and accessing the otter habitat and people climbing over the fence. Additional native hedgerow planting along the development side of the boundary fencing will further screen and buffer the otter habitat from the development (see Carcur landscape plan).

The proposed lighting scheme has been designed using directional LED lighting avoiding illumination of the shoreline habitats. The external lighting and lux level layout (W1810-External Lighting Design, Douglas Carroll Consulting Engineers) illustrates the resulting lux levels at the boundary of the built land element of the development. In general, at the outer boundary of the perimeter road, lux levels are low ranging between approximately 1.4 to 4.9 lux. These levels are for the outer boundary of the road and would decrease further with distance from the light source towards the shoreline vegetation. There is a localised area of 8.1 lux at the southeast corner of the site. At the south east corner of the site existing tall vegetation will serve to shield lighting from the shoreline or reed bed area.

Additional planting incorporated into the landscape design along the boundary of the development will further help to shield the shoreline habitats from obtrusive light. Therefore lighting associated with the development is not anticipated to contribute to indirect habitat loss or disturbance to otter.

There will be no deterioration in water quality of the transitional waters adjacent to the site (Section 10.1.1) and therefore no impact on feeding resources available to the otter.

Residual effect

There will be no net loss in otter habitat area as a result of this development. The new pond may indeed provide a better resource for otters washing their coats as it will be a freshwater pond and not brackish. The new pond may provide additional feeding resources as frogs may use the freshwater pond. The current pond is thought to be not suitable for frogs due to it brackish nature. The areas used as couch sites and holt sites at the margins of the development site will be retained secure from disturbance meeting the conservation objectives and targets set for otter in the Slaney River valley SAC. The extent of vegetation retained at the site is shown in the aerial overlay below.

Plate 1 Layout of development overlaid on satellite imagery showing the extent of vegetation retained at the margins of the site

10.4.4 Disturbance to otter due to construction activities

Construction activities on the development site have potential to cause disturbance and potential displacement to otter during construction particularly if a natal holt was established in the area. However, no evidence to indicate the presence of a natal holt was found during the otter surveys.

Construction of the retaining wall along the otter boundary and the pipeline outfalls may cause disturbance to otter however as construction activities will take place during the day time when otter are least active this disturbance is anticipated to have a temporary slight negative impact on otter and is not anticipated to have a significant negative impact on the conservation status of the local otter population.

Temporary and localized increases in the night-time lighting of the site, including facilitating working in winter or security lighting at site compounds during the construction period, has the potential to adversely impact on otter.

Mitigation measures are proposed below to avoid any significant disturbance impact to otters near the site and therefore no significant impact to otters is anticipated due to the construction activities on site.

Construction is scheduled in four phases. Therefore, the level of construction activity will be reduced to smaller areas and the construction activity less than if the whole site was developed at one time. This will also help to minimise disturbance to otter during construction.

10.4.5 Otter disturbance mitigation measures

Having regard for *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (NRA, 2006) the following measures will be implemented to mitigate potential disturbance to the otter during construction:

- A project ecologist will be appointed to the project to oversee the implementation of the mitigation measures to prevent disturbance to otter.
- Prior to construction of the berm, the retaining wall and the installation of the surface water pipelines to the estuary and prior to each phase of construction commencing, a preconstruction otter survey will take place to identify any changes in otter activity and holt locations since previous otter surveys. The area of survey will include the development site, particularly the shoreline and up to 250 m from the boundary of the site upstream and downstream along the shoreline. The preconstruction survey will take place no more than 10-12 months in advance of construction.
- This preconstruction survey will be supplemented by a further inspection of the development area, immediately prior to site clearance or site infill to ensure that no new holts have been created in the intervening period and to check if any of the previous identified potential holts are in active use by breeding females or have otter cubs present.
- The preconstruction otter surveys will inform site-specific measures to avoid disturbance to otter at the time of construction and these will be agreed with the NPWS.
- Should an active breeding holt be identified on the shoreline adjacent to the development site then a temporary buffer zone of 150 m will be established between the holt and construction activities. No works will be permitted within 150 m of the holt site until the female and cubs have vacated the holt. In the event that this is not feasible, then consultation will take place with the NPWS and appropriate mitigation measures to avoid disturbance to the otters will be implemented under derogation licence.
- The retaining wall will be built along the otter habitat boundary and temporary fencing will be fixed to this until the permanent shoreline wall and fenceline is constructed for each completed phase of the development. Security fencing around each phase of development will prevent access to other non-developed parts of the site and the shoreline.
- This otter habitat boundary line establishes otter habitat as a minimum of 10m from the high water mark along the northern and eastern boundaries of the site with additional areas provided as otter habitat around the new pond, around the reedbed and at the western end of the site as per site layout plan (Drawing: RAU-ZZ-ZZ-DR-A-31006). This will prevent any incursion by construction machinery or site workers into the otter habitat. The fence will also serve to eliminate the potential for otters to move into the development site

- No works involving wheeled or tracked vehicles will take place within 20 m of an active but non-breeding holt. No scrub clearance or digging will take place within 15 m of such holts except under licence. Temporary fencing will be erected at 20 m excluding works around active holt sites.
- Any temporary external lighting proposed for construction on the site will be sensitive to the presence of otter along the shoreline boundary of the site. Lighting of the site during construction will be designed so as not to overspill on to the shoreline habitats and will be designed in accordance with the following guidance: -

    - Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2011);
    - Bats & Lighting - Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, 2010);
    - Bats and Lighting in the UK – Bats and the Built Environment Series, Bat Conservation Trust UK

Residual effect

Temporary slight disturbance impacts to otter are anticipated during the construction of the retaining wall, the new pond and installation of the outfalls for the pipeline. This slight disturbance impact is not anticipated to cause a significant negative effect to otter due to the temporary nature of the works and the fact that construction work will be carried out during the daytime when otters are least active . With the implementation of mitigation measures to avoid significant disturbance to otter during the construction phase, no significant negative impact from disturbance is anticipated.

10.4.6 Ongoing disturbance to or displacement of otter due to residential activities

It is not anticipated that ongoing disturbance due to residential activities would have a significant impact on the otter. The otter habitat comprising the banks adjacent to the shoreline, the pond area and the associated hedgerow and scrub habitat will be retained. The scrub and hedgerow provide good cover for the otter. Otters are most active at night and early morning when residential activity would be expected to be lowest. The wall and fence will serve to prevent access to the otter habitat by people or dogs which could cause disturbance to otters.

Furthermore, construction of the development is scheduled in four phases. Therefore the level of human activity on site will gradually increase over time so that if human activity and change in the environment conditions is detected by otter this will be more gradual than if the site was developed all at once. Otters may then habituate gradually to any human activity/traffic noise etc. that they detect.

The finding of no significance disturbance to otters is supported by the literature. The most recent monitoring survey of otters conducted in 2010/2012 by Reid *et al.* (2013) indicates that “while it is a general perception that otters are negatively affected by poor water quality there has been little published evidence demonstrating any consistent relationship with pollution or human disturbance”.

The conservation status of otters is favourable with a short term trend of increasing population (NPWS 2019b). No significant threats to the national conservation status of otters were listed in the Article 17

assessment 2019 (DAHG, 2019). The main localised threats to the otter include diffuse and point source pollution and accidental deaths (road traffic and fishing gear). These threats are considered to produce local impacts only and are not considered to have a significant effect on the overall national conservation status of otter (NPWS, 2019).

Road kill is not a potential threat associated with this development. The fence line will exclude otters from accessing the development site and in any case as a residential development speed limits will be imposed so that road kill does not represent a significant threat.

Four national surveys have been conducted to date. The first in 1980/81 found signs of otters throughout the country, at 88% of sites surveyed. There was some suggestion of declines in the survey results of 1990/91 and 2004/05 but the most recent survey (2010) indicated recovery to 1980 levels.

The otter is widespread in Ireland, occupying lotic and lentic freshwater systems from headwaters to estuaries, remote mountain lakes to city canals. It is also present along the coast including many off-shore islands (NPWS 2019). In the national conservation assessment in 2019 of habitat availability expert judgement was used to assess habitat availability/quality based on overall assessment of riparian, lacustrine and coastal waters, the species' catholic and adaptable diet, plus the widespread nature of otters and the apparent population recovery seen over the short term. Given the widespread and adaptable nature of the otter habitat availability/quality is not considered to be or to have been a limiting factor in the species' range. Hence, the underlying trend in habitat is assumed to have remained stable.

Research on the otter population in Cork city was conducted by Sleeman and Moore (2005) to confirm the presence of otters in Cork City and to map their distribution across the city. Cork City is a useful comparison to Wexford as its location on a tidal estuary is similar to Wexford town.

The research confirmed the presence of otters in the city all year round and the city centre appeared to be a focus for sprainting activity. This research showed that even urbanised islands are attractive to otters. The authors' state that this is further evidence that the otter is very tolerant of indirect forms of disturbance.

Sleeman and Moore (2005) cite further examples of otters in Irish urban areas: in Dublin (Lunnon, 1996), Belfast (Macloughlin, 1949), Limerick City Centre and Athlone (Chapman and Chapman, 1982) otters are still being found in smaller Irish towns. Urban otters are also being reported from towns and cities in England and breeding has been reported from several urban areas there (Chanin, 2003).

More recent research by White et al (2013) used non-invasive genetic sampling (NGS) for otters in Cork City to investigate otter population size, sex ratio and genetic diversity. Their results indicate relatively high numbers of otters were found in the city centre but further research is required to establish whether all of them are resident in the city centre. Otters may be using the city as an important corridor between freshwater and marine habitats to increase resources and foraging opportunities. White *et al* (2013) consider that the high number of otters in Cork City, along with similar findings by Park *et al* (2011), challenges the assumption that cities are poor habitats for otters.

Sleeman and Moore (2005) present threats to otters in Cork City as road traffic, toxicants, oil spills and dogs. Various records of road kill were cited particularly near holt sites and wooded sites. Clearly road traffic presents a threat to otters particularly near holt sites. Toxicants may make otters more prone to traffic accidents by debilitating the otters. Domestic dogs, which are numerous in Cork City, are known to attack and kill otters.

The research cited above would suggest that otters persist in urban habitats. Threats associated with the urban environment, including the presence of dogs and risk of road kill, will be mitigated by the fence bordering the site which will prevent regular access to the otter habitat by dogs and will prevent otters from accessing the development site or the residential area when built.

A monitoring programme for otter post construction has been detailed in the EIAR. The monitoring programme will provide valuable information on the otter population at Carcur and the data and results of that monitoring programme can be used to inform impact assessments on otter for future developments in Wexford.

Therefore, it concluded that there will be no negative impact on the otter population due to disturbance or displacement of otters caused by residential activities in the area and the conservation objectives and targets for otter will be met.

10.5 Impact from the potential spread of invasive plant species

10.5.1 Invasive plants species on and near site

The legally controlled invasive plants Japanese knotweed (*Fallopia japonica*) and three-cornered leek (*Allium triquetrum*) are present on site. Japanese knotweed is located along the southern boundary adjacent to the treeline bordering the rail line. This is a tall stand of approximately 30x5 m with further numerous stems spreading into the site. There is another stand of Japanese knotweed off site on the edge of the GAA pitch close to the existing bridge onto the site. Further areas of Japanese knotweed were noted along the existing road infrastructure into the GAA grounds.

A small clump of three-cornered leek is located on the earthbank (BL2) along the northern boundary and several clumps in the disturbed ground (ED3 habitat) in the centre the centre of the site. The presence of these invasive plant species is mapped and illustrated in the habitat map (Figure 5 above).

The spread of these species to the shoreline habitats could have a negative impact by outcompeting native species and contributing to bank erosion. The spread of these species in controlled and subject to regulation under Section 49 of the Birds and Habitats Regulations 2011.

Other medium impact invasive plant species that are not subject to legal control include winter heliotrope (*Petasites fragrans*) and butterfly bush (*Buddleia davidii*). The impact from potential spread of *Buddleia davidii* is not considered a significant threat but the spread of winter heliotrope to the shoreline could negatively impact shoreline habitats.

10.5.2 Risk of importation of invasive plant species

The site requires infilling to raise the level of the site. Material will be sourced from other construction projects and will be composed of soil and rock. There is a risk of invasive plant species being imported onto the site with infill transported onto the site. The spread and transportation of invasive plant species listed on Schedule 3 or soil contaminated with invasive plant material listed on Schedule 3 is legally controlled under Section 49 of the Birds and Natural Habitats regulations 2011. The risk of introduction of invasive plant species onto the site within infill is therefore reduced. However, it is possible that material/soil contaminated with invasive plant material could be imported if they were not previously identified.

To mitigate this risk, the development site will be monitored during the construction phase and post construction for the growth of invasive plant species. (See more detail in section 10.5.3 below).

10.5.3 Mitigation to control the spread of invasive plant species

The risk of spread of invasive plant species present on the site within the site or to the shoreline habitats will be minimised by the implementation of an appropriate invasive species management plan. The invasive species management plan will be compiled and implemented by an experienced invasive plant species specialist and will be agreed with NPWS prior to the commencement of construction. The invasive species management plan will prevent the spread of these species within or outside the site.

The invasive species management plan will:

- Identify and map all locations of Japanese knotweed, three-cornered leek and winter heliotrope within the site and any other invasive plant species that is identified.
- Establish exclusion zones around the invasive plant species to prevent incursion by construction vehicles and personnel onto areas containing invasive plant species.
- Present control and eradication options for the treatment of the invasive plant species and in particular Japanese knotweed, e.g. herbicide treatment, stockpile and bund method or burial. (Note as the site will be infilled burial may be an option but this would be subject to consultation with the local authority and the NPWS).
- Implement appropriate measures to treat and prevent the spread of Japanese knotweed, three-cornered leek and winter heliotrope within or outside of the site during the construction phases.
- Carry out prompt reseeding and landscaping of the site as construction progresses to prevent the re-growth and spread of winter heliotrope.
- Monitor undeveloped areas between phases of development for the growth of invasive plant species including Japanese knotweed, three-cornered leek, winter heliotrope and other invasive plant species, and carry out appropriate treatment (removal or control with herbicide) by a suitability qualified contactor certified in the professional use of pesticides.

With the implementation of the above mitigation measures, the risk of spread of invasive plant species will be minimised and therefore no impact from the spread of invasive plant species on the habitats of the SAC is anticipated.

11 Potential impacts on the Wexford Harbour and Slobs SPA and the Raven SPA

11.1 Introduction

This section assesses the potential impacts of habitat removal and disturbance on the screened in SCIs of the Wexford Harbour and Slobs SPA and the Raven SPA.

The potential water quality impacts have been assessed in Section 10 above. This has concluded that the proposed development will not cause significant impacts to surface water quality. Therefore, no further assessment of water quality impacts in relation to potential impacts on the SCIs is required.

Artificial light is likely to have positive impacts on waterbirds in intertidal habitats by enhancing the efficiency of nocturnal foraging (Dwyer et al., 2013) and may also reduce predation risk to roosting birds (cf. Gorenzel and Salmon, 1995). Therefore, detailed assessment of the potential impact of light overspill from the proposed development is not required.

11.2 Habitat removal

The proposed development will remove all the scrub/rough grassland habitat from the interior of the site. This provides potential foraging habitat for Hen Harriers. Given the proximity of the roost site it is likely that Hen Harriers use this habitat at times. However, there were no observations of Hen Harriers hunting over the site during the bird survey work (a total of nine days on site), or during other ecological survey work carried out for this assessment. Therefore, any usage of the site by Hen Harriers is likely to be irregular at best. Furthermore, Hen Harriers range widely in winter and can regularly forage up to 10 km from their roost sites. Therefore, for the above reasons the loss of this habitat is not considered likely to cause a significant decline in the extent of suitable foraging habitat for the Wexford Harbour and Slobs Hen Harrier population.

The terrestrial habitat within the development site is not used by any of the other SCI species. There will be no removal of intertidal or subtidal habitat. Therefore, there will be no impacts from habitat removal on any of the other SCI species.

11.3 Habitat disturbance

Four stormwater outfalls will be constructed that will discharge into the tidal habitats to the north of the development site. These outfalls will consist of buried pipes that will discharge to the permanent subtidal zone. Installation of these outfalls will involve disturbance to sediments along the corridor around 10 m wide along the length of each outfall. The total area of intertidal habitat disturbed will be 0.08 ha. This amounts to around 0.1% of the mapped area of intertidal habitat in the Ferrycarrig subsite under moderate spring low tide conditions (see Fig. 2). As the outfalls will discharge to the permanent subtidal zone, there will be no long-term impacts to the intertidal habitat through scouring, etc.

A study by Lewis et al. (2002, 2003) found temporary impacts on benthic fauna from pipeline construction in Clonakilty Bay, with good recovery 6-12 months after the impact. There was also reduced usage of the impacted area by foraging waterbirds, which may have lasted longer than the impact on the benthic fauna. However, there was increased usage by roosting waterbirds, which was considered to be due to the disturbed area providing shelter or camouflage. Based on this study, it can be predicted that the construction of the stormwater outfalls will cause temporary loss of foraging waterbird habitat. However, the magnitude of the impact will be very small, due to the very small area involved, and the fact that the count sector (S4) in which the impact does not hold large numbers of waterbirds. Therefore, the habitat disturbance associated with the construction of the stormwater outfalls will not cause significant impacts to any waterbird species.

11.4 Disturbance

11.4.1 Potential impacts of disturbance

Disturbance impacts can affect bird populations in two ways. If disturbance levels are intense enough, birds may completely abandon an area and the disturbance impact is, therefore, analogous to habitat loss. At lower disturbance intensities, birds may continue to use an area but may suffer energetic impacts due to loss of foraging time and energy expended in evasive behaviour.

For disturbance to cause displacement impacts, the disturbance pressure will have to operate over a wide area (relative to the size of the site) and be more or less continuous. For disturbance to cause significant energetic impacts, birds must be disturbed with sufficient frequency, and/or forced to engage in energetically expensive evasive behaviour (e.g., long flights, or extended interruption of feeding). Various modelling studies have indicated that multiple disturbance events per daylight hour are required to cause impacts on wader survival rates (Goss-Custard et al., 2006; West et al., 2006; Durell et al., 2008).

11.4.2 Disturbance pressure

There is existing human activity within the site. The site is used as an informal recreation area, and people were observed walking in the site and/or along the eastern shoreline of the site on four of the eight count days. While some of these observations only refer to people seen in the interior of the site, it is likely that all the visitors to the site would walk to one, or more, of the shoreline areas. Higher levels of activity may occur at weekends (all the count days were during the week). Bait digging was recorded on the spit off the north-eastern corner of the development site on the one count day with spring low tide conditions when extensive intertidal sediment were exposed here.

The proposed development will clearly cause a major increase in levels of human activity within the site. This will occur both during the construction period and in the operational phase. During the construction period, major construction work will take place in close proximity to the shoreline. During the operational phase, there will be 419 households on the site, and people will use the green areas within the site for recreation, etc.

11.4.3 Sensitive species

The SCI species that regularly use the intertidal and/or subtidal habitat adjacent to the development site are Cormorant, Grey Heron, Little Grebe, Oystercatcher, Curlew, Black-tailed Godwit, Redshank and Black-headed Gull. Little Grebe exclusively use subtidal habitat. Grey Heron, Oystercatcher, Curlew, Black-tailed Godwit and Redshank exclusively use intertidal habitat. Cormorant mainly uses the subtidal habitat but occasionally uses the shingle spit at the eastern end of S4 as a daytime roost. Black-headed Gull uses both intertidal and subtidal habitat.

11.4.4 Disturbance responses

Intertidal habitat

A study of the disturbance responses of waterbird species in intertidal habitat adjacent to the development site was carried out for this assessment. The full results from this study are included in Appendix C. A summary of the main findings relevant to this assessment is provided below.

The study found that, across all species, the modal direct response distance (RD) of birds flushed by walking along the shoreline was 50-75 m, and 85% of observations of birds flushing were at direct RDs of 150 m or less. Although the data was limited, Curlew appeared to have relatively large direct RDs with all four observations at distances of more than 150 m. The modal direct RD at which birds showed no response was 100-150 m, while birds could tolerate approach to within 25-50 m. On 29/09/2015, there were two bait diggers working off the shingle spit and there were 6 Oystercatcher and 36 Black-tailed Godwit feeding within 25-50 m, and 26 Redshank feeding within 50-75 m of the bait diggers. Similarly, these birds did not flush when the surveyor walked along the shoreline at similar distances from the birds.

As well as recording direct RDs, the disturbance study also recorded lateral RDs, which are the perpendicular distance from the shoreline. The reason for distinguishing between direct and lateral RDs is that birds are more likely to flush when they are in the direct path of the disturbance source. Therefore, a bird on the shoreline may flush at a long direct distance (with the lateral distance being zero), while the same bird on mudflats adjacent to the shoreline may tolerate approach to a much closer distance as the walker passes along the shoreline. The lateral RDs are probably more informative about the potential disturbance impacts because they indicate the width of the intertidal zone that will be potentially affected by disturbance.

Observations of lateral RDs during the disturbance study were limited, as they were only possible when there was sufficient exposure of intertidal mud. However, apart from Shelduck and Curlew, all the observations were at lateral RDs of 75 m or less.

Where the destination to which flushed birds moved was recorded, 63% of observations involved birds moving out of the sector. These usually involved birds moving between the two sectors immediately adjacent to the development site. Movements of birds to the sectors to the east and west and across the estuary to the opposite shore were also recorded quite frequently. There were only two observations of more distant movements.

Subtidal habitat

Waterbird species using subtidal habitat are generally less sensitive to disturbance impacts from shore-based activities and their disturbance responses were not systematically recorded during the survey work carried out for this assessment. Most observations of birds in subtidal habitat adjacent to the development site involved birds well out from the shoreline, and these birds showed no obvious disturbance response. On some occasions, Little Grebes that were close into the shoreline swam out a short distance as a disturbance response. There were also occasional incidents of Black-headed Gulls that were roosting on subtidal habitat close to the shoreline being flushed and resettling a short distance away.

11.5 Construction impacts

11.5.1 Potential impacts

Burton et al. (2002) studied the effects of disturbance from construction work associated with major development work on waterbirds in Cardiff Bay. Construction work caused significant impacts to birds on adjacent areas of mudflats with reductions in densities of five species (Teal, Oystercatcher, Dunlin, Curlew and Redshank) and in the feeding activity of three of these species (Oystercatcher, Dunlin and Redshank, and possibly also Curlew). The only species (of those studied) that was not affected by construction work was Mallard. The study was based on observations of bird numbers and behaviour in a number of count sectors and the results (as presented) do not indicate the distance over which the disturbance effects operated. However, the count sectors that were assessed as being disturbed by construction activities extended over distances of up to 500 m from the relevant construction site. Therefore, it is reasonable to assume that the disturbance effects extended over distances of a few hundred metres, as if they were confined to a narrow zone adjacent to the construction site it is unlikely that they would have been able to produce effects that were detectable at the scale of the analyses of whole count sectors. However, the study does not report the effect size (the magnitude of the reductions in density). Furthermore, Cardiff Bay is not a very good analogy with the proposed development: the Cardiff Bay development involved multiple major development projects (including the Cardiff Bay barrage, road/bridge construction, land reclamation, hotel and housing development) at a number of locations around the bay, several of which involved work directly adjacent to, or even extending on to, the mudflats. By contrast, the Carcur Park development involves a single construction location that adjoins a relatively small amount of the total extent of intertidal habitat in the Ferrycarrig subsite.

In contrast to Burton et al. (2002), other studies have reported reduced, or less clear-cut, impacts from major construction work.

The effects of the construction of the Mutton Island WWTP in Galway Bay on a high tide wader roost on this island have been reported by Nairn (2005). This study found no negative effects of construction disturbance. The development of the WWTP introduced access controls to the island and the numbers of bird using the roost actually increased due to reduced pedestrian disturbance.

Dwyer (2010) studied the effect of construction of major road bridge in the Firth of Forth (Scotland). Two species (Cormorant and Redshank) showed significant reductions in numbers in count sectors adjacent to the bridge, with a reduction of around 30% in Redshank numbers. Other species showed mixed patterns,

depending on tidal state, showing increased numbers in count sectors adjacent to the bridge at certain tidal stages. The reductions in Cormorant and Redshank numbers were considered to reflect disturbance to their roost sites (low tide roost in the case of the Cormorant and high tide roost in the case of Redshank), which, for Redshank, may also affect their use of habitat at low tide as they tend to feed close to their roost sites. However, given that the study did not find consistent patterns across a number of species indicating displacement due to construction disturbance, it may not be appropriate to interpret the effects on Cormorant and Redshank as being proof of displacement impacts caused by construction disturbance.

Cutts and Allen (1999) and Cutts et al. (2009) report on the responses of waterbirds to flood defence works in the Humber Estuary (England). They found that disturbance impacts were related to the presence of people and the visibility of the works: piling activity behind a seawall had no apparent impact, while once the work extended onto the seaward slope, some impacts were noted. However, even then the impact was minor with birds continuing to feed around 200 m from the piling operations. Similarly, in another study in the Tees (England), percussive piling had no apparent effect on waterbirds in a mudflat 270 m from the piling location (quoted in PD Teesport and Royal Haskoning, 2007). Based on their research, and research on disturbance by military activities summarised by Smit and Visser (1993), Cutts and Allen (1999) suggest that noise levels in excess of 84 dB(A) cause flight responses in waterbirds, while below 55 dB(A) there is no effect, with a "grey area" in between. This assessment was refined by Cutts et al. (2009), who classified noise levels of below 50 (dBA) as having no effect, 50-70 dB(A) as having a moderate effect ("head turning, scanning behaviour, reduced feeding, movement to other areas"), 70-85 dB(A) as having a moderate-high effect, and above 85 dB(A) as having a high effect ("maximum responses, preparing to fly away and flying away, may leave area altogether"). They recommended that "ambient construction noise levels should be restricted to below 70 dB(A), birds will habituate to regular noise below this level", while "sudden irregular noise above 50dB(A) should be avoided as this causes maximum disturbance to birds".

Wright et al. (2010) investigated the response of waterbirds to experimental impulsive noise. They reported the following ranges of responses to various noise levels:

- No observable behavioural response: 54.9-71.5 dB(A) (with a high proportion of extreme outliers).
- Non-flight response: 62.4-79.1 dB(A).
- Flight with return: 62.4-73.9 dB(A).
- Flight with all birds abandoning the site: 67.9-81.1 dB(A).

It should be noted that both Cutts et al. (2009) and Wright et al. (2010) acknowledge limitations to the general applicability of the thresholds they specify. But these do provide some useful indication of the range of noise levels where impacts may occur, and 55 dB(A) has been used as a threshold noise level for assessing potential impacts in various assessments of potential impacts to waterbirds from development projects (e.g., the York Field Development Project; Rose, 2011).

Therefore, while the Cardiff Bay study indicates that disturbance impacts from multiple major construction projects could cause statistically significant displacement impacts (but of unknown

magnitude) over a distance of several hundred metres from the development site, studies of single construction projects do not provide strong evidence of large displacement impacts.

11.5.2 Impact assessment

Noise disturbance to intertidal habitats

As discussed above, a range of noise levels have been identified as potentially causing disturbance to waterbirds. It is also necessary to take into account the degree of habituation to noise, which will vary from site to site, depending upon the existing noise environment. The research evidence on this subject was reviewed by Cutts et al. (2013), and they have identified general threshold noise levels for varying degrees of impacts, which also take into account habituation effects (Table 12). These threshold levels have been used for the purpose of this assessment.

Table 12: Threshold levels for assessing noise disturbance effects on waterbirds

Impact category	Response	Thresholds
High level	Regular responses to stimuli with birds moving away from the works to areas which are less disturbed (within noise tolerances). Most birds will show a degree of response to noise stimuli. Birds that remain in the affected area may not forage efficiently and if there are additional pressures on the birds (cold weather, extreme heat etc.) then this may impact upon the survival of individual birds or their ability to breed.	above 60 db (sudden noise event) above 72 db (prolonged noise)
Moderate level	High level noise which has occurred over long periods so that birds become habituated to it or lower level noise which causes some disturbance to birds	above 55 dB (occasional noise events) 60-72 dB (regular noise) above 72 dB (long-term regular noise)
Low level	Unlikely to cause response in birds using a fronting intertidal area	less than 55 dB 55-72 dB in some highly disturbed areas

Source: Cutts et al. (2013).

The existing noise levels in the vicinity of the development site were measured as part of the noise assessment for this project (see EIAR chapter 5). In the three locations measured the average noise levels (L_{AEQ}) were: 52-54 dB in location S01, 56-57 dB in location S02 and 48-54 dB in location S03 (see Figure 6 for locations). While there were no direct measurements of noise levels in the tidal habitat adjacent to the development site, these noise levels indicate that the birds using this habitat are unlikely to have become habituated to high, or moderate, level noise.

Information on projected noise levels from construction work within the site have been supplied by AWN Consulting (who carried out the noise assessment for this project). For each element of works, based on the worst case assumption that all activity is occurring on the boundary of the site concurrently, the distances at which the threshold levels would occur are shown in Table 13. Noise levels above 72 dB are predicted to not extend more than 20 m beyond the site boundary. As there will be an undeveloped buffer at least 10-15 m wide, this means that, effectively, there will be no high level noise impacts to waterbirds in the adjacent tidal habitat. Noise levels above 60 dB are predicted to extend up to 55 m beyond the site boundary, while noise levels above 55 dB are predicted to extend up to 90 m beyond the site boundary.

The extent of habitat potentially affected, based on these distance bands are shown in Figure 6. As the construction noise involves regular noise, rather than occasional noise events, the 55 m distance is more relevant. Therefore, it can be concluded that the maximum likely construction noise impact will be a moderate level impact to the intertidal habitat in S4 and S5.

Table 13: Buffer distances for specified noise levels from construction work in the development site			
Element	**Construction Noise Level (m)**		
	55dB $L_{Aeq(1hour)}$	**60dB $L_{Aeq(1hour)}$**	**72dB $L_{Aeq(1hour)}$**
Site Preparation	85 m	55 m	<20 m
Foundations	90 m	55 m	<20 m
General Construction	85 m	55 m	<20 m
Landscaping	75 m	50 m	<20 m

See text for assumptions.

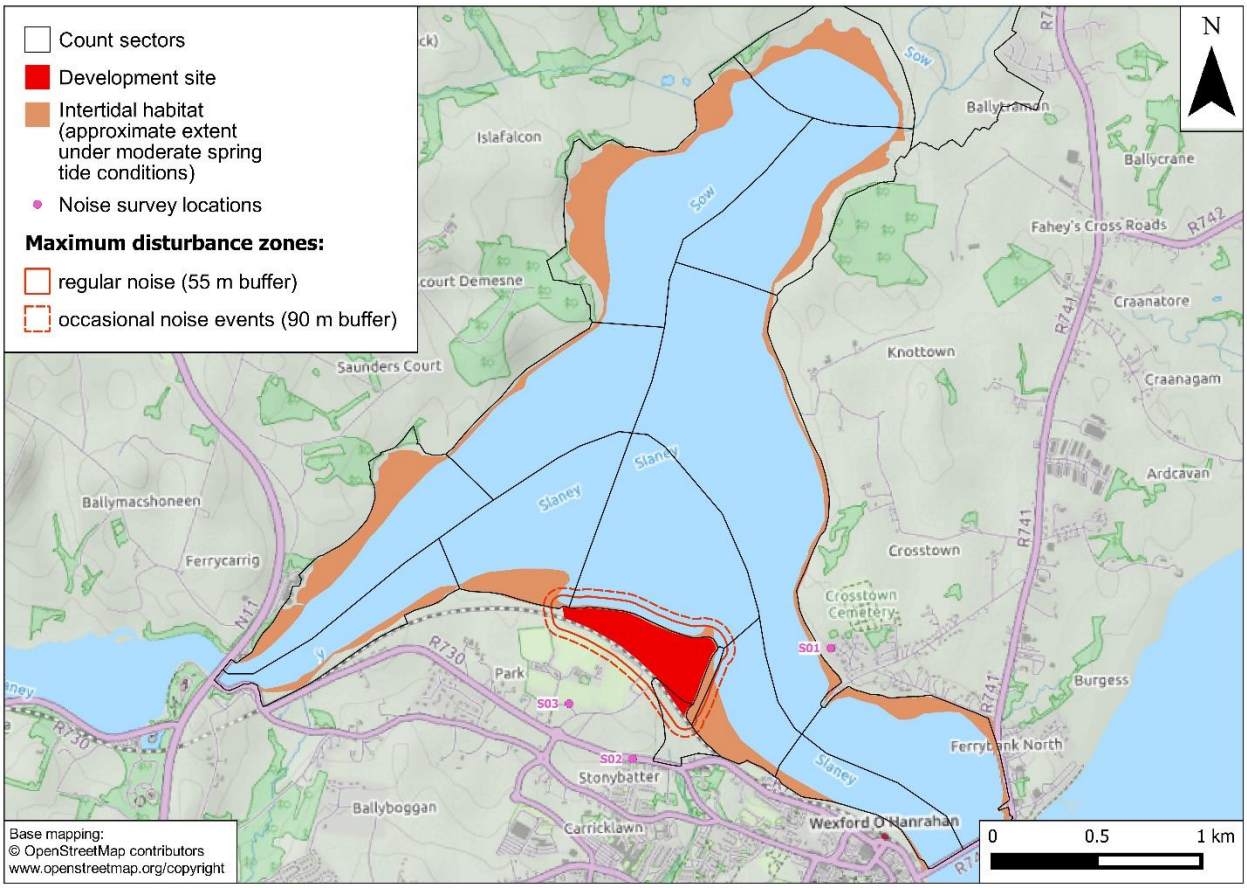
Source: Ronan Murphy, AWN Consulting.

Based on the mean percentages of the Ferrycarrig subsite populations of the relevant species in the relevant sectors during the 2015/16 low tide counts, and the mean percentages of the Wexford Bay populations recorded in the Ferrycarrig subsite during the 2009/10 WSP programme, and assuming that these noise impacts caused complete displacement of birds from the affected areas, the potential displacement impact can be estimated. These calculations indicate that around 1-16% of the Ferrycarrig populations, and up to around 1% of the Wexford Bay populations, of the affected species would be displaced (Table 14). There are a number of uncertainties in the waterbird data used for calculating these potential displacement impacts. However, this is an extreme worst-case scenario due both to the assumptions made for the noise predictions (see above), the fact that development will take place in phases so only a proportion of the site will have active construction work at any one time, and the fact that moderate level noise impacts are generally unlikely to cause complete displacement of birds from the affected areas. Therefore, taking these factors into account, it can be concluded that construction noise is unlikely to cause significant disturbance impacts to any of the waterbird species covered by this assessment.

Table 14 - Worst-case scenario displacement impact due to construction noise disturbance				
Species	**Sensitivity to noise disturbance**	**Number of birds displaced**	**% of Ferrycarrig population displaced**	**% of Wexford Bay population displaced**
Grey Heron	-	1.5	10%	1.2%
Oystercatcher	moderate	13.6	16%	1.2%
Curlew	moderate	1.3	1%	0.1%
Black-tailed Godwit	moderate	7.5	1%	0.2%
Redshank	high	11.0	3%	0.8%
Black-headed Gull	-	9.6	2%	0.2%

Sensitivity to noise disturbance as categorised by Cutts et al. (2013).

Figure 6. Approximate extent of intertidal and subtidal habitat potentially disturbed by construction noise disturbance from the development site



Visual disturbance to intertidal habitat

The potential impact of visual disturbance from construction work on waterbirds using the adjacent tidal habitats will depend upon the degree of visibility of the work. The retention of the buffer zone vegetation will provide some screening, but there are some gaps in this vegetation, while the height of the buildings, and the raising of ground within the site, will mean that some of the work will be visible above this vegetation. In particular, the proposed apartment blocks in the north-eastern corner of the development site overlook the shoreline and construction work on these apartment blocks may have a high degree of visibility to waterbirds in adjacent tidal habitats. The construction work will take place in phases. This means that at any one time only a section of the development site will have the potential to cause visual disturbance from construction work.

The potential impact of visual disturbance from construction work to waterbirds has been summarised by Cutts et al. (2013) and they provide species-specific buffer distances indicating potential sensitivity to disturbance from construction work. These distances have been used to calculate the potential worst-case scenario of displacement impacts on intertidal habitats due to visual disturbance from construction works, taking account of the phasing of the construction work. These calculations assume that there is no

screening of construction work so that all activity within the site is visible, the construction work is taking place at the perimeter of the site, and that all birds within the affected distance are displaced.

Table 15 shows the estimated displacement impacts, based on the mean percentages of the Ferrycarrig subsite populations of the relevant species in the relevant sectors during the 2015/16 low tide counts (adjusted for the relative area of the sector affected), and the mean percentages of the Wexford Bay populations recorded in the Ferrycarrig subsite during the 2009/10 WSP programme, and assuming that these visual disturbance impacts caused complete displacement of birds from the affected areas. The potential displacement impact varies from less than 1% of the Ferrycarrig population, and less than 0.5% of the Wexford Bay population, for Black-tailed Godwit, to around 8-11% of the Ferrycarrig population and 1% of the Wexford Bay population for Grey Heron and Oystercatcher. There are a number of uncertainties in the waterbird data used for calculating these potential displacement impacts. However, as a lot of the construction work will be screened by the retained vegetation and will not, therefore, cause any visual disturbance, and much of the work will be in the interior of the site, the actual displacement impact from visual disturbance is likely to be much less than that indicated in Table 15. Furthermore, while there is no specific information available on the habituation of waterbirds to construction work in Wexford Harbour, given the nature of the area with significant areas of the site adjacent to urban development, it is likely that waterbirds have some degree of habituation and may tolerate visual disturbance at closer distances than those indicated in Table 15.

The existing buffer zone vegetation will be retained, apart from removal of up to 2m adjacent to the otter fence for construction of retaining walls and the pump station. As the buffer zone is a minimum of 10 m wide, the retained buffer zone vegetation will provide substantial visual screening of the construction works from the adjacent tidal habitats, although raising of ground levels within the site may reduce the effectiveness of the screening. There are some gaps in this vegetation, particularly in the north-east corner of the site. Temporary fencing, or other suitable screening, will be used to fill in these gaps to minimise any visual disturbance to waterbirds from ground level construction activity within the development site.

Table 15 - Worst-case scenario displacement impact due to visual disturbance from construction works

Species	Sensitivity to visual disturbance	Buffer distance	Phase	% of Ferrycarrig population displaced	% of Wexford Bay population displaced
Grey Heron	**-**	**300 m**	**1**	9.2%	1.1%
			2	8.4%	1.0%
			3	8.4%	1.0%
			4	10.2%	1.2%
Oystercatcher	**moderate**	**200 m**	**1**	10.5%	0.8%
			2	10.8%	0.9%
			3	10.2%	0.8%
			4	7.6%	0.6%
Curlew	**moderate**	**300 m**	**1**	1.7%	0.1%
			2	1.4%	0.1%

Table 15 - Worst-case scenario displacement impact due to visual disturbance from construction works					
Species	**Sensitivity to visual disturbance**	**Buffer distance**	**Phase**	**% of Ferrycarrig population displaced**	**% of Wexford Bay population displaced**
			3	1.5%	0.1%
			4	1.7%	0.1%
Black-tailed Godwit	**moderate**	**250 m**	**1**	0.8%	0.3%
			2	0.6%	0.2%
			3	0.6%	0.2%
			4	0.9%	0.3%
Redshank	**low**	**100 m**	**1**	2.5%	0.6%
			2	1.7%	0.4%
			3	1.2%	0.3%
			4	2.2%	0.5%
Black-headed Gull	**-**	**300 m**	**1**	1.8%	0.2%
			2	1.3%	0.2%
			3	1.2%	0.1%
			4	6.1%	0.7%

Disturbance sensitivity and buffer distances from Cutts et al. (2013). For Grey Heron and Black-headed Gull, which are not covered by Cutts et al., the buffer distance for Curlew has been used, as that is the maximum distance given by Cutts et al.

Impacts to roost sites

There appears to be little information available about the impacts of construction disturbance on waterbird roost sites. Cutts et al. (2013) indicate that roosts may be sensitive to disturbance at distances of over 250 m. However, as discussed above, major construction work at Mutton Island in Galway Bay did not appear to have negative impacts on an adjacent high tide wader roost (Nairn, 2005).

Small high tide roosts of Oystercatcher and Redshank occur irregularly along the railway line in S3 (about 100-200 m east of the eastern side of the development site) and on the shingle bank at the southern end of S4. A small daytime Cormorant roost occurs irregularly on the shingle spit at the north-eastern corner of S4. Construction work in phase 1 may cause disturbance impacts to the Oystercatcher and Redshank roosts, while construction work in phases 1 and 2 may cause disturbance impacts to the daytime Cormorant roost. Construction work in phases 3 and 4 is unlikely to cause disturbance impacts to any of these roost sites.

The numbers of birds using these roost sites are very small. The Oystercatcher and Redshank roost on the opposite shore at the southern end of S13, while the Cormorant roost is only occasionally used. Therefore, temporary disturbance to these roost sites during construction work would not be likely to significantly affect the high tide roost capacity of the Wexford Harbour and Slobs SPA.

Impacts to subtidal habitat

Birds using subtidal habitats in the Ferrycarrig subsite are generally less likely to be sensitive to disturbance impacts due to the relatively much larger area of subtidal habitat that is available compared to the availability of intertidal habitat. While a small area of subtidal habitat is included within the 55 m construction noise buffer, the area included is so small relative to the overall extent of subtidal habitat (Figure 6) that impacts to species using subtidal habitat from construction noise can be discounted. Visual disturbance impacts could potentially affect somewhat larger areas of subtidal habitat. However, the species that regularly occur in the subtidal habitat adjacent to the development site (Cormorant and Little Grebe) either occur in very low densities in subtidal habitat across the entire Ferrycarrig subsite so plenty of alternative habitat is likely to be available for any birds temporarily displaced, or are likely to be relatively tolerant of disturbance impacts (Black-headed Gull). Therefore, any construction disturbance is unlikely to have significant effects on these species.

Little Tern could potentially feed in subtidal habitat adjacent to the development site during the summer months. However, tern species are generally very tolerant of human disturbance when foraging. Therefore, significant disturbance impacts from construction activity within the site are not likely to occur.

Impacts from installation of the stormwater outfalls

The above assessment does not include the construction of the stormwater outfalls, where they extend into tidal habitat outside the development site boundary. However, these works will be of very short duration, taking a total of 4-8 days, and will take place in summer. Therefore, any noise and visual disturbance impacts will be very short and will occur outside the main period of occurrence of the waterbird populations, so the impact will not be significant.

11.6 Operational impacts

11.6.1 Characteristics of impacts

Potential disturbance impacts during the operational phase will be generated by human activity within the site. The main potential disturbance source will be pedestrian activity close to the shoreline. There will be roads/paths within 20 m of the shoreline, while the closest houses to the shoreline will be within 30 m of the shoreline. Existing vegetation and proposed new landscape planting will screen some of the pedestrian activity in these areas from the shoreline.

The ground level within the site will be raised by around 1-2.5 m, relative to the existing height at the development boundary (Table 16). However, the existing scrub vegetation along the shoreline is generally tall enough, so that, even with the raised ground levels, it will still screen pedestrians from the immediately adjacent intertidal habitat, although there may be longer distance views over the top of the vegetation in places.

The proposed apartment blocks in the north-eastern corner of the development site overlook the shoreline and the upper stories of these apartment blocks may have a high degree of visibility to waterbirds in adjacent tidal habitats. However, waterbirds using the tidal habitats are unlikely to be very sensitive to visual disturbance from human activity in these apartment blocks due to the vertical separation between the upper stories of the apartment blocks and the tidal habitats.

New landscape planting of trees and shrubs will be carried out on the development side of the otter fence along most of the length of the shoreline apart from a short section at the extreme north-western corner of the site, a section to the west of the new pond, and along the southern half of the eastern shoreline (see landscape masterplan). The insertion of the wall will impact on some of the existing vegetation during the construction, this will be mitigated against by extensive new hawthorn planting along the length of the fence providing additional screening to the protected zone and softening the impact of the fence and acting as a secondary deterrent to anyone wishing to gain unauthorised access. The proposed otter protection fence at Public park A along the north western boundary will be extensively planted with hawthorn and mixed native tree species to provide good screening and a protective vegetation barrier.

Public Park D along the northern boundary will be extensively planted with native trees and hawthorn hedgerows to provide buffer to the otter habitat (Landscape Proposals for Carcur P. Nolan and D. Wildes, Landscape Planning and Design Consultancy).

Direct access to the shoreline itself will be prevented by fencing, but it is likely that some level of unauthorized access will take place (e.g., children climbing over fences).

Table 16 - Proposed changes in ground levels adjacent to the shoreline

Shoreline	Cross-section	Height above existing level (m)	
		existing level at development boundary	height of path above existing level at development boundary
North	A-A	2.2	2.2
North	B-B	2.4	2.4
North	C-C	1.3	1.3
North	D-D	2.3	2.3
North	E-E	1.7	1.7
North	F-F	2.2	2.2
North	G-G	1.2	1.2
East	H-H	1.2	1.2
East	I-I	0.8	0.8
East	J-J	1.0	1.0

Cross-sections are in clockwise sequence around the shoreline from the north-western corner of the site. The development boundary is the line of the otter fence. All heights taken from Arthur Murphy & Co. Shoreline Sections drawing number PL11 (received 20/07/2020). Where relevant heights were not shown on the drawing, they were read off from scaled measurements.

11.6.2 Impact assessment

Displacement impacts to birds using intertidal habitat

The results of the disturbance study indicate that, for Grey Heron, Oystercatcher, Black-tailed Godwit, Redshank and Black-headed Gull the maximum distance from the shoreline over which birds are likely to be disturbed by pedestrian activity within the site is 100-150 m, while disturbance of Curlew could take place over distances of up to 200-300 m. Therefore, the maximum area of intertidal habitat potentially

affected by disturbance impacts from the proposed development can be estimated by applying a 125 m buffer (Grey Heron, Oystercatcher, Black-tailed Godwit, Redshank and Black-headed Gull), or a 250 m buffer (Curlew) to the development site (Figure 7). These buffers would cover all the intertidal habitat within S4 and S5, around 26%, or 54%, of the intertidal habitat within S3, and around 19%, or 61%, of the intertidal habitat within S6 (based on the approximate extent of intertidal habitat exposed at low tide on a moderate spring tide; see Appendix C). The total area of intertidal habitat affected would be around 6 ha (Grey Heron, Oystercatcher, Black-tailed Godwit, Redshank and Black-headed Gull), or 11 ha (Curlew). This would represent around 8%, or 14%, respectively, of the total area of intertidal habitat within the Ferrycarrig subsite, and 2%, or 4%, respectively, of the total area of intertidal habitat in the Wexford Harbour and Slobs SPA (excluding the section upstream of Ferrycarrig Bridge). Based on the mean percentages of the Ferrycarrig subsite populations of these species in the relevant sectors during the 2015/16 low tide counts (adjusted for the relative area of the sector affected), and the mean percentages of the Wexford Bay populations recorded in the Ferrycarrig subsite during the 2009/10 WSP programme, the potential displacement impact can be estimated as shown in Table 17.

There are a number of uncertainties in the waterbird data used for calculating these potential displacement impacts. However, as the overall scale of the impacts are very small, and taking account of the fact that the WSP dataset will tend to overestimate the percentage occurrence of species in the Ferrycarrig subsite, it can be concluded that, even under the worst-case scenario, the scale of the potential displacement impact will be very small.

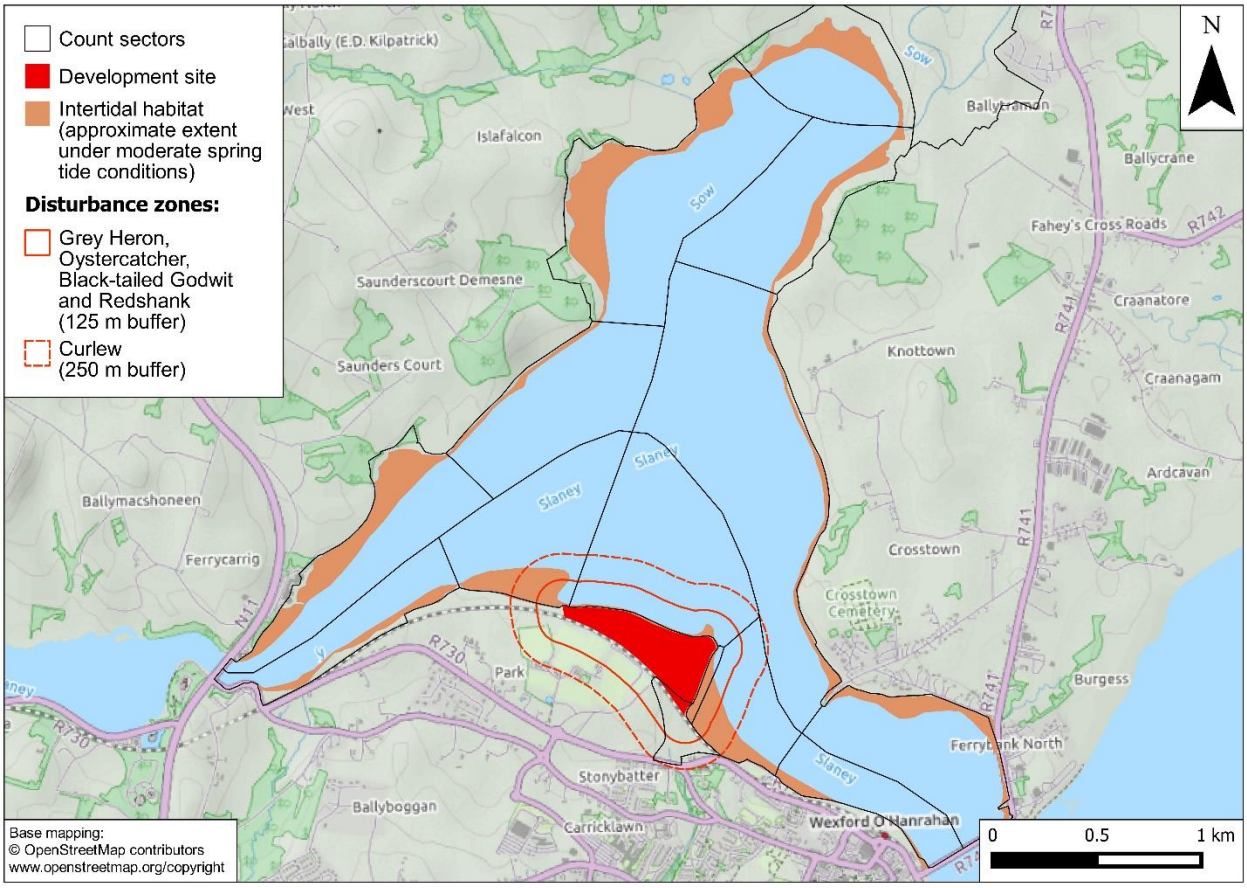
Table 17 - Worst-case scenario displacement impact due to operational disturbance

Species	Number of birds displaced	% of Ferrycarrig population displaced	% of Wexford Bay population displaced
Grey Heron	**1.3**	**3.8%**	**0.4%**
Oystercatcher	**13.6**	**1.2%**	**0.1%**
Curlew	**2.3**	**1.4%**	**0.1%**
Black-tailed Godwit	**10.6**	**0.5%**	**0.2%**
Redshank	**11.0**	**3.4%**	**0.8%**
Black-headed Gull	**17.7**	**2.0%**	**0.2%**

The above calculations represent an unrealistic worst-case scenario. There will not be continuous pedestrian activity along the shoreline, while the existing vegetation and the proposed landscape planting will screen a lot of the activity from the shoreline, when it does occur. Furthermore, given the physical separation of the pedestrian activity from the intertidal zone it is likely that, over time, birds will habituate to the activity and show reduced disturbance distances. Therefore, given the low levels of impact predicted under the unrealistic worst-case scenario, and the factors ameliorating this impact discussed

above, it is concluded that the pedestrian disturbance will not cause significant displacement impacts to any of the SCI species using intertidal habitat adjacent to the development.

Figure 7. Approximate extent of intertidal habitat potentially disturbed by pedestrian activity within the development site



Energetic impacts to birds using intertidal habitat

Even if birds are not displaced, disturbance could cause energetic impacts through birds stopping feeding and/or temporarily moving/flying away from the disturbance sources. The results of the disturbance study indicate that on most occasions when birds are disturbed in the intertidal habitat around the site, they will fly short distances to adjacent areas along the same shoreline, or to the shoreline opposite the north-east corner of the development site. Therefore, the energetic impact of a single disturbance impact will be minor.

Most of the completed development site will be screened from the adjacent intertidal area by the retained buffer zone vegetation and by additional landscape planting along the inside of the buffer zone. This means that there are only likely to be occasional disturbance impacts from activity within the site and, in combination with the likely minor energetic costs of responses to individual disturbance events, it is unlikely that such activity will cause significant energetic impacts to birds using intertidal habitat adjacent to the site.

There is also likely to be some degree of unauthorized access to the shoreline. If this becomes a regular feature, it is possible that it could cause a measurable degree of energetic impact to birds using this area. However, the displacement calculations above, show that any such energetic impacts would not affect a significant proportion of the Wexford Bay populations of the relevant species.

Impacts to roost sites

Small high tide roosts of Oystercatcher and Redshank occur irregularly along the railway line in S3 (about 100-200 m east of the eastern side of the development site) and on the shingle bank at the southern end of S4. A small daytime Cormorant roost occurs irregularly on the shingle spit at the north-eastern corner of S4.

The retained buffer zone vegetation, and the additional landscape planting along the inside of the buffer zone, will provide effective screening of these roost sites. However, any unauthorized access to the shoreline in these areas will cause temporary abandonment of the roost sites on the shingle bank and shingle spit and, if this becomes a regular feature, the roost sites may be permanently abandoned. However, the numbers of birds using these roost sites are very small. The Oystercatcher and Redshank roost on the railway embankment would not be likely to be affected, and these birds also roost on the opposite shore at the southern end of S13. Therefore, the loss of these roost sites would not be likely to significantly affect the high tide roost capacity of the Wexford Harbour and Slobs SPA.

Impacts to birds using subtidal habitat

Three SCI species that use subtidal habitat were regularly recorded in the sectors adjacent to the development site: Cormorant, Little Grebe and Black-headed Gull.

Cormorant were regularly recorded feeding in subtidal habitat adjacent to the development site but were always well out from the shoreline, and never showed any disturbance responses. On some occasions, Little Grebes that were close into the shoreline swam out a short distance as a disturbance response. There were also occasional incidents of Black-headed Gulls that were roosting on subtidal habitat close to the shoreline being flushed and resettling a short distance away. Therefore, given the nature of these species occurrence patterns and responses, significant disturbance impacts to these species are not likely to occur.

Little Tern could potentially feed in subtidal habitat adjacent to the development site during the summer months. However, tern species are generally very tolerant of human disturbance when foraging. Therefore, significant disturbance impacts from pedestrian activity within the site are not likely to occur.

12 Summary of mitigation measures

Detailed mitigation measures by design or otherwise to avoid potential negative effects on relevant habitats and species of the Slaney River Valley SAC have been outlined in the relevant sections above. The

following is a summary of mitigations measures that have been either incorporated into the design of the development or are proposed as mitigation measures during construction.

A project ecologist will be appointed to the project during infill of the site and all construction phases to oversee the implementation of the mitigation measures incorporated into this development.

Prevention of surface and ground water pollution during construction

- A preliminary construction management plan has been drawn up for the development by William Neville and Sons.
- A specific construction management plan for the importation of fill has been drawn up by Arthur Muphy & Co. and provides for appropriate measures for the containment and handling of construction site materials and construction site management procedures to avoid significant risk of pollution of surface waters during construction.
- A permanent retaining wall will be constructed along the entire length of the shoreline boundary to retain infill on site
- A temporary berm will be constructed along the entire shoreline boundary of the development to prevent construction site run off.
- Temporary silt ponds will be constructed. All construction site runoff will be directed to these.
- Prior to commencement, detailed construction method statements will be drawn up by the contractors for each phase of the development and agreed with NPWS and Inland Fisheries Ireland (IFI).
- The construction management will include requirements for sensitive construction and security site lighting to avoid light overspill to the boundary vegetation or riparian habitats
- Landscaped areas will be reseeded promptly.

Control of dust

- A dust minimisation plan will be formulated for the project (Reference Air Quality EIAR Chapter 8 and Appendix 8.4.3.)

Prevention of pollution of surface water during the operational phase

- Wastewater will be treated at Wexford Wastewater treatment Plant prior to discharge.
- The storm water resulting from the built development will be attenuated through a system of attenuation tanks and oil interceptors and will discharge to the subtidal waters in Wexford Harbour.
- Dumping will be discouraged by the design and layout of the development. No residential units back onto the shoreline habitats. A fence line along the shoreline and retention of scrub and hedgerow habitats along the shoreline coupled with further native hedgerow and tree planting will provide a buffer to the shoreline discouraging access and dumping.

Mitigation of habitat loss and potential disturbance to otter and wintering birds during construction

- Prior to development commencing**,** detailed construction method statements will be drawn up and agreed with NPWS. The construction method statements will include measures to minimise damage to the otter habitat at the boundary of the development during site clearance, infilling and construction of the retaining wall.
- The retaining wall will be built along the otter habitat boundary and temporary fencing will be fixed to this until the permanent shoreline wall and fenceline is constructed for each completed phase of the development.
- Security fencing will be erected for each phase of the development to prevent access by the public to the shoreline until the permanent shoreline fence line is complete for the entire development.
- Vegetation removal to facilitate the construction of the retaining wall and the construction of the outfall pipes will be replaced immediately with hedgerow planting of native species including hawthorn, blackthorn and/or gorse.
- The Project Ecologist will supervise the proposed site infill and construction works and will monitor the works to ensure the protection of the otter habitat.
- Prior to construction commencing, a new freshwater pond designed for use by otters will be constructed in the northeast corner of the site. The pond will be monitored and use of the pond by otters will be confirmed prior to infilling of the existing pond.
- Prior to construction commencing for each phase of the development, a preconstruction otter survey will take place to identify any changes in otter activity and holt locations since the otter survey. The area of survey will include the development site, particularly the shoreline and up to 250 m from the boundary of the site upstream and downstream along the shoreline. The preconstruction survey will take place no more than 10-12 months in advance of construction.
    - This preconstruction survey will be supplemented by a further inspection of the development area, immediately prior to site clearance to ensure that no new holts have been created in the intervening period and to check if any of the previous identified potential holts are in active use by breeding females or have otter cubs present.
    - The preconstruction otter survey will inform site-specific measures to avoid disturbance to otter at the time of construction following guidance contained in The Treatment of Otters Prior to the Construction of National Road Schemes (BRA (2006) and other guidance as relevant.
    - The construction of the surface water outfalls will take place during summer months to avoid construction works in the intertidal area overlapping with the presence of the wintering bird populations
    - Security and construction work lighting will be set up to avoid illumination of the otter habitat and the shoreline habitats and will follow guidelines:
        - Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals,
          2011)

- Bats & Lighting - Guidance Notes for Planners, Engineers, Architects and Developers (Bat
  Conservation Ireland, December 2010)
- Bats and Lighting in the UK – Bats and the Built Environment Series, Bat Conservation Trust UK

Mitigation to minimise disturbance to otter and wintering birds during the operational phase

- The entire boundary of the site along the shoreline , reedbed and woodland to the west of the site will be permanently fenced off by a low wall and fence of total height of 2100mm to prevent access to the shoreline habitats by people of dogs.
- This fence, and the buffer zone vegetation, will be regularly inspected. Any damage to the fence will be quickly repaired and if evidence is detected of regular access to the shoreline (e.g., trampled paths through the buffer zone vegetation, further measures (e.g., taller, and/or additional, fencing) will be put in place.
- The proposed lighting scheme ensures that the lighting around the perimeter of the development is directional to prevent overspill onto the shoreline and treeline habitats along the rail line.

Prevention of the spread of invasive plant species

An invasive species management plan will be drawn up by an experienced invasive plant species specialist and agreed with the NPWS prior to the commencement of construction.

The invasive species management plan will:

- Identify and map all locations of Japanese knotweed, three-cornered leek and winter heliotrope within the site.
- Establish exclusion zones around the invasive plant species to prevent incursion by construction vehicles and personnel onto areas containing invasive plant species
- Present control and eradication options for the treatment of invasive plant species in particular Japanese knotweed and three-cornered leek
- Implement appropriate measures to treat and prevent the spread of the invasive plant species within or outside of the site during all the construction phases.
- Monitor undeveloped areas between phases of development for the growth of invasive plant species including Japanese knotweed, three-cornered leek, winter heliotrope and other invasive plant species and carry out appropriate treatment (removal or control with herbicide) by a suitability qualified contactor certified in the professional use of pesticides.
- Post construction monitoring of the site to check for re-establishment of the species on the site

13 'In combination' effects

Potential cumulative impacts relate to cumulative impacts on water quality and disturbance to wintering waterbirds and otters. In combination or cumulative effects of development were assessed with reference to planning applications granted in the last 5 years in the vicinity of the development and the Wexford Town and Environment Development Plan 2009-2015 (as extended).

Development plan zoning

Carcur Park lies in development zone 4 and the land is designated for mixed use residential development. South of the development site there are areas of similar size or larger than the development site designated for community use (the sport playing fields), low residential development and open space and amenity. The open space and amenity area is adjacent to the saltmarsh area located to the southeast of the development site. A coastal walk is proposed between these areas and the railway line. There is also land zoned for open space and amenity west of the development site.

Coastal walks

The development of coastal walks has the potential to cause disturbance impacts to waterbirds and otter. However, the routes identified in the Wexford Town and Environs Development Plan 2009-2015 (Figure 8) are all either in areas with existing coastal access (Ferrybank-Ardcavan shoreline and Wexford Town), or in areas with narrow intertidal zones and low waterbird utilisation (shorelines east of Ferrycarrig Bridge and north of Crosstown) where any disturbance impacts are not likely to affect significant numbers of waterbirds.

No access to the shoreline will be provided within the development site. However, footpaths and cycling paths within the development site may link with other coastal walk if proposals proceed. Within the development site, the use of the footpaths and cycling paths as part of a coastal walk would not be anticipated to result in additional disturbance impacts to wintering birds or otter as the fence will prevent direct access to the shoreline and the boundary vegetation will visually shield the activity from the shoreline.

Proposed future bridge crossing of the River Slaney

There are also proposals for a third river bridge crossing at Park using the proposed access roads for this development. This bridge development could pose cumulative impacts to wintering birds and otter near the site. No detailed design is available for the design or layout of this bridge therefore comprehensive analysis of the cumulative impacts of this bridge could not be undertaken. However, the new pond for otter will be located out of the line of this proposed bridge. The proposed bridge location is at a point where there are only narrow bands of intertidal habitat on either shore. Therefore, any direct impacts on intertidal habitat will be minimal. The construction of the bridge will cause disturbance impacts to waterbirds, and the scale of these impacts is likely to be substantially higher than the disturbance impacts associated with construction work within the Carcur Park site due to the fact that the construction work

for the bridge will take place within the tidal habitats. However, the disturbance impacts from the bridge construction work would only have cumulative impacts in-combination with the disturbance impacts from development of the Carcur Park site if construction work for both projects took place at the same time. Waterbirds generally habituate to regular traffic activity, so operation of the bridge is unlikely to have significant disturbance impacts.

Similarly, disturbance impacts to otter due to construction of the new bridge would only have cumulative impacts if the construction schedules for both projects overlap. The operation of the new bridge and the potential impacts to otter would depend on the design of the bridge. The proposed bridge development will be subject to appropriate assessment on the possible impacts of the bridge on the Natura sites and this process would likely influence the design of the bridge to avoid significant impacts.

Trinity Wharf

The Trinity Wharf project comprises the development of a mixed-use urban quarter redevelopment on a brownfield site at the southern end of the Wexford Quays.

Two Annex I habitats for which the Slaney River Valley is selected were identified in the NIS to be likely affected by the proposed development "Estuaries" and "Mudflats and sandflats not covered by seawater at low tide (Roughan & O'Donovan, 2019a, b). The proposed development provides for the permanent loss of a limited area of estuary and intertidal mudflat habitat. The total area of the Annex I habitat that will be lost will be no more than 2,168m^2 , 969m^2 of which is within the Slaney River Valley SAC, representing c. 0.005% of the estimated total area of "Estuaries" and c. 0.009% of the estimated total area of "Mudflats and sandflats not covered by seawater at low tide" within the SAC. The mudflats and benthic habitats have low faunal diversity (RPS, 2018) and are not an important area for wintering birds (Natura, 2016).

There is no permanent habitat loss associated with the proposed development at Carcur. There will be temporary disturbance impact with anticipated recovery within 6-12 months of 0.014% of the estuarine community. The in combination effect of the Trinity Wharf development with the Carcur development will lead to disturbance of 0.15% of the intertidal mudflat is therefore insignificant due to the very small areas of habitats concerned.

The NIS for the Trinity Wharf project concluded that "*any construction-phase water quality impacts remaining following the inclusion of the above mitigation measures are considered to be slight to imperceptible and the risk of such impacts occurring is considered to be negligible. Therefore, given the full and proper implementation of these measures, construction or operation of the proposed development will not give rise to any adverse effects in terms of water quality on the Conservation Objectives of the Slaney River Valley SAC or the Wexford Harbour and Slobs SPA"*

Therefore in combination effects on water quality are not anticipated.

Surveys undertaken for the NIS for the Trinity Wharf development concluded that otters use the estuary habitats in the immediate vicinity of the proposed development for feeding and commuting. It was deemed unlikely to use the area for holting due to the poor quality of the terrestrial habitats.

A suite of mitigation measures were proposed to reduce any potential impacts on water quality, hydroacoustic noise impacts on fish species, harbour seal and otter along with compliance measures including the appointment of a project ecologist for the Trinity Wharf Project.

It was considered that the mitigation measures proposed will reduce all negative impacts on Annex I habitats, apart from the above habitat loss, to imperceptible levels.

It was considered that the mitigation prescribed in Section 5.2 of the NIS and the implementation and compliance measures prescribed in Section 5.3 will reduce all negative impacts on the migratory fish species, otter and harbour seal listed as Qualifying Interests of the Slaney River Valley SAC to imperceptible levels.

The potential for in combination disturbance impacts on fish species, otter and seal were considered in light of the timing of the Trinity Wharf construction works. According to information provided on the website for the Trinity Wharf Development website construction works are due to start in October 2020 and progress on a phased basis with completion due in 80 months (6.6 years).

There are no significant disturbance impacts associated with the Carcur development. There are no disturbance impacts associated with the construction of the outfall pipes to fish species and harbour seal as they will take place at low tide and over a short time frame of 4-8 days. Therefore there will be no significant in combination effects with the Trinity wharf development on these species.

Residual temporary short-term slight disturbance impacts to otter are possible from the construction of the retaining wall and outfall pipes but these are not considered to have a significant impact on otter. The Trinity wharf development anticipated any disturbance impacts to otter to be imperceptible. Therefore due to the slight disturbance impacts anticipated for both developments significant in combination impacts on otter are not anticipated.

The EIAR and NIS for the development (Roughan & O'Donovan, 2019a, b) did not predict any significant impacts to waterbirds from the development, and found that the scale of any impacts would be very minor. This was mainly due to the very small numbers of waterbirds that occur adjacent to the site. In addition, the location of the development means that waterbirds using the adjacent tidal habitats will already be habituated to a high level of disturbance. As the predicted impacts from both this development, and from the Carcur Park development, to waterbird populations are very small, the cumulative impact of the impacts from the two developments in-combination will not be significant.

The NIS for the Trinity wharf Development considered the possibility of "in combination effects" within the likely zone of influence of that development determined to be the entire area within 550 m of the proposed development (a precautionary flushing distance for waterbirds) and the Lower Slaney Estuary transitional water body (as far upstream as Ferrycarrig Bridge) together with the Wexford Harbour coastal

water body plus an additional 1 km buffer. The assessment was undertaken in view of the conservation objectives of the relevant European sites and found that the proposed development does not have the potential to significantly affect any European site in combination with other plans or projects.

Other Development

Development zones 1, 2 and 3 are located on the northern bank of the river. Zone 1 (Ardcavan) provides for open space and amenity use along the coastal section, with land for long term development identified adjacent to this along with land designated for commercial/mixed use. Zone 2 at Crosstown provides for medium scale residential development, lands for community use and coastal land for open space and amenity. Zone 3 at Ferrybank provides for medium scale residential development and commercial/mixed use development along with smaller areas of open space and amenity including a coastal walk along the coastline.

Development zone 5 is west of zone 4 and incorporates the lands of Ballyboggan and Newtown. This area is also adjacent to the Slaney River. Along the coast in this zone the land is designated as open space and amenity as far Ferrycarrig Bridge. South of the coastal zone the lands are designated as commercial/mixed use and also for super low residential use.

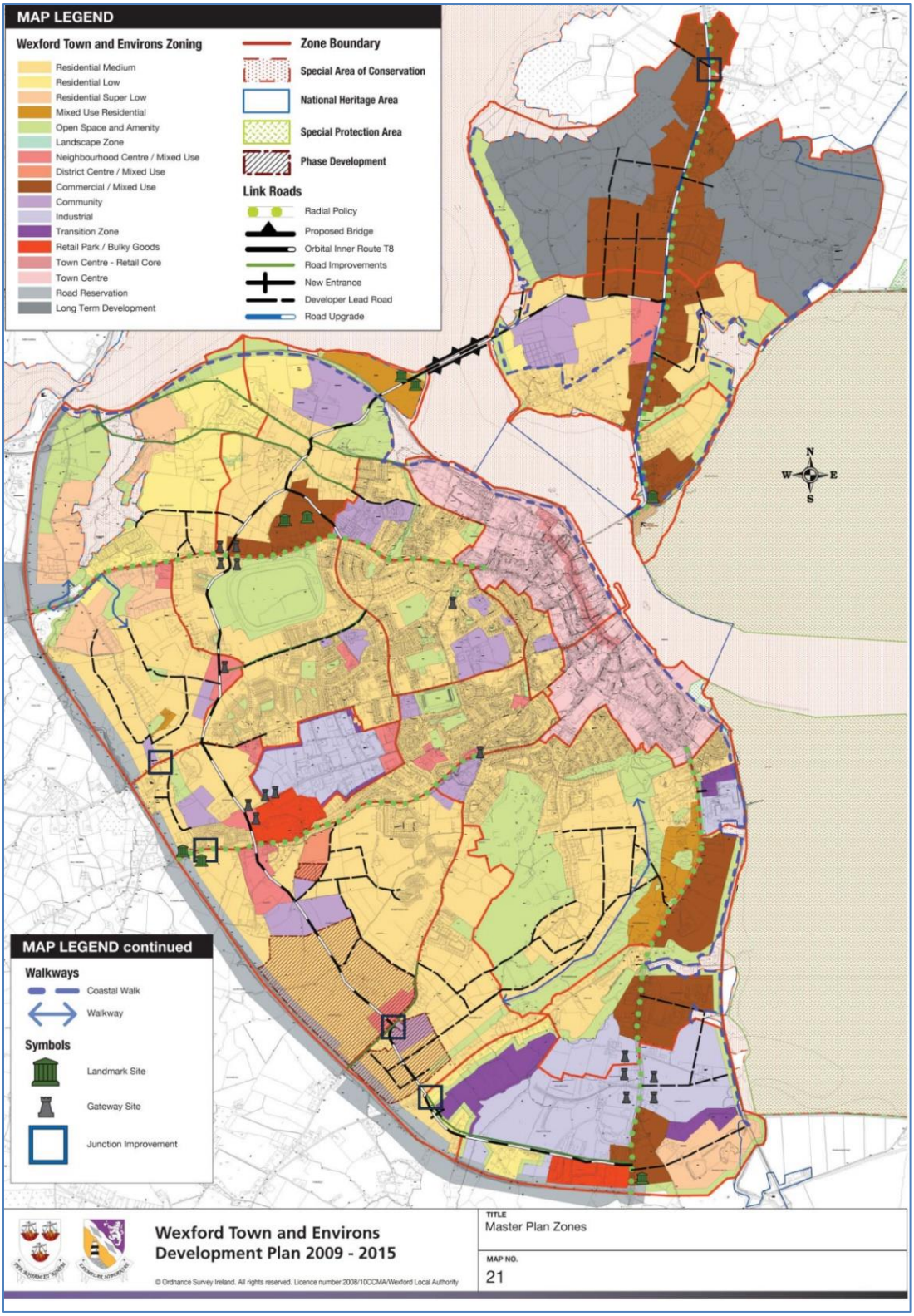
In summary the Wexford Town and Environs land use zoning indicates that for the most part the coastal areas of land are zoned for open space and amenity which would suggest that the habitats and species of the Natura sites will not be subject to cumulative pressure from development. Open space and amenity zones relates to both public and private land. The council will not normally permit development in this zone that would result in the loss of established open space (zoning objective E Chapter 10 Wexford Town and Environs development plan 2009-2015 as extended).

Variation Number 1 to the Wexford Town and Environs Development Plan 2009-2015 stipulates that "To ensure that any plan or project and any associated works, individually or in combination with other plans or projects, are subject to Appropriate Assessment Screening to ensure there are no likely significant effects on the integrity (defined by the structure and function) of any Natura 2000 site(s) and that the requirements of Article 6(3) and 6(4) of the EU Habitats Directive are fully satisfied."

Chapter 8 states that the overall aim of the Council will be to promote a reasonable balance between conservation measures and development measures in the interests of promoting the orderly and sustainable development of Wexford Town.

Natural heritage policy (NH7) is to "prohibit development which would damage or threaten the integrity of sites of international or national importance, designated for their habitat/wildlife or geological/geomorphological importance including the proposed Natural Heritage Areas, candidate Special Areas of Conservation, Special Protection Areas, Ramsar sites and Statutory Nature Reserves".

Figure 8 Development plan zoning for Wexford Town and Environs (Reproduced from Wexford Town and Environs Development Plan 2009-2015 as extended)



Planning applications for the last 7 years from 2012 to July 2020 in the vicinity of the River Slaney north of Wexford Bridge including the areas of Park, Crosstown, Ferrybank North and South and Ferrycarrig were reviewed using Wexford County Council online Planning Map Viewer. Planning permissions granted (other than Trinity Wharf discussed above) are shown in the Table 18 below. Planning permissions granted are all small developments including 2 new dwellings, extensions to existing dwellings or buildings and sports club facilities. Installation of tennis court flood lights at Wexford Tennis Club was screened from appropriate assessment concluding that the light spill from the flood lights would not cause any significant negative impact to the Slaney River Valley SAC or the Wexford Harbour and Slobs/the Raven SPA due to the directional nature of the lighting and the small area of light overspill (D'Arcy D. 2018). No significant cumulative impacts were identified as a result of these permitted developments.

The works for the installation of a new pipeline in Wexford Harbour were carried out in 2018. Due to the time lapse between the two projects no in combination effects are anticipated.

Table 18 – Summary of planning applications in the vicinity of the River Slaney north of Wexford Bridge to Ferrycarrig and Wexford Harbour

Year	Location	Details
20200065	Park Wexford	Retention of alterations and extensions to house and entrances as constructed.
20200166	Castlebridge	Permission for construction of 25 No. fully serviced dwelling houses including all associated and ancillary site development works.
20200539	Ballytramon	Decision pending. Permission for the proposed erection of a fully serviced split level dwelling house with indoor swimming pool together with all associated site works and ancillary services. A NIS was submitted which concluded no significant impact to the Wexford Harbour and Slobs SPA due to the location and the small scale of the development
20200494	Ballytramon	Decision pending. Permission for (a) the proposed demolition of derelict former piggery buildings and stores and a derelict steel shed, (b) the proposed erection of a two-storey office and storage building, (c) the proposed erection of a storage warehouse building (d) for the provision of car parking spaces together with all associated site works and ancillary services F. I. request for AA screening and/or NIS
20200520	Crosstown Ardcavan	Permission for the alterations and extensions to existing dwelling together with all associated site works including boundary treatments and erection of a carport.
20200580	Saunderscourt, Killeen, Kilpatrick	Permission for the proposed erection of a fully serviced dwelling house, domestic shed, carport, on-site treatment system and new vehicular access along with all associated site works to facilitate same.

Table 18 – Summary of planning applications in the vicinity of the River Slaney north of Wexford Bridge to Ferrycarrig and Wexford Harbour		
Year	**Location**	**Details**
20190484	Ballytramon Ardcavan	Erection of an extension to side and rear of existing child care centre.
20180320	Park Wexford	Permission for the erection of two new dressing rooms and a toilet block to the club premises; the conversion of the existing gym area into dressing rooms and the erection of a training shed. Permission for the erection of a covered porch and access
20180589	Commercial Quay	Permission refused on appeal to An Bord Pleanala
20181381	Wexford Tennis Club	Permission for retention to existing building comprising 45 sq m for lift installation.
20181382	Wexford Tennis Club	Permission for erection of 6No. 10 metres flood lights
20171064	Crosstown Ardcavan	Permission for proposed single and 2 storey extension and alterations to existing dwelling at Granard Villa
20170861	Town Park	Permission for construction of two tennis courts and associated site works
20170860	Crosstown	Permission for the retention of single and two storey extensions and alterations to existing dwelling house
20171064	Crosstown	Permission for proposed single and 2-storey extensions, and alterations to existing dwelling
20160981	Park Wexford	Permission for installation of a new sewage treatment system, erection of a boundary wall and alterations to site layout and site boundaries from plans approved under planning reg no. 27301
20161287	Ferrybank North	Permission for (1) the proposed external alterations to main building consisting of (a) the removal of the existing external facade to the west, north and south elevations and for the proposed erection of new cladding, signage and new curtain wall
20151160	Wexford WWTP	Permission for the installation of a new 900mm diameter high-density polyethylene outfall pipeline to be constructed adjacent to the existing outfall pipeline from the shoreline to the existing outfall point in Wexford Harbour. Works were carried out in 2018. No cumulative impacts anticipated due to the time lapse between the two projects
20150352	Park Wexford	Permission for the following at the club grounds, park lane, Wexford: the erection of a toilet block to the club premises and for the conversion of the existing gym area into dressing rooms. Also permission for the erection of a separate covered indoor training area

Table 18 – Summary of planning applications in the vicinity of the River Slaney north of Wexford Bridge to Ferrycarrig and Wexford Harbour		
Year	**Location**	**Details**
20150540	Newtown, Carrick	Permission for the erection of a bar and restaurant and all associated site works including car parking facilities, connection to mains sewerage and road junction improvement works to the national primary route n11
20150300	Ferrybank South	Permission to infill a 218 sqaure meter open area at ground floor level of existing four storey hospital building for use as office space, including new entrance to building, to upgrade, reconfigure and extend the existing car parking to the front of the property from 51 car spaces to 98 car spaces and all associated site works including realigning internal service road at Ely Hospital
20141003	Park Wexford	The erection of a 2 storey clubhouse consisting of dressing rooms, gym, assembly/training area, ancillary car parking and site works, connection to existing drains and entrance onto existing new road.
20140241	Crosstown	Retention of the construction of x 2 extension to the side & rear of dwelling house all with ancillary site works
W2014004	Crosstown	Alterations to approved planning permission register number w2012081 consisting of (a) change of house type to the approved new dwelling
20140922	Park Wexford	Demolish an existing rear extension, construct a new rear extension and deck area, construct a separate garage and make alterations to the front elevation of house
20140949	Crosstown	Development will consist of extensions to front, side and rear of existing dwelling, new covered terrace area to the front, amendments to all elevations, internal alterations and all associated site works.
W2013050	Crosstown	Permission for the proposed erection of 2 bedroom granny flat extension to the side of the existing dwelling house together with new wall to roadside boundary and all ancillary services and associated site works on site
W2012081	Crosstown	New dwelling

A review of the Wexford County Development Plan (2013-2019) revealed that the plan seeks to:

- Promote the balanced and sustainable development of the urban and rural areas of the County for a range of residential, services and employment opportunities.

- Protect, conserve and enhance the County's built, natural and cultural environment through promoting awareness, and good quality urban and rural design.

- Promote the balanced and sustainable development of the urban and rural areas of the County for a range of residential, services and employment opportunities.

- Protect and enhance the County's unique natural heritage and biodiversity, while promoting and developing its cultural, educational and eco-tourism potential in a sustainable manner.

- Harness the County's natural resources in a manner that is compatible with the sensitivity of rural areas, the existing quality of life, and the protection and enhancement of the County's natural heritage and biodiversity.

The assessment matrix found in Table 28, Section 7.3 of the SEA report (Vol. 8 Wexford County Council 2013) has assessed each policy and objective and has demonstrated that the plan has overall a sustainable development approach – the Plan will ensure the orderly development of the County without adversely affecting the quality of the built and natural environment.

The Appropriate Assessment screening report of the Wexford County Development plan 2013-2019 found that "The likely impacts that will arise from the draft CDP have been examined in the context of a number of factors that could potentially affect the integrity of the Natura 2000 network. None of the sites within 15 km of the plan area will be adversely affected. It finds that the Plan has been formulated to ensure that uses, developments and effects arising from permissions based upon the Plan (either individually or in combination with other plans or projects) shall not give rise to significant effects on the integrity of any Natura 2000 sites"

In general terms, all proposals for development will be required to have due regard to the environmental considerations outlined in the County Development Plan 2013-2019. Proposals for development which are deemed contrary to the policies and objectives contained within the plan will not normally be permitted.

In addition to this, the Water Framework Directive (WFD) requires that a programme of measures (POMs) is established in order to achieve its environmental objectives. The EU WFD (2000/60/EC), which came into force on 22 December 2000, is the most important piece of European water legislation. It aims to promote common approaches, standards and measures for water management on a systematic and comparable basis throughout the European Union. It establishes a new, integrated approach to the protection, improvement and sustainable use of Europe's rivers, lakes, transitional waters (estuaries), coastal waters and groundwaters. The WFD is implemented in Ireland through River Basin Catchment Management programmes which aim to restore all rivers to good status.

The implementation of the SERBMP Plan will bring incremental improvement leading to the majority of waters reaching at least 'good status' by 2027 at the latest, benefiting the whole community by providing long-term sustainable access to and use of those waters. Where waters are currently at less than good

status, they must be improved until they reach good status and there must be no deterioration in the existing status of waters (Wexford County Council 2013b).

In light of the implementation of the WFD and the policies outlined in the County Development Plan and the Wexford Town and Environs Development Plan and the review of recent planning applications, significant 'in combination' effects on the Slaney Valley SAC or the Wexford Harbour and Slobs SPA are not anticipated.

14 Conclusion and Natura Impact Statement

The proposed project has been assessed taking into account

- the nature, size and location of the proposed development and the associated works and possible impacts arising from same.
- the qualifying interests, conservation objectives and conservation status of the adjacent Natura sites –the Slaney River Valley SAC, The Wexford Harbour and Slobs SPA and The Raven SPA
- the potential for impacts arising from the development on the adjacent Natura sites and
- the potential for cumulative impacts arising from current or future development in the area.

The overall conclusion of this Natura Impact Statement report is that provided mitigation measures as summarized in Section 12 and detailed in the relevant impact assessment sections in this report are implemented in full, there will be no significant direct, indirect or cumulative negative effects on the conservation objectives of the Slaney River Valley SAC or the Wexford Harbour and Slobs SPA or The Raven SPA.

14.1 Natura Impact Statement

It is determined that the proposed development will not have significant direct, indirect or cumulative effects on the integrity of the Slaney River Valley SAC or the Wexford Harbour and Slobs SPA or The Ravan SPA.

15 References

Burton, N.H.K., Rehfisch, M.M. & Clark, N.A. (2002). Impacts of disturbance from construction work on the densities and feeding behavior of waterbirds using the intertidal mudflats of Cardiff Bay, UK. Environmental Management, 30, 865–71.

Chanin P. (2003). Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology Series No. 10 English Nature.

Chapman N.G. and Chapman L. (1982). Otter Survey of Ireland Vincent Weir Trust, London.

Chartered Institute of Ecology and Environmental Management (CIEEM) (2016). Guidelines for Ecological Impact Assessment Impact in the UK .

Chartered Institute of Ecology and Environmental Management (CIEEM) (2019). Advice Note on the Lifespan of Ecological Reports & Surveys. Chartered Institute for Ecology and Environmental Management, Winchester.

Circular L8/08. Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments 2 September 2008.

Circular NPW 1/10 & PSSP 2/10. Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.

Cutts, N. & Allen, J. (1999). Avifaunal Disturbance Assessment: Flood Defence Work, Saltend. Report to Environment Agency, Institute of Estuarine and Coastal Studies, University of Hull.

Cutts, N., Phelps, A. & Burdon, D. (2009). Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance. Report to Humber INCA, Institute of Estuarine and Coastal Studies University of Hull.

D'Arcy D. (2018) Appropriate Assessment Screening Report Proposed Flood Lighting at Wexford Boat and Tennis Club.

DoEHLG (2009). Appropriate Assessment of Plans and Projects in Ireland. Guidelines for Planning Authorities.

Durell, S.E.A. le V. dit, Stillman, R.A., Triplet, P., Desprez, M., Fagot, C., Loquet, N., Sueur, F. & Goss-Custard, J.D. (2008). Using an individual-based model to inform estuary management in the Baie de Somme, France. Oryx, 42, 265–277.

Dwyer, R.G. (2010). Ecological and Anthropogenic Constraints on Waterbirds of the Forth Estuary: Population and Behavioural Responses to Disturbance. University of Exeter.

Dwyer, R.G., Bearhop, S., Campbell, H.A. & Bryant, D.M. (2013). Shedding light on light: benefits of anthropogenic illumination to a nocturnally foraging shorebird. Journal of Animal Ecology, 82, 478–485.

EPA (2009). Code of Practice Wastewater Treatment and Disposal Systems Serving Single Houses, EPA, Johnstown Castle, Co. Wexford, Ireland

EPA (2013). County Wexford River Water Quality Report 2013. Environmental Protection Agency, Johnstown Castle, County Wexford, Ireland.

EPA (2014a). Integrated Water Quality Assessment for the South Eastern River Basin District 2013. Environmental Protection Agency, Johnstown Castle, County Wexford, Ireland.

EPA (2018) *Urban Wastewater Treatment in 2018* Environmental Protection Agency. Johnstown Castle Ireland Y35W821.

EU (2007). Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC Clarification of the Concepts of: Alternative Solutions, Imperative Reasons Of Overiding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commision. *European Commission* January 2007

EU (2000). Managing Natura 2000 sites – The provisions of Article 6 of The Habitats Directive 92/43/EEC. European Commisson, 2000.

EU (2002). Assessment of Plans and Projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission, 2002.

Farmer A. M. (1993) Environmental Pollution 79(1): 63-75

Fossitt J.A. (2000). A Guide to Habitats in Ireland. The Heritage Council.

Gittings, T. & O'Donoghue, P. (2016). Wexford Harbour, the Raven and Rosslare Bay: Appropriate Assessment of Aquaculture. Unpublished report by Atkins to the Marine Institute (https://bit.ly/2WPcm23).

Gorenzel, W.P. & Salmon, T.P. (1995). Characteristics of American Crow urban roosts in California. The Journal of Wildlife Management, 59, 638–645.

Goss-Custard, J.D., Triplet, P., Sueur, F. & West, A.D. (2006). Critical thresholds of disturbance by people and raptors in foraging wading birds. Biological Conservation, 127, 88–97.

Hicks W.K., Whitfield C.P., Bealey W.J. and Sutton M.A. (Eds.) (2011) Nitrogen Deposition and Natura 2000: Science and Practice in Determining Environmental Impacts. Findings of a European workshop linking scientists, environmental managers and policy makers. European Cooperation in Science and Technology (COST).

King J. J. and Linnane S. M. (2004). The status and distribution of lamprey and shad in the Slaney and Munster Blackwater SACs. Irish Wildlife Manuals, No. 14. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Lewis, L.J., Davenport, J. & Kelly, T.C. (2002). A study of the impact of a pipeline construction on estuarine benthic invertebrate communities. Estuarine, Coastal and Shelf Science, 55, 213–221.

Lewis, L.J., Davenport, J. & Kelly, T.C. (2003). A study of the impact of a pipeline construction on estuarine benthic invertebrate communities Part 2. Recolonization by benthic invertebrates after 1 year and response of estuarine birds. Estuarine, Coastal and Shelf Science, 57, 201–208.

Lunnon R. (1996). Otter *Lutra Lutra* Distribution in Ireland. In Reynolds J. D. (ed). The conservation of aquatic systems. Royal Irish Academy, Dublin.

Masters-Williams, H, Heap, A, Kitts, H, Greenshaw, L, Davis, S, Fisher, P, Hendrie, M, Owens, D (2001). Control of water pollution from construction sites. Guidance for consultants and contractors. Construction Industry Research and Information Association CIRIA C532.

Macloughlin J. H. (1949). An otter in Belfast. Irish Naturalists J Macloughlin J. H. (1949). An otter in Belfast. Irish Naturalists Journal, 10: 42.

McCorry M. & Ryle T. (2009). Saltmarsh Monitoring Project 2007-2008. DAHG

Murphy A. (2020) Storm Water Report Arthur Murphy & Co., Civil & Structural Engineering Consulting, Garryrichard, Foulsmills, Co. Wexford July 31st, 2020

Nairn, R.G.W. (2005). Use of a high tide roost by waders during engineering work in Galway Bay, Ireland. Irish Birds, 7, 489–496.

NPWS (2011a). Conservation Objectives: Slaney River Valley SAC 000781. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [accessed 13/01/2016]

NPWS (2011b). Conservation Objectives: Raven Point Nature Reserve SAC 000710. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [accessed 13/01/2016]

NPWS (2011c). Slaney River Valley SAC Conservation objectives supporting document - marine habitats and species. Version 1 August 2011. Department of Arts, Heritage and the Gaeltacht [accessed 13/01/2016]

NPWS (2011d). Wexford Harbour and Slobs Special Protection Area (Site Code 4076) & the Raven Special Protection Area (Site Code 4019) Conservation Objectives Supporting Document. Version 1. National Parks and Wildlife Service.

NPWS (2012). Conservation Objectives: Wexford Harbour and Slobs SPA 004076. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [accessed 13/01/2016]

NPWS (2013). Conservation Objectives: Long Bank SAC 002161. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [accessed 13/01/2016]

NPWS (2013). Conservation Objectives: Blackwater Bank SAC 002953. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [accessed 13/01/2016]

NPWS (2014) Conservation Objectives: Ballyteige Burrow SAC 000696. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. (Used as guidance in the absence of conservation objectives set for saltmarsh habitats for the Slaney River valley SAC)

NPWS (2014a). Site Synopsis Slaney River Valley 000781 Version date: 10.02.2014 000781_Rev13.Doc [accessed 23/01/2015].

NPWS (2014b). *Margaritifera* Sensitive Areas, Version 06, October 2014, Explanatory text, Áine O Connor, updated October 2014.

NPWS (2015). Conservation objectives for Screen Hills SAC [000708]. Generic Version 4.0. Department of Arts, Heritage and the Gaeltacht**.** [accessed 13/01/2016]

NPWS (2019a). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill

NPWS (2019b). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill

NRA (2006) Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes. Environmental Series on Construction Impacts.

Park, H-C., Han, T-Y., Kim, D-C., Min, M-S., Han, S-Y., Kim, K-S., Lee, H. (2011). Individual identification and sex determination of Eurasian otters (*Lutra lutra*) in Daegu city based on genetic analysis of otter spraint. Genes & Genomics 33: 653-657.

PD Teesport and Royal Haskoning (2007). Northern Gateway Container Terminal. Supplement to the Environmental Statement: Information for Appropriate Assessment.

Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013). National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Rose, K. (2011). Letter from Natural England (Newcastle Upon Tyne office) to Paul Dacombe, Centrica, dated 04 November 2011, Natural England ref 3708.

Roughan & O'Donovan (2019a). Trinity Wharf Development: Environmental Impact Assessment Report.

Roughan & O'Donovan (2019b). Trinity Wharf Development: Natura Impact Statement.

Scottish Natural Heritage, Otters and Development, Scottish wildlife series, **http://www.snh.org.uk/publications/on-line/wildlife/otters**

Sleeman D. P. and Moore P. G. (2005). Otters Lutra Lutra in Cork City. Irish Naturalists Journal 28: 2.

Smith G., O'Donoghue P., O'Hora K. and Delaney E. (2011). Best Practice Guidance for Habitat Survey and Mapping, Heritage Council.

Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W. & Burton, N.H.K. (2012). Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. Biological Conservation, 156, 53–61.

West, A.D., Yates, M.G., McGrorty, S. & Stillman, R.A. (2007). Predicting site quality for shorebird communities: A case study on the Wash embayment, UK. Ecological Modelling, 202, 527–539.

Wexford County Council (2013). Draft County Development Plan 2013-2019. www.wexford.ie [accessed 29.01.2015]

Wexford County Council (2013b). Wexford County Development plan Plan 2013-2019 Appropriate Assessment Screening.

White S., O'Neill D., O'Meara D.B., Shores C., O'Reilly C., Harrington A.P, Weyman G., and Sleeman D.P. (2013). A Non-invasive genetic survey of otters (Lutra lutra) in an urban environment: a pilot study with citizen scientists. IUCN Otter Spec. Group Bull. 30(2).

Wright, M.D., Goodman, P. & Cameron, T.C. (2010). Exploring behavioural responses of shorebirds to impulsive noise. Wildfowl, 60, 150–167.

16 Appendices

Appendix A: Responses to Consultations

Appendix B: Otter Survey Report

Appendix C: Bird Survey Report

Appendix D: Construction Management Plan

Appendix E: Otter Pond Design

Iascach Intíre Éireann
Inland Fisheries Ireland

Deborah D'Arcy
Heather View
Annagh
Gorey
Co. Wexford

22 September 2015

Carcur Park Residential Development, Wexford.

Dear Ms. D'Arcy,

With reference to the above proposed development, we note that the site borders the Slaney Estuary. The Slaney River is an important salmonid system with populations of salmon, brown trout, sea trout, eels, twaite shad, Allis shad and lamprey.
Estuaries and inshore waters provide significant nursery habitat for the larval and juvenile forms of (transitional and marine) fish species, in addition to providing shelter and food for many young and adult fish and shellfish. These in turn provide food resources for other levels of the trophic chain including shore birds, waterfowl, larger fish and marine mammals. Intertidal areas host high densities of benthic fauna in particular worms and molluscs. This in turn can make them important habitats for juvenile fish such as flounder, and juvenile crustaceans such as crabs which may inhabit such habitats in high numbers. The majority of fish in estuaries, feed primarily on the benthos and thus live a demersal existence. Estuarine fish can generally be divided into a number of groups:

- Estuarine dependant (opportunists) species typically enter estuaries from the sea for a period each year but do not stay permanently. The majority of these species drift into estuaries as larvae and when as young fish they become demersal, they take advantage of the rich benthic food sources available in sublittoral and intertidal estuarine habitats. Estuaries contain large numbers of '0 group' fish that use them as nursery grounds before migrating to the sea as recruits to adult populations.
- Marine stragglers enter estuaries irregularly and are often restricted to the seaward end (usually low in numbers of individuals)
- Riverine species come from the freshwater end of the system and are mainly found in low salinity waters.
- Truly estuarine species (residents) comprise only a small number of species although they may form a high overall biomass. The gobies are most typical of this group as they are found in estuaries around the year.
- Migratory species use the estuary and inshore waters as a route from rivers to the open sea or vice versa. Most of these species are anadromous (breed in freshwater) e.g. the

lampreys, the shads and the salmon (*Salmo salar*) / sea trout (Salmo trutta). Eels (*Anguilla anguilla*) are catadromous and breed in the sea.

As you are aware, IFI is charged with the protection, conservation and promotion of fisheries within our functional area. Board policy is aimed at maintaining a sustainable fisheries resource through preserving the productive capacity of fish habitat by avoiding habitat loss, or mitigating harmful alteration to habitat. Projects such as this have the potential to impact on downstream/adjacent fisheries resources if they are not carried out in an environmentally sensitive manner.

We note that your letter states that the site will require infilling as part of the development to raise the level of the area to that required for flood risk management. It is important that access for anglers is maintained over the entire length of the coastal section of this site and that there is an appropriate buffer zone over the coastal section where no infilling is permitted.

The following observations and comments are of necessity of a general nature, as construction proposals and method statements are not as yet available. While they apply to the proposed development in general, the waters in fisheries terms likely to be impacted act primarily as nursery habitat for numerous different species of fish as well as macrophytes, algae and macro-invertebrates. The proposed works, have the potential to convey deleterious matter from those works such as concrete, silt, fuel, lubricating and hydraulic oils from construction plant and equipment to adjacent/downstream waters unless proper safeguards are in place. IFI request you have particular regard to the following in the planning stage of the proposed development.

Uncured concrete can kill fish and macro-invertebrates by altering the pH of the water. When cast-in-place concrete is required, all work must be done in the dry and effectively isolated from any water that may enter the drainage network for a period sufficient to cure the concrete. Concrete delivery vehicles should be precluded from washing out at or in the environs of the site, or at such location as would result in a discharge to surface waters. If bagged cement is stored on site during construction work, it should be held in a dry secure area when not in use.

One of the potential impacts of the proposed development is the discharge of silt-laden waters to waters where earth moving and excavation works are on-going. Silt can clog important fisheries habitat. Similarly, plant and macro-invertebrate communities can literally be blanketed over, and this can lead to loss or degradation of valuable habitat. It is important to incorporate best practices into construction methods and strategies to minimise discharges of silt/suspended solids to waters.

The potential for soil erosion/suspended solids generation is higher, during/after periods of prolonged rainfall. Systems should be put in place to ensure that there shall be no discharge of suspended solids or any other deleterious matter to waters during the construction/operational phase and during any landscaping works. Stockpiles of sand to be used in the works should be covered with sheeting when not in use to prevent washout of fines during rainfall. Stockpiles of topsoil and associated materials arising during site development should be similarly protected. A comprehensive plan should be drawn up at the planning stage with specific measures to address the high potential for silt pollution of adjacent waters during infill/construction and landscaping works.

All oils and fuels should be stored in secure bunded areas, and particular care and attention should be taken during refuelling and maintenance operations on plant and equipment. Bunding should be to a volume not less than the greater of the following; 110% of the capacity of the largest tank or drum

within the bunded area, or 25% of the total volume of substance that could be stored within the bunded area. All plant and equipment should carry oil/fuel spill kits. Where temporary diesel or petrol driven pumps are required, they should be sited within portable temporary bunded units. Where site works involve the discharges of drainage water to surface waters, temporary oil interceptor facilities should be installed and maintained. Waste oils, empty oil containers and other hazardous wastes should be disposed of in accordance with the requirements of the Waste Management Act, 1996.

I trust these observations which are without prejudice will be of assistance. Notwithstanding statutory obligations under the planning process requiring the referral of certain applications for planning permission to us, IFI would be obliged to receive advance notification in the event our your clients proposing to submit an application for planning permission.

Yours sincerely,

Donnachadh Byrne
Senior Fisheries Environmental Officer

Please note that any further correspondence regarding this matter should be addressed to Mr. Donnachadh Byrne, Senior Fisheries Environmental Officer, Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Your Ref:
Our Ref: **G Pre00280/2015**
(Please quote in all related correspondence)

21 October 2015

Deborah D'Arcy
Ecological Consultant
Heather View
Annagh
Gorey
Co. Wexford

Via email to deborahdarcy@eircom.net

Re: Scoping consultation regarding a proposed residential development at Carcur Park, Wexford

A chara

On behalf of the Department of Arts, Heritage and the Gaeltacht, I refer to correspondence received in connection with the above.

Outlined below are heritage-related observations/recommendations of the Department under the stated heading(s).

Nature Conservation

You have indicated that this proposed residential development is adjacent to the Slaney River Valley candidate Special Area of Conservation (cSAC) and the Wexford Harbour and Slobs Special Protection Area (SPA). You have indicated that your assessment will include bi-monthly low tide counts. It is not clear why high tide counts are not included as birds may roost on the proposed development site depending on the habitat type present. It is not clear from the documentation provided what the current habitat is on this site. It is envisaged by this Department that the impacts on the SPA will include disturbance both at construction stage and from the use of the proposed linear park as well as possible loss or changes in habitat of the development site which may have been used by birds from the SPA. These issues should be assessed.

It is envisaged by this Department that the impacts on the cSAC will include potential loss of habitat and there is a risk that imported fill may contain invasive species. In addition if the raising of the land for flood management could change patterns of erosion

and deposition then there could be hydrogeomorphological impacts elsewhere. These issues need to be assessed.

Apart from the above there may also be some loss of biodiversity resulting from the changed use of the site and this should be mitigated for. In particular it is important that the coastal fringe of maritime vegetation should be retained and that any future coastal paths would be landward of such vegetation. Design criteria should consider how to reduce foreshore dumping of garden waste, for example ensuring that garden boundaries are not adjacent to the foreshore.

It has been noted by this Department that some vegetation clearance of the site has already taken place. Such clearance could prejudice the vegetation and species survey for the EcIS and no further clearance should take place.

Please find below some generic scoping comments for EcIS and appropriate assessment screening/appropriate assessment and for licensing requirements which may assist you in scoping your assessment.

EcIS

Ecological Survey

With regard to scoping for an EcIS for a proposed development, in order to assess impacts on biodiversity, fauna, flora and habitats, an ecological survey should be carried out of the site of the proposed development site including the route of any access roads, pipelines or cables etc. to survey the habitats and species present. Where ex-situ impacts are possible survey work may be required outside of the development sites. Such surveys should be carried out by suitably qualified persons at an appropriate time of the year depending on the species being surveyed for. The EcIS should include the results of the surveys, and detail the survey methodology and timing of such surveys. It is expected by this Department that in any survey methodology used that best practice will be adhered to. The EcIS should cover the whole project, including construction, operation and, if applicable, restoration or decommissioning phases. Alternatives examined should also be included in the EcIS. Inland Fisheries Ireland should be consulted with regard to fish species if applicable. For information on Geological and Geomorphological sites the Geological Survey of Ireland should be consulted.

Baseline data

With regard to the scope of baseline data, details of designated sites can be found at www.npws.ie . For flora and fauna the data of the National Parks and Wildlife Service (NPWS) should be consulted at www.npws.ie . Where further detail is required on any information on the website www.npws.ie , a data request form should be submitted. This can be found at http://www.npws.ie/maps-and-data/request-data . Other sources of information relating to habitats and species include that of the National Biodiversity Data Centre (www.biodiversityireland.ie), Inland Fisheries Ireland (www.fisheriesireland.ie), BirdWatch Ireland (www.birdwatchireland.ie) and Bat Conservation Ireland (www.batconservationireland.org). Data may also exist at a County level within the Planning Authority.

Impact assessment

The impact of the development on the flora, fauna and habitats present should be assessed. In particular the impact of the proposed development should be assessed, where applicable, with regard to:

- Natura 2000 sites, i.e. Special Areas of Conservation (SAC) designated under the EC Habitats Directive (Council Directive 92/43/EEC) and Special Protection Areas designated under the EC Birds Directive (Directive 2009/147 EC),
- Other designated sites, or sites proposed for designation, such as Natural Heritage Areas and proposed Natural Heritage Areas, Nature Reserves and Refuges for Fauna or Flora, designated under the Wildlife Acts 1976 to 2010,
- Species protected under the Wildlife Acts including protected flora,
- '*Protected species and natural habitats*', as defined in the Environmental Liability Directive (2004/35/EC) and European Communities (Environmental Liability) Regulations, 2008, including Birds Directive – Annex I species and other regularly occurring migratory species, and their habitats (wherever they occur) and Habitats Directive – Annex I habitats, Annex II species and their habitats, and Annex IV species and their breeding sites and resting places (wherever they occur),
- Important bird areas such as those identified by Birdlife International,
- Features of the landscape which are of major importance for wild flora and fauna, such as those with a "stepping stone" and ecological corridors function, as referenced in Article 10 of the Habitats Directive.
- Other habitats of ecological value in a national to local context (such as those identified as locally important biodiversity areas within Local Biodiversity Action Plans and County Development Plans).
- Red data book species,
- and biodiversity in general.

Reference should be made to the National Biodiversity Plan and any relevant County Biodiversity Plan. Any losses of biodiverse habitat associated with this proposed development, such as woodland, scrub, hedgerows and other habitats should be mitigated for.

In order to assess the above impacts it may be necessary to obtain hydrological and/or geological data. In particular any impact on water table levels or groundwater flows may impact on wetland sites some distance away. The EcIS should assess cumulative impacts with other plans or projects if applicable. Where negative impacts are identified suitable mitigation measures should be detailed if appropriate. As EU Member States have to report every 6 years on the National resource of habitats and species listed under the Habitats Directive it is important that any impact on such habitats and species both inside and outside of Natura 2000 sites is recorded.

Alien invasive species

The EcIS should also address the issue of invasive alien plant and animal species, such as Japanese Knotweed, and detail the methods required to ensure they are not accidentally introduced or spread during construction. Information on alien invasive species in Ireland can be found at http://invasives.biodiversityireland.ie/ and at http://invasivespeciesireland.com/ .

Hedgerows, and protected species

Hedgerows form important wildlife corridors and provide areas for birds to nest in. In addition badger setts may be present. If suitable trees are present bats may roost there and they use hedgerows as flight routes. Hedgerows also provide a habitat for woodland flora. Where a hedgerow forms a townland or other historical boundary it is usually an old hedgerow. Such hedgerows will contain more biodiversity than a younger hedgerow. Hedgerows should be maintained where possible. The EcIS should provide an estimate of the length of hedgerow that will be lost, if any. Where trees or hedgerows have to be removed there should be suitable planting of native species in mitigation. Where possible hedgerows and trees should not be removed during the nesting season (i.e. March 1st to August 31st). Birds nests can only be intentionally destroyed under licence issued under the Wildlife Acts of 1976 and 2000.

Bats

Bat roosts may be present in trees, buildings and bridges. Bat roosts can only be destroyed under licence under the Wildlife Acts and a derogation under the Habitats Regulations and such a licence would only be given if suitable mitigation measures were implemented. Where so called bat friendly lighting is proposed as mitigation then it should be proven to work as mitigation.

Rivers and Wetlands

Wetlands are important areas for biodiversity. Any watercourse or wetland impacted on should be surveyed for the presence of protected species and species listed on Annexes II and IV of the Habitats Directive. These species could include otters (*Lutra lutra*), which are protected under the Wildlife Acts and listed on Annexes II and IV of the Habitats Directive, Salmon (*Salmo salar*) and Lamprey species listed on Annex II of the Habitats Directive, Freshwater Pearl Mussels (*Margaritifera species*) and White-clawed Crayfish (*Austropotamobius pallipes*) which are protected under the Wildlife Acts and listed on Annex II of the Habitats Directive, Frogs (*Rana temporaria*) and Newts (*Trituris vulgaris*) protected under the Wildlife Acts and Kingfishers (*Alcedo atthis*) protected under the Wildlife Acts and listed on Annex I of the Birds Directive (Council Directive 79/409 EEC*)*.

A suitable riparian habitat should be left along each watercourse. Construction work should not be allowed impact on water quality and measures should be detailed in the EcIS to prevent sediment and/or fuel runoff from getting into watercourses which could adversely impact on aquatic species. Flood plains, if present, should be identified in the EcIS and left undeveloped to allow for the protection of these valuable habitats and provide areas for flood water retention. If applicable the EcIS should take account of the guidelines for Planning Authorities entitled "*The Planning System and Flood Risk Management*" and published by the Department of the Environment, Heritage and Local Government in November 2009.

IFI should be consulted with regard to impacts on fish species and the applicant may find it useful to consult their publication entitled "Planning for watercourses in the urban environment" which can be downloaded from their web site at http://www.fisheriesireland.ie/fisheries-management-1/86-planning-for-watercourses-in-the-urban-environment-1 .

Water quality

Ground and surface waters quality should be protected during construction and operation of the proposed development and if applicable the applicant should ensure that adequate sewage treatment facilities are or will be in place prior to any development. The applicant should also ensure that adequate water supplies are present prior to development.

Marine

Marine information is available at http://www.npws.ie/marine/

Green Infrastructure

From a biodiversity point of view it is important to take note of the EU Green Infrastructure Strategy. Further information on this can be found at http://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructure_broc.pdf . Care should be taken to ensure that green infrastructure involves greening existing infrastructure rather than adding infrastructure to existing biodiversity corridors or other areas rich in biodiversity. With regard to waterways, the applicant may find it useful to consult the IFI publication entitled "Planning for watercourses in the urban environment" which can be downloaded from their web site at http://www.fisheriesireland.ie/fisheries-management-1/86-planning-for-watercourses-in-the-urban-environment-1 .

CMPs

Complete project details including construction management plans (CMPs) need to be provided in order to allow an adequate assessment to be undertaken. Applicants need to be able to demonstrate that CMPs and other such plans are adequate and effective mitigation, supported by scientific information and analysis, and that they are feasible within the physical constraints of the site. The positions, locations and sizes of construction infrastructure and mitigation, such as settlement ponds, disposal sites and construction compounds, may significantly affect European sites, other designated sites, habitats, and species in their own right and could have an effect for example on drainage, water quality, habitat loss, and disturbance. If these are undetermined at time of the assessment, all potential effects of the development on the site are not being considered. If applicants are not in a position to decide the exact location and details of these at time of application, then they need to consider the range of options that may be used in their assessment so that all issues are covered.

Appropriate Assessment

Guidance

With regard to appropriate assessment (AA) and screening for AA, some Guidance documents are referred to below which may help. However CJEU case law has to some extent clarified certain issues and should be consulted. In particular case C-258/2011-N6 Galway City Outer Bypass is relevant as is the recent opinion on the Briels case, C-521/12.

Guidance on AA is available in the Departmental guidance document on Appropriate Assessment, which is available on the NPWS web site at http://www.npws.ie/sites/default/files/publications/pdf/NPWS_2009_AA_Guidance.pdf and in the EU Commission guidance entitled "*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*" which can be downloaded from http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf

Conservation objectives

In order to carry out the appropriate assessment screening, and/or prepare the Natura Impact Statement (NIS), information about the relevant Natura 2000 sites including their conservation objectives will need to be collected. Details of designated sites and species and conservation objectives can be found on www.npws.ie . Site-specific, as opposed to generic, conservation objectives are now available for some sites. Each conservation objective for a qualifying interest is defined by a list of attributes and targets and are often supported by further documentation. Where these are not available for a site, an examination of the attributes that are used to define site-specific conservation objectives for the same QIs in other sites can be usefully used to ensure the full ecological implications of a proposal for a site's conservation objective and its integrity are analysed and assessed. It is advised, as per the notes and guidelines in the site-specific conservation objectives, that any reports quoting conservation objectives should give the version number and date, so that it can be ensured and established that the most up-to-date versions are used in the preparation of Natura Impact Statements and in undertaking appropriate assessments.

Where further detail is required on any information on the website www.npws.ie , a data request form should be submitted. This can be found at http://www.npws.ie/maps-and-data/request-data .

Cumulative and ex situ impacts

A rule of thumb often used is to include all Natura 2000 sites within a distance of 15km. It should be noted however that this will not always be appropriate. In some instances where there are hydrological connections a whole river catchment or a groundwater aquifer may need to be included. Similarly where bird flight paths are involved the impact may be on an SPA more than 15 km away.

Other relevant Local Authorities should be consulted to determine if there are any projects or plans which, in combination with this proposed development, could impact on any Natura 2000 sites

Water and wastewater

If this development is not on mains sewerage then impacts from wastewater, including cumulative impacts, on groundwater and any nearby surface waters or wetland habitats should be assessed. In addition if it is not on mains water supply then impacts, including cumulative impacts, relating to water abstraction should be assessed. This may require hydrogeological information. Where connection will be to existing infrastructure the

impact of the demand for additional potable water, waste water treatment, and additional surface runoff should be assessed.

Alien invasive species

If the proposed development is adjacent to a Natura 2000 site and involves landscaping or a garden, care should be taken to ensure that no terrestrial or aquatic invasive species are used which could impact negatively on these sites. Information on alien invasive species in Ireland can be found at http://invasives.biodiversityireland.ie/ and at http://invasivespeciesireland.com/ .

CMPs

Complete project details including construction management plans (CMPs) need to be provided in order to allow an adequate appropriate assessment to be undertaken. Applicants need to be able to demonstrate that CMPs and other such plans are adequate and effective mitigation, supported by scientific information and analysis, and that they are feasible within the physical constraints of the site. The positions, locations and sizes of construction infrastructure and mitigation, such as settlement ponds, disposal sites and construction compounds, may significantly affect European sites, designated sites, habitats, and species in their own right and could have an effect for example on drainage, water quality, habitat loss, and disturbance. If these are undetermined at time of the assessment, all potential effects of the development on the site are not being considered. If applicants are not in a position to decide the exact location and details of these at time of application, then they need to consider the range of options that may be used in their assessment so that all issues are covered. The CMP should also include methods to ensure invasive alien species are not introduced or spread.

Licences

Where there are impacts on protected species and their habitats, resting or breeding places, licences may be required under the Wildlife Acts or derogations under the Habitats Regulations. In particular bats and otters are strictly protected under annex IV of the Habitats Directive and a copy of Circular Letter NPWS 2/07 entitled "*Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species/applications for derogation licences*" can be found on the Departmental web site at http://www.npws.ie/sites/default/files/general/circular-npws-02-07.pdf

In addition licences will be required if there are any impacts on other protected species or their resting or breeding places, such as on protected plants, badger setts or birds nests. Where possible hedges and trees should not be removed during the nesting season (i.e. March 1st to August 31st). Birds nests can only be intentionally destroyed under licence issued under the Wildlife Acts of 1976 and 2000.

In order to apply for any such licences or derogations as mentioned above the results of a survey should be submitted to the National Parks and Wildlife Service of this Department. Such surveys are to be carried out by appropriately qualified person/s at an appropriate time of the year. Details of survey methodology should also be provided. Such licences should be applied for in advance of planning to avoid delays and in case project modifications are necessary.

Should this survey work take place well before construction commences, it is recommended that an ecological survey of the development site should take place immediately prior to construction to ensure no significant change in the baseline ecological survey has occurred. If there has been any significant change mitigation may require amendment and where a licence has expired, there will be a need for new licence applications for protected species.

The above observations and recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by a planning authority, in her role as statutory consultee under the Planning and Development Act 2000, as amended.

You are requested to send further communications to this Department's Development Applications Unit (DAU) at **manager.dau@ahg.gov.ie** (team monitored); if this is not possible, correspondence may alternatively be sent to:

The Manager
Development Applications Unit (DAU)
Department of Arts, Heritage and the Gaeltacht
Newtown Road
Wexford
Y35 AP90

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Yvonne Nolan,
Development Applications Unit
Tel: (053) 911 7382

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Your Ref:
Our Ref: **G Pre00280/2015**
(Please quote in all related correspondence)

07 December 2015

Deborah D'Arcy
Ecological Consultant
Heather View
Annagh
Gorey
Co. Wexford

Via email to deborahdarcy@eircom.net

Re: Scoping consultation regarding a proposed residential development at Carcur Park, Wexford

A chara

On behalf of the Department of Arts, Heritage and the Gaeltacht, I refer to correspondence received in connection with the above.

Outlined below are heritage-related observations/recommendations of the Department under the stated heading(s).

Nature Conservation

This Department notes the applicant's request for a meeting with Dr. Marnell of the Scientific Unit of the National Parks and Wildlife Service (NPWS) of this Department and with NPWS Regional staff to seek further guidance on otters, in particular impact assessment and mitigation. This Department recommends that you consult with the otter literature which is referred to and/or is available on www.npws.ie including the otter threat response plan at:
http://www.npws.ie/sites/default/files/publications/pdf/2009_Otter_TRP.pdf
and the site specific conservation objectives for the Slaney River Valley SAC at
http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000781.pdf

The Department notes that a walkover survey has found otter on site. Therefore a more detailed otter survey may be necessary in order to determine population and territories

to enable a determination of impacts. Should the applicant require further expert information the applicant may wish to consult an otter expert.

In addition to the above, should the applicant wish to consult further with Regional staff of NPWS the District Conservation Officer, Ms. Ciara Flynn, can be contacted at 076-100-2680.

The above observations and recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by a planning authority, in her role as statutory consultee under the Planning and Development Act 2000, as amended.

You are requested to send further communications to this Department's Development Applications Unit (DAU) at **manager.dau@ahg.gov.ie** (team monitored); if this is not possible, correspondence may alternatively be sent to:

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An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Your Ref:
Our Ref: **G Pre00280/2015**
(Please quote in all related correspondence)

13 April 2016

Deborah D'Arcy
Ecological Consultant
Heather View
Annagh
Gorey
Co. Wexford

Via email to deborahdarcy@eircom.net

Re: Scoping consultation regarding a proposed residential development at Carcur Park, Wexford

A chara

On behalf of the Department of Arts, Heritage and the Gaeltacht, I refer to correspondence received in connection with the above.

Outlined below are heritage-related observations/recommendations of the Department under the stated heading(s).

Nature Conservation

The new compensatory pond must be built prior to the destruction of the existing freshwater pond. Concentrations of otter use were found on the seaward side of this pond and it may be important to otters which frequently require freshwater in which to wash their coats. It should be constructed using current best practice guidance in the construction of such ponds specifically for otter. Detailed design including reference to any guidance documents used must be included in the Planning Application. A regime to monitor usage of the pond to determine success of this mitigation must take place prior to the destruction of the existing pond. Where otter usage is not found, further mitigation may be required to the initial pond design to increase usage by otter prior to the destruction of the existing pond.

There are long-term plans for a bridge across the estuary, served by a road which would run through the development and overlap with the proposed new pond location. Design of the new pond should take into account this and any other potential future

development in its vicinity to safeguard its long-term availability to otters. In addition, in combination impacts of this bridge and the development on otter must be covered in the NIS.

The above observations and recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by a planning authority, in her role as statutory consultee under the Planning and Development Act 2000, as amended.

You are requested to send further communications to this Department's Development Applications Unit (DAU) at **manager.dau@ahg.gov.ie** (team monitored); if this is not possible, correspondence may alternatively be sent to:

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Y35 AP90

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Yvonne Nolan,
Development Applications Unit

Otter *Lutra lutra* survey of the Lower River Slaney Estuary at Carcur, Co. Wexford

October 2016

PROJECT TITLE	**Carcur Residential Housing Project**
REPORT TITLE	**Otter *Lutra lutra* survey of the Lower River Slaney Estuary at Carcur, Co. Wexford**
AUTHORS	**Ross Macklin (Tirturus Environmental Services)**
DOCUMENT NO. & REVISION	**JN01_16_3 (For Issue)**
Date	**10th October 2016**

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1. Introduction

Triturus Environmental Services were contracted by Seamus Neville & Sons to undertake a European Otter *Lutra lutra* (L.) survey (hereafter otter) on the River Slaney estuary at Carcur, Co. Wexford between January and March 2016. The surveys would identify the distribution pattern of otters in the light of a proposed residential housing development in the area (see Figure 2.1 below).

The River Slaney Estuary is known as an important habitat for otter and the species is found from the upper reaches of the river system as far downstream as Wexford Harbour. The presence or absence of otters in the vicinity of the proposed development will help inform mitigation to prevent impacts to the local population as a result of proposals. The species is considered vulnerable given their reliance on fish food supplies, sensitivity to disturbance and pollution in addition to their short life cycle and small litter sizes (Channin, 2003).

Of most importance in terms of conservation are natal holting sites where otters rear their young. To date there has been limited research on otters inhabiting the Lower River Slaney and Wexford Harbour apart from work carried out during the national otter surveys. Therefore, by identifying contemporary records of otter utilisation of the River Slaney estuary at Carcur, any overlap between otter breeding and feeding places and the proposals can be established.

Triturus Environmental Services made an application under Sections 9 & 23 (6) b of the Wildlife Acts 1976 to 2012 to monitor otter holt activity by means of trail camera surveillance at Carcur. A license was required given that the use of camera equipment near a breeding/ resting site. As such this act may constitute a disturbance. Subsequently Triturus were successfully granted a license to undertake surveys between January and March 2016. The Development Applications Unit planning reference for the project is GPRE00280/2015 (proposed residential development at Carcur Park, Wexford).

Otter Legal Status in Ireland

Otter are listed under Annex II & V of the EU Habitats Directive (92/43/EEC). Otter breeding and resting areas are afforded protection under the Wildlife Act 1976 and Wildlife (Amendment) Act, 2000 (S.I. No. 38 of 2000) and the European Communities (Birds and Natural Habitats) Regulations, 2011. More specifically with regard to development it is considered an offence to;

- Deliberately or Intentionally kill, injure or capture an otter
- Deliberately disturb an otter

- Possess or control any live or dead specimen or anything derived from an otter
- Wilfully interfere with any structure or place used for breeding or resting by an otter
- Damage or destroy a breeding site or resting place of an otter

Otter Conervation Status in Ireland

Otter conservation status has been assessed as 'Near threatened' (Marnell et al. 2009). The previous Article 17 report on the Status of EU Protected Species and Habitats in Ireland for otter, deemed the prospects of the population trend to be poor (NPWS, 2008). This was accounted for by an estimated 24% decline in the estimated number of breeding females from 8,400 to 6,400 (Marnell et al. 2011). However, the range of the species (66500km^2) still remained favourable (NPWS, 2008), in addition to the habitat and future prospects (NPWS, 2008). During follow up surveys (i.e. the 2010/2012 National Otter Survey of Ireland) it was illustrated that there was an increase in otter range by order of 31% from the 1993-2006 survey data. Despite an increase in the range of the species the established population baseline estimates from 1993-2006 were not significantly different (Reid et al. 2013). The data collated under the statutory parameters in assessing the conservation status of a species i.e. range, population, habitat & future prospects were considered to be in 'Favourable or Good Conservation Status' in contradiction to the findings of earlier national otter surveys. The observed positive trends (i.e. changes from previous survey conclusions) were linked to more accurate data collation and survey knowledge rather than empirical evidence of improved conservation status (Reid et al. 2013).

Otters are listed as a conservation objective species in the Slaney River Valley SAC (site code 0781; NPWS 2011). Despite being a conservation objective species limited research on the distribution of otter within the River Slaney Estuary has been undertaken apart from the National Otter Surveys undertaken during 1980/1981, 2004/2005, 2010/2011. It is apparent that there has been some trend of decline in the number of positive otter records recorded at sites of the River Slaney, despite inconsistency in the sample size between years (see Table 1.1 below; Reid et al. 2013).

Table 1.1 – Number of Positive Otter records at survey sites on the River Slaney during the National Otter Surveys between 1980/1981, 2004/2005 & 2010/2011 (extracted from Reid et al. 2013).

Year	1980/1981		2004/2005		2010/2011	
Criteria	**+ve/n**	**%**	**+ve/n**	**%**	**+ve/n**	**%**
Records	55/57	96.5	15/17	88.2	3/7	42.9

2. Methods

Study Site

The townland of Carcur, Co. Wexford in which the study site is situated, is located 2km north west of Wexford Bridge (Irish Grid, T 03795 23321). The site is located on the southern banks of the Lower River Slaney Estuary (IE_SE_040_0200) which itself is contained within Hydrometric Area 12 and within the South Eastern River Basin District. The transitional waters of the Lower River Slaney Estuary are considered potentially eutrophic according to the Environmental Portection Agency (i.e. downstream of Oilgate[1]). The Upper River Slaney Estuary however, has improved water quality, being of 'Intermediate Quality' or essentially achieving moderate levels of enrichment. The study site is also located within the Slaney River Valley SAC (site code 0781), the Wexford Slobs and Harbour SPA (site code 4076) and the Wexford Slobs & Harbour pNHA (site code 0712).

The River Slaney catchment contains approx. 4.94km^2 of fluvial habitat, with the entire accessible reaches of the catchment comprising 4.38% of the total national riverine habitat accessible to Atlantic salmon, ranking it 7th nationally (McGinnity et al., 2003). The wider river basin thus contains fisheries resources important for the sustenance of otter populations that predate on salmonids.

The Carcur area was traditionally an Atlantic salmon *Salmo salar* draft net fishery. Inshore sheltered estuarine areas with bays act as excellent holding areas for salmon and seatrout *Salmo trutta* in advance of migration upriver. The rich feeding resourves of the Slaney River and Estuary thus provide a good foraging area for otter.

Otter Activity Survey

Walkover otter surveys were conducted during dry weather conditions between January and March 2016. The surveys helped identify patterns of otter usage of the site (i.e. by evidence of spraint, latrines, couches, prints, slides etc). Walkover surveys targeted gravel / sand bars adjoining the estuary, grassy points, scrub, ponds and drainage channels where spraint, slides and prints can be typically found found. Embankments and areas of dense vegetation were examined for evidence of holting. The walkover surveys followed the best practice survey methodology as recommended by Chanin (2003) and Bailey & Rochford (2006);

- Sites are selected at convenient access points;
- A survey is carried out for spraints (but other signs, such as prints, fish remains, slides, etc. are also recorded) over a distance of 600m along the bank;

[1] Refer to EPA envision webmapper at www.epa.ie

- At Carcur however, the full extent of the site was surveyed along the coast and along any freshwater habitats, areas of scrub and areas of known otter activity;
- At each discrete block of otter habitat sketch maps were drawn and photographs taken to aid relocation, while habitat variables (both aquatic and terrestrial) including pollution and disturbance levels were recorded.
- Holt sites were mapped relative to the extent adjoining areas of cover (i.e. scrub/ woodland/ treelines etc.) to define the breadth of the habitat to establish the current extent of otter habitat cover.

It is widely known that otter mark territory by sprainting. Aggregations of spraint indicate regular use of a particular area by otter and can be used as a proxy for otter usage of a particular area of habitat. At Carcur otter activity was monitored over three periods between Janaury and February 2016 to establish patterns of otter usage of the site. The numbers of otter spraints were counted at each sprainting site and the location of each sprainting site was recorded in ITM co-ordinates using a garmin Oregon GPS unit. The data was then transferred into a GIS database using Qunatum 2.10. Heat maps of spraint density were then constructed for each survey time period (i.e. 3 no.) to identify otter usage of the wider site. By comparing otter usage of the site temporally it was possible to establish 'hotspots' of otter activity and this would help tailor the mitigation proposals to prevent impacts to the species.

Camera Surveys at Holts

Given the evident high usage of the intertidal habitat by otter and the presence of potential otter breeding sites it was deemed necessary to undertake follow up holt surveys to the preliminary walkover surveys carried out during the autumn and winter of 2015. Further surveys were then commissioned for the winter and early spring of 2016.

Following the identification of patterns of otter usage of the site including validation of potential natal holt sites (as identified during preliminary site surveys), four cameras were positioned at strategic locations including access points to holt areas. Given that the cameras have a trigger range of 20m they were placed no closer than 10m from holt entrances where possible to minimise disturbance. Cameras were positioned during the day to avoid potential disturbance to otters that are most active at dawn, dusk or nocturnally. The cameras record time, date, temperature and other attributes and are triggered by mammal movement using infra red sensors. Cameras were repositioned after

Example of an otter detected using a Browning trail camera on the River Lee, Co. Cork

10 day static periods at six time intervals between January and March 2016. Browning special ops XTR 10MP, infrared cameras were used as they are considered the best available on the market and have silent black flash that causes a minimal disturbance to wildlife. In advance of commencement of the survey the local ranger of the NPWS was notified.

The trail cameras were alternated between potential holt sites that were identified on the first site walkover conducted in early January 2016. Cameras were positioned along identified animal trails leading into the observed excavated entrances to dwellings. The number of camera triggers would indicate the frequency of use. It was not possible in all cases to get very clear shots given the security of the cameras along a relatively open shoreline that is walked by patrons of Wexford Town.

Constraints (Camera Trapping)

For security reasons and because of the tidal range on the foreshore, the position of trail cameras was somewhat restricted. As such camera angles and had to be enclosed at tight angles and utilise the existing tree and embankment as best as possible in order to void theft. Furthermore, very wet weather conditions often resulted in lens condensation.

Habitat Mapping

Habitat mapping was prepared by Deborah D'Arcy (lead ecologist on the project) as part of other ecological reporting being prepared as part of the Ecological Impact Assessment. The habitat mapping helped establish the nature of the baseline terrestrial landscape in order to define the extent of available otter habitat relative to the location of holt sites, feeding territory and bathing areas. Typical habitat of importance to otter includes treelines, scrub, flowing water, ponds and any habitat that can support food or secluded breeding (e.g. wetlands with amphibians, culverts with rodents, estuaries with fish and crustaceans etc.). The situation of identified habitats whether breeding or foraging areas relative to concentrations of activity can then be identified in terms of their functional importance as habitats supporting otter.

Optimum Survey Period and seasonal sensitivities

There is not specifically an optimal season for otter surveying as the species is active all year round and can breed at any time during the year. By covering three months of surveying between January and March 2016, the chances of detecting otter usage of a holt site was better optimised.

Figure 2.1 - Carcur Otter Survey Area, Carcur, Co. Wexford (prepared on google street map base layer)

3. Results

Habitats at Carcur

The site area at Carcur, Co. Wexford (Irish Grid, T 03795 23321) was defined as a loosely triangular block of land dominated by scrub and broken treelines. Much of the scrub from the centre of the site had been cleared meaning the majority of the site comprised recolonising bare ground spoil heaps with clumps of cut gorse. The eastern boundary of the site was marked by a narrow strip of broadleaved woodland and the south by amenity grassland GAA fields. The south east of the site contained a block of reed swamp bordering the Wexford railway line. Estuarine habitat marked the northern and eastern boundaries of the site. Where boundaries of the site overlapped intertidal hbitat they were divided by linear strips of gorse scrub and scattered trees. These habitats provided a degree of seclusion for otter moving along the intertidal area. A small pond was located to the north east of the site which provided an area for otters to bath.

Otter Usage of Site

During the autumn and winter of 2015 otter records were collected by Tom Gittings and Deborah D'Arcy at Carcur (December 2015 records illustrated above in Figure 3.1 below). Further repeat surveys were undertaken by Ross Macklin during January through March 2016. The follow up surveys were commissioned to consolidate further information on the patterns of usage on the site by otter. Otter activity in the form of spraints, couches and potential holting areas was concentrated along the intertidal (see Figures 3.1, 3.2 & 3.3). Records were found almost exclusively within 15m of the high tide mark. Concentrations of spraint were located predominantly in narrow strips of dry grassland adjoining the intertidal and scrub areas. While occasional spraint and prints were found on the sand and shingle of the intertidal, these areas are inundated on high tide and such were washed away quickly unless fresh at the time of surveying. Overall the most regular sprainting sites were concentrated at three areas. These were to the west of the site at an open grassy emebankment adjoining broadleaved woodland, between the pond and point to the north east of the site and between the small track and reedswamp to the south east of the site. The sprainting area to the south east of the site was used with less regularity during the winter and early spring of 2016 than during the autumn and winter of 2015. What remains clear is that areas of dry grassy embankment adjoining the intertidal were the most important sprainting areas (see Figure 3.1 & 3.2).

Figure 3.1 – Otter records December 2015, Carcur, Co. Wexford using a geo-rectified Bing Aerial Image

Visual Sightings of Otter

Otter are considered a shy animal in most istances and are considered to be most active at dawn, dusk and during the night. However, occasionally they can be seen during the day, should feeding, social behaviour or other stimuli permit daytime activity. Visual observations of otter were recorded by Tom Gittings while carrying out eight winter bird survey counts between September 2015 and January 2016. Each survey took between 5-6 hours at low tide between Wexford Bridge and Ferrycarrig Bridge and / or ebb/ flood tide counts around the development site at Carcur. Live sightings were recorded on two occasions;

- 29/10/2015 - 1 seen swimming into shore and then going into reeds, carrying a fish, near Castlebridge end of estuary (approx grid ref 304300 125200) at 12:50.
- 10/12/2015 - 2 on eastern shore of site, just up from reedbed, in intertidal zone, close to path into scrub (approx grid ref 303700 122900) at 08:35. Observed from northern shore through telescope. Both animals appeared to be grooming, possible mutual. One in front was an adult, the other was patially obscured.

Figure 3.2 – Location of otter records (spraint, prints, slides excluding holts & couches) at Carcur, Co. Wexford

Potentential holts were identified as excavations with gaps >30cm in dimater, with evidence of usage in the form of worn tracks through scrub and grassy areas, otter hair on bramble, fish remains etc. Such features coupled with knowledge of otter scent (a useful cue for otter presence) helped identify suspected holt areas. Furtheemore, large openings underneath tree rooting zones and man made structures that provided oppurtunities were also investigated (see Figure 3.3 below).

Sites with good potential were typically surrounded by scrub (dominated by gorse) and or trees including oak and hawthorn. The root zones allowed animals to excavate under the soil structure bound by the root zones. Often there were sequences of smaller burrows and these were a readily indentifiable example of rat dwellings rather than otter.

Example of excavation (monitored as a potential holt west of pond)

Fox entering potential den area near gorse scrub at pond

Brown rat near potential holt western end of site

While some of the potential holt site excavations were large >40cm in height and upto 80cm wide (maximum) they were used by brown rats at the time of the survey as the cameras revealed very frequent nocturnal triggers by rats and / or mice. Rats and mice are very common in Wexford given the known grain production in the wider region. Fox were common near areas containing gorse scrub, where they likely were hunting rats and mice. Otter activity near the observed potential holt excavations was limited. Indeed the only potential holt site where otter were recorded with any frequency was a holt structure situated in a boulder pile forming part of the treeline/ embankment bordering the shoreline to the north of the site. This man made holt was specifically located near an overgrown trail into gorse scrub leading to the holt.This area was considered to be used as an infrequent resting place as <10 triggers were noted here over a 45 day monitoring period. Nonetheless this was the only potential holt site where some level of otter activity was detected. While frequent use of a holt site was not detected as described above, frequent activity at other otter resting places in the open was identified. These resting areas know as 'couches' were located at three distinct areas in dry grassy verges between the interidal zone and land boundaries. They were as follows and as illustrated on Figure 3.3; i) *To the west of the site (near broadleaved forestry strip)*, ii) *between the pond and the point to the north east of the site*, and iii) *near the junction of a small path and the shoreline to the east of the site*. These flattened areas of grassy banks were often accompanied by piles of otter spraint

Otter entering man made holt site

Otter movement approaching man made holt

nearby and were above the high tide limit. Given they were accompanied by scrapings and high numbers of spraints (i.e. often >5) they could be considered as 'latrine sites'.

Table 3.1 – Holt Survey Records from trail camera surveillance

Potential Holt Description	Location (ITM)	Number of Camera Triggers	Animal Detected (number of triggers in parenthesis)
1. Excavation on embankment bordering intertidal	703664, 623365	4	Fox
2. Excavation on embankment bordering intertidal	703561, 623402	>100	Rat, Mouse
3. Excavation on embankment bordering intertidal	703344, 623844	>75	Rat, Mouse
4. Excavation on embankment bordering intertidal	703346, 623486	>50	Fox
5. Man made (old boulder pile in gorse scrub)	703459, 623447	10	Otter (9), Grey crow (1)
6. Excavation on embankment bordering intertidal	703242, 623499	20	Fox

Excavation on embankment bordering intertidal	703081, 623497	>50	Rat, Thrush

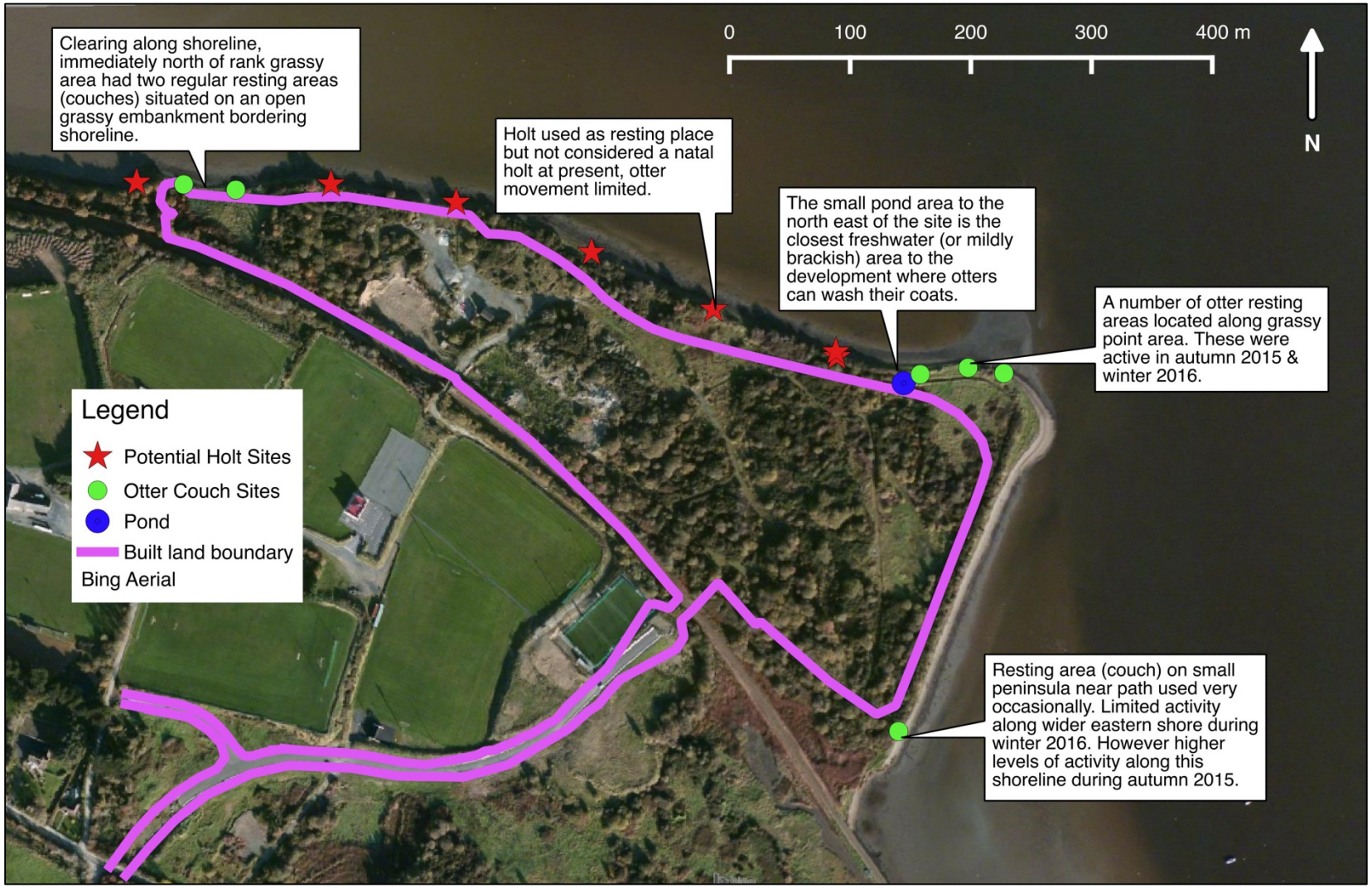

Figure 3.3 – Location of potential holt sites & identified resting areas (couches) at Carcur, Co. Wexford

4. Discussion

Otter Usage of the Study Area

Information on otter activity in the footprint of the proposed development site at Carcur, Co. Wexford was collated by recording patterns of otter activity during the autumn and late winter of 2015 and during the winter and early spring of 2016. The otter usage of the study area at Carcur was exclusively restricted to areas within 15m of the intertidal. Sprainting sites were detected in dry grassy strips adjoining the intertidal. Otter also frequently visited a small ponding area to the north east of the site (see Figure 3.2 above). This was likely a functional visit as otters are known to wash their coats upto once a day in freshwater. Given that the patterns of use were relatively consistant overtime at Carcur, it has been identified that the four important zones of otter activity exist adjacent to the proposed development. They include the following areas;

1. The open grassy embankment adjoining the woodland strip and small point to the north west of the site
2. The small freshwater pond to the north east of the site
3. The large point and adjoining dry grassy areas to the north east of the site (majority of records detected here)
4. The south eastern extent of the site (near trackway through scrub) and adjoining reed swamp

Outside of regular sprainting sites as identified above, holting areas and more open otter resting sites (couches) were also studied in detail. Potential holt sites were a combination of man made structures (1 no.) and natural bankside holes and excavations (6 no.). The rooting zones of oak and hawthorn facilitated some natural holes of various dimensions between 20cm and 40cm +. While numerous small holes existed they were predominantly used by rats and mice. Larger natural excavations were potentially used by fox or otter, but activity in these areas was not recorded apart from fox, rats and mice. Typically areas used by fox were concentrated in areas of gorse scrub that sometimes extended inside the site boundary. Otter activity by contrast was rarily far from the shoreline (approx. 25m from intertidal but typically <10m). Of the numerous initial identified potentially suitable holt sites only was was used by otter with any consistant regularity. This semi-active holt site resulted from an old quarry embankment of boulders surrounded by gorse scrub. Several large voids upto 0.5m width to 0.4m high existed here. While the identified holt site was not considered a natal holt as no young were present at the time of the survey and only one animal was visiting very infrequently (9 triggers over a 45 day period) it is nonetheless considered a resting place. Further regular resting places (3 no. non holt sites) in the form of couches, were located areas of flattened dry grassland strips above the high tide line.

These areas were identified alongside frequent sprainting sites (see Figures 3.2 & 3.3). In summary three regular resting areas were identified broadly overlapping regular sprainting sites and one occasionally used holt (man made). All resting sites and the single active holt were located within 15m of the high tide mark of the intertidal zone. These areas are summarised below;

1. Open grassy embankment adjoining the woodland strip and small point to the north west of the site (two regular couch areas were located here)
2. Manmade holt, where gaps between boulders existed supporting irregular usage by otter (not considered a natal holt at present)
3. The large point and adjoining dry grassy areas to the north east of the site (3 regularly used couch sites located here)
4. The south eastern extent of the site (near trackway through scrub) and adjoining reed swamp (couch area on short grassy promontory)

Threats

According to the Ecological Guidance for Local Authorities & Developers, Scott Cawley (2013) key threats to otter as a result of development include the following;

- Loss of and damage to bankside, coastal and in-stream habitats causing loss of shelter and holt sites by drainage, removal of wet areas, removal of vegetation or landscape features and pollution of waterbodies.
- Fragmentation of commuting routes between feeding areas caused by bridge works, roads, weirs and culverts.
- Loss of feeding areas caused by infilling of wetlands or depreciation of water quality.
- Effects of lighting, noise, vibration and human activity during construction and operation near areas used by otter

Specifically, impacts relating to the proposals at Carcur include disturbance and the removal of habitat. Disturbance would relate to both the operational and construction phases of the development. This would include large machinery disturbance during site clearance and the build phases. Furthermore, potential changes in the levels of human activity on the intertidal zone from walkers would occur during the operational phase. There are proposals to clear the central areas of the site but these areas had no evidence of otter activity, based on numerous site visits, sprainting activity and trail cameras. The central areas of the site as existing comprise mainly partially cleared ground with recolonising

grassy patches and scrub on piles of earth. While impacts to otter habitat is not considered to be significant in the central areas of the site given no recorded levels of activity and existing partially cleared ground[2], proposals to remove the freshwater pond (see Figures 3.2 & 3.3) could have potential significant negative impacts. This is considered given that the pond is an important freshwater source for otters to wash their coasts and conenrations of otter activity were noted on the seaward side of the pond (i.e. north side; see Figures 3.2 & 3.3).

[2] Note the site was historically a gravel quarry

5. Mitigation

Summary of Otter usage of the site

Conclusively, the evident pattern of use by otter of the intertidal along a narrow coastal strip at Carcur, can be considered an important area for commuting and feeding otters. It is essential to maintain ecological connectivity for the species between different types of micro-habitat that offer different oppurtunities for otter. Otter appear to move between the reedwamp and tidal channel to the south east of the site and along the intertidal towards the upper River Slaney Estuary (based on the pattern of spraints). At Carcur important connecting habitats bordering the site include the following;

1. Reedswamp, tidal channel and adjoining scrub south of the railway line (i.e. south east of site)
2. Shingle, san and mud intertidal (entire estuarine perimeter)
3. Dry grassy strips adjoining the intertidal, used as sprainting sites
4. Freshwater pond to north east of site
5. Scrub and scattered trees coastal strip providing seclusion along the shoreline

These habitats should be preserved and not damaged during the site clearance phase of the project (i.e. for road and housing construction). The coastal strip of scrub and scattered trees should be marked by boundary fencing in advance of site clearance to avoid destruction and or fragmentation of this habitat. To avoid unnecessary loss of habitat the construction method statement should clearly mark areas to be fenced off in advance of construction commencement that should be agreed with the NPWS. An Ecological Clerk of Works (EcOW) should be commissioned to oversee the site clearance and construction phases to ensure the important habitats used by otter are not disturbed.

Otter Habitat Buffer Zone

Otters are typically known to forage within 80m of the high water mark of the shoreline (NPWS 2007; Kruuk 2006), while a 10m buffer zone into terrestrial habitat from the high water mark may be considered critical (NPWS 2007). Given the development area at Carcur overlaps the River Slaney Estuary SAC it would be essential that the existing scrub habitat is retained and a buffer is kept in place of at least 10-15m. A conservative buffer of 15m (where construction will not take place) will be applied from the banktop bordering the intertidal zone as the banktop is a consistant marker not affected by tidal ranges. It is proposed that the shoreline be fenced off with permanent fencing to

prevent access to the shoreline by regular dog walkers. This will help prevent significant changes in the patterns of usage of the shoreline that currently receives moderate footfall. The fence line should also enclose the new proposed otter pond and man made holt as discussed in the extended mitigation below.

Otter Holt

Given the presence of a man-made holt site along the centrepoit of the northern shoreline (ITM 703459, 623447; see Table 3.1 & Figure 3.3) it is important that the activity of this holt area is rechecked immediately prior to construction. This will inform the application of the standard guidance recommended by the National Roads Authority (NRA) in advance of site clearance and works commencement (NRA 2008);

- No works should be undertaken within 150m of any holts at which breeding females or cubs are present.
- Following consutation with NPWS, works closer to such breeding holts may take place provided appropriate mitigation measures are in place, e.g. screening and / or restricted working hours onsite.
- No wheeled or tracked vehicles should be used within 20m of active, but non-breeding otter holts.
- Light work such as digging by hand or scrub clearance should also not take place within 15m of such holts , except under license.
- The prohibited working area associated with otter holts should be fenced off where appropriate with temporary fencing with appropriate signage on exclusion fence, with appropriate communication to site staff of the sensitivity of the area.

In advance of any site clearance, piling, light works or use of plant machinery at the locations of the holting sites, an adequate buffer zone should be agreed in consultation with the NPWS based on the monitoring data along with requirements for a Section 25 derogation under the 1997 Habitats Regulations. The holt area should also be closed off with perimeter fencing in advance of site clearance.

Otter Pond

The current proposed layout will overlap the freshwater pond to the north-east of the site. As a result, the pond would be infilled. To mitigate for the loss of this habitat (that incidentally is important for otter washing their coats), a new compensatory pond will be constructed in the north east of the site.

The pond will be of equal or greater dimensions to the existing freshwater pond (approx. 20m by 15m) with an average depth of 0.75m. The pond should be landscaped with hawthorn and blackthorn scrub at the landward side to provide seclusion for otter. There should also be planting along the fenceline that will be constructed to protect the pond. Prior to the construction of the new pond the old pond should be fenced off in adavance of site clearance to prevent its distruction in advance of the construction of the new pond. The permanent new pond structure will be fenced off at the landward site to prevent access by dogs and people from the adjacent housing development. As described above a line of hawthorn/ blackthorn trees should be planted along the fenceline to help provide seclusion for otter. An indicative location for the new pond has been provided in Appendix B.

Following consultation with the NPWS, the following requirements have been proposed for otter with regard the construction of the new pond (consultation reference **G Pre00280/2015**);

- The new compensatory pond must be built prior to the destruction of the existing freshwater pond.
- The pond design should use current best practice guidance in the construction of such ponds specifically for otter. Detailed design including reference to any guidance documents used must be included in the Planning Application.
- A regime to monitor usage of the pond to determine success of this mitigation must take place prior to the destruction of the existing pond.
- Where otter usage is not found, further mitigation may be required to the initial pond design to increase usage by otter prior to the destruction of the existing pond.
- There are long-term plans for a bridge across the estuary, served by a road which would run through the development and overlap with the proposed new pond location.
- Design of the new pond should take into account this and any other potential future development in its vicinity to safeguard its long-term availability to otters. In addition, in combination impacts of this bridge and the development on otter must be covered in the NIS.

6. Bibliography

Chanin, P. (2003). Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.

National Roads Authority (2008) Guidelines on the treatment of otters prior to the construction of national road schemes. National Roads Authority, Dublin 4.

NPWS (2011) Conservation Objectives: Slaney River Valley SAC 000781. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland

APPENDIX A

NPWS Section 9 & 23-6(b) License

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Licence No. **134/2015**

NATIONAL PARKS & WILDLIFE SERVICE

Wildlife Acts 1976 to 2012 - Sections 9 and 23 (6) (b)

LICENCE TO PHOTOGRAPH/FILM WILD ANIMALS FOR EDUCATIONAL, SCIENTIFIC OR OTHER PURPOSES

The Minister for Arts, Heritage and the Gaeltacht in exercise of the powers conferred on her by Sections 9 and 23 of the Wildlife Acts 1976 to 2012 authorises:

Ross Macklin, 42 Norwood Court, Rochestown, Cork

To photograph/film the species of wild animals specified in Column 1 of the Schedule hereunder in the area specified in Column 2 for educational, scientific or other purposes during the period beginning on the **21st day of December 2015** and ending on the **31st day of March 2016,** subject to the conditions listed overleaf.

Schedule

1	2
Species	**Area(s)**
Otter	**Carcur, Co. Wexford**

Dated this the 21st day of December 2015
For the Minister for Arts, Heritage and the Gaeltacht

National Parks & Wildlife Services
LICENCE

Conditions

1. This licence shall be produced for inspection on a request being made on that behalf by a member of An Garda Síochána or any person appointed by the Minister for Arts, Heritage and the Gaeltacht under Section 72 of the Wildlife Acts 1976 to 2012, to be an authorised person for the purposes of the Acts.

2. This licence does not confer the right to capture or handle any of the above species.

3. Local National Parks & Wildlife Service staff must be notified and agreement reached before any work can commence at any site.

4. You must liaise with the local Conservation Ranger prior to embarking to photograph/film at any particular location. The local Conservation Ranger must be contacted in advance during business hours.

5. Any query in relation to this licence should be made to National Parks and Wildlife Service, 7 Ely Place, Dublin 2, D02 TW98. Telephone: (01-8883232)

NOTE: This licence does not confer right of entry on any land

APPENDIX B

Indicative location of proposed Otter Pond

(Prepared by Reddy Architecture)


RESIDENTIAL DEVELOPMENT, CARCUR PARK
WEXFORD, CO. WEXFORD
HOUSE TYPE | DESCRIPTION | UNITS
DETACHED HOUSE
A-1 | 4 Bedroom Detached House + Garage, 2 Storey | 23
SEMI-DETACHED HOUSE
B-1 | 4 Bedroom Semi-Detached House, 2 Storey | 20
B-2 | 3 Bedroom Semi-Detached House, 2 Storey | 68
TERRACED HOUSE
C-1 | 3 Bedroom Terraced house, 2 Storey | 29
C-1A | 3 Bedroom Terraced house, 2 Storey | 10
C-4 | 2 Bedroom Terraced house, 2 Storey | 28
C-4A | 2 Bedroom Terraced house, 2 Storey | 14
TOTAL | 192
APARTMENT BLOCK
BLOCK A | Apartment Block | 52
BLOCK I | Apartment Block | 52
BLOCK J | Apartment Block | 52
BLOCK M | Apartment Block | 56
TOTAL | 212
TOTAL HOUSE + APARTMENTS | 404
OTTER HABITAT BOUNDARY
NATURA BOUNDARY
FUTURE BRIDGE
GAA Pitch
PLAYING PITCH
NATURAL BOUNDARY
OTTER HABITAT BOUNDARY
SITE BOUNDARY
CENTRAL REFUGE ISLAND
PUBLIC OPEN SPACE
PRIVATE GARDEN
PRIVATE / SECONDARY ROAD
CYCLING LANE
DRG SERIES
2.1 DESIGN DEVELOPMENT
REV | DATE | DRN | NOTES
reddy architecture + urbanism
JOB
CARCUR PARK
CLIENT
WILLIAM NEVILLE & SONS
TITLE
PROPOSED SITE LAYOUT PLAN
DATE DECEMBER 2015
SCALE 1:1000
DRN BJR
CHECKED MK
JOB NUMBER
15-209K
DRWG NUMBER
RAU-ZZ-ZZ-DR-A-21005
REVISION
DUBLIN OFFICE
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CARCUR PARK DEVELOPMENT:
WATERBIRD REPORT

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STATUS OF REPORT: Revision 1
DATE OF REPORT: 23 February 2016

CONTENTS

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LIST OF FIGURES

1. INTRODUCTION

1.1. TERMS OF REFERENCE

This report was commissioned by William Neville and Sons. The purpose of the report is to inform the assessment of the potential impacts of the proposed housing development at Carcur Park on the waterbird populations of the Wexford Harbour and Slobs SPA.

The report includes a review of existing waterbird data that is relevant to the assessment, and the results of waterbird surveys that were carried out between September 2015 and January 2016 for the present assessment. These surveys included: full low tide counts of the Ferrybank (Wexford Bridge) - Castlebridge (0O407) subsite of Wexford Harbour, ebb/flood tide and high tide counts of the area around the proposed development site, and recording of the disturbance responses of waterbirds in this area.

1.2. TERMINOLOGY

Development site: the site of the proposed Carcur Park housing development.

Ferrycarrig subsite: the Ferrybank (Wexford Bridge) - Castlebridge (0O407) subsite used in I-WeBS and WSP counts of Wexford Harbour.

I-WeBS: the Irish Wetland Bird Survey.

RD: the response distance used for the disturbance recording, defined as the distance of a bird from a disturbance source when it showed a disturbance response, or, for birds that did not show a disturbance response, the closest distance to which the bird was approached by the disturbance source.

SCI: Special Conservation Interest.

SPA: Special Protection Area.

Wexford Bay: the site used for waterbird monitoring comprising the Wexford Harbour and Slobs SPA downstream of Wexford Bridge, and the Raven SPA.

WSP: the 2009/10 Waterbird Survey Programme as undertaken by the National Parks & Wildlife Service.

2. METHODOLOGY

2.1. STUDY AREA

The Wexford Harbour and Slobs SPA is a large site extending from Enniscorthy along the River Slaney to Wexford Harbour and including the North and South Slobs (Figure 1). Within the SPA, the area between Wexford Bridge and Ferrycarrig Bridge forms a discrete unit of estuarine habitat, which can be distinguished from the main harbour downstream of Wexford Bridge (dominated by open sandflats) and the tidal river habitat upstream of Ferrycarrig Bridge. This area is recognised as a distinct subsite for the purposes of waterbird monitoring (the Ferrycarrig subsite). The development site is in the middle of the southern shore of the Ferrycarrig subsite. Therefore, the Ferrycarrig subsite was defined as the main study area for this assessment.

2.2. REVIEW OF EXISTING WATERBIRD DATA

For the purposes of waterbird monitoring, the Wexford Harbour and Slobs SPA has been divided into two sites: the River Slaney and Wexford Bay (Figure 2). The River Slaney site extends from Enniscorthy to Ferrycarrig Bridge. The Wexford Bay site includes the Wexford Harbour and Slobs SPA downstream of Ferrycarrig Bridge and the Raven SPA. The Wexford Bay site is divided into a number of subsites. It should be noted that the subsites do not include the middle of the main harbour and areas of sandbank at the mouth of the harbour are not covered by the subsites. Therefore, waterbird counts for Wexford Bay will tend to underestimate the total numbers that occur in the harbour.

Existing waterbird data for Wexford Bay includes annual I-WeBS counts and the WSP counts carried out in 2009/10.

I-WeBS coverage of Wexford Bay has been very patchy and there have only been a handful of complete counts since 1996/97 (unpublished review of I-WeBS coverage carried out for the Marine Institute). On I-WeBS counts, the Ferrycarrig subsite is mainly counted on ebb tides (unpublished review of I-WeBS coverage carried out for the Marine Institute). As waterbird usage of the Ferrycarrig subsite is fluid at this time (see Section 3.2.2), it is difficult to interpret the significance of these counts. Therefore, I-WeBS counts do not provide accurate data on waterbird numbers in Wexford Harbour, and are not very useful for assessing usage of the Ferrycarrig subsite, and I have, therefore, not used I-WeBS data in this assessment.

The WSP counts provide more systematic coverage of Wexford Harbour and included four low tide counts and one high tide count. In addition, a separate high tide roost survey was carried out to map roost locations, and information on potentially disturbing activities was recorded during all the counts. General details of the NPWS BWS methodology are provided by Lewis and Tierney (2014), while details of the NPWS BWS methodology and results at Wexford Harbour and the Raven are described in Cummins and Crowe (2010) and NPWS (2011).

2.3. 2015/16 WATERBIRD COUNTS

2.3.1. Survey objectives

The purpose of the waterbird counts carried out for this assessment was to establish the total numbers of waterbirds using the Ferrycarrig subsite at low tide, and to record the waterbird usage of the areas adjoining the development site at various tidal stages (low, ebb/flood and high tide)

2.3.2. Count sectors

The Ferrycarrig subsite was divided into 13 sectors for the purposes of this study (Figure 3). The sectors were primarily designed to cover the intertidal habitat and the boundaries between the sectors in the middle of the subsite (i.e., within the subtidal zone) are somewhat arbitrary. The saltmarsh habitat at the northern end of the subsite was not counted.

Two sectors (S4 and S5) covered the sections adjoining the proposed development site, and a further two sectors (S3 and S6) covered adjacent areas. Sector S4 was defined as a narrow sector to represent the shingle shoreline along the eastern boundary of the site. When continuous

intertidal habitat was exposed connecting S4 and S3, the boundary between the two sectors was defined as a minor tidal channel that ran parallel to the S4 shoreline, about 40 m out from the shoreline. Sector S3m includes the reedbed in the south-eastern corner of the development site and the tidal habitat impounded by the railway line. The remaining sectors were defined mainly to help organise the low tide counts and avoid double-counting.

2.3.3. Count dates and timings

Counts were carried out on eight dates over the period September 2015-January 2016. On each count date, a full low tide count of the Ferrycarrig subsite was carried out. In addition, flood/ebb tide and high tide counts of the sectors adjacent to the development site (S3-S6) were also carried out. However, high tide counts were not carried out on 15/09/2015 (as I carried out an initial site reconnaissance before starting the counts on that date), or on 10/12/2015 (as there was no daylight high tide). The high and low tide counts were generally carried out in three hour windows centred on low, or high, tide (Table 1). However, the first three low tide counts were not completed until 1.75-2 hours after low tide due to the large numbers of birds present. The ebb/flood tide counts were carried out between the low and high tide count windows. Weather conditions during the counts were generally good (Table 2). However, due to early starts, the visibility was only moderate for the start of the low tide count on 23/11/2015 and for the ebb tide count on 10/12/2015.

Table 1. Count timings in relation to tidal conditions.

Date	Low tide		High tide		Count timings		
	time	height	time	height	low tide	flood/ebb	high tide
15/09/2015	15:47	0.6	08:53	1.9	15:03-17:33	12:30-12:51	no count
29/09/2015	15:25	0.4	08:28	2.0	14:03-17:20	12:25-13:13	09:05-09:34
08/10/2015	09:29	0.8	16:30	1.6	08:12-11:34	13:52-14:20	15:45-16:36
29/10/2015	14:44	0.5	07:48	2.1	13:10-15:49	11:47-12:22	07:40-08:45
23/11/2015	10:06	0.6	16:27	1.9	08:20-11:12	12:09-12:45	16:07-16:34
10/12/2015	12:14	0.6	05:43	1.8	10:25-11:12	08:31-08:50	no count
08/01/2016	11:37	0.7	17:35	1.9	10:08-12:16	08:38-09:04	16:06-16:14
27/01/2016	15:32	0.8	08:59	2.1	13:59-16:23	11:57-12:29	08:46-09:35

Tidal data from Admiralty EasyTide (www.ukho.gov.uk/).

Table 2. Weather conditions.

Date	Count	Cloud	Rain	Visibility	Wind
15/09/2015	LT	1	1	1	W1
	EBB	1	1	1	SW3
29/09/2015	HT	1	1	1	E3
	LT	1	1	1	E2
	EBB	1	1	1	E3
08/10/2015	HT	2	1	1	SW3
	LT	2	1	1	0 becoming SW2
	FLOOD	2	1	1	SW3
29/10/2015	HT	2	1	1	SE1
	LT	3	2	1	SE2
	EBB	1	1	1	SE2
23/11/2015	HT	3	1	1	SW4
	LT	3	1	1-2	0 becoming SW2
	FLOOD	3	1	1	SW3
10/12/2015	LT	3	1	1	S2
	EBB	2	1	2	S1
08/01/2016	HT	3	1	1	SW3
	LT	1	1	1	SW3

Date	Count	Cloud	Rain	Visibility	Wind
	EBB	1	1	1	SW3
	LT	2	1	1	NW5
27/01/2016	EBB	3	1	1	NW5
	HT	2	1	1	NW5

Cloud: 1 = 0-33%; 2 = 34-66%; 3 = 67-100%.

Rain: 1 = none; 2 = showers; 3 = drizzle.

Visibility: 1 = good; 2 = moderate; 3 = poor.

Wind: Beaufort scale and direction.

2.3.4. Count methodology

Apart from on the first count, the low tide counts began at the upper end of the subsite with counts of S10-S12 from VP1 and VP2, and then worked clockwise around the subsite to finish with counts of S7-S9 from VP8 and VP9 (Table 3). The sectors adjoining the development site (S3-S6) were always counted within 30 minutes of the official low tide time. Two of the vantage points were accessed by walking along the shoreline: VP1 and VP5. Accessing VP1 caused disturbance to birds in the southern part of S12 and the northern part of S13, while accessing VP5 caused disturbance to birds in the southern part of S13. I generally arrived at VP1 15-30 minutes before the start of the count period, which allowed birds to settle back into S12. Numbers of birds in S13 were low and I was able to keep track of birds that I flushed to avoid potential double-counting.

On the first count, I attempted to count S10-S12 at the end of the count from VP3, and other vantage points along the same road. This did not allow complete coverage of Sector S10 and, as S10 usually holds significant numbers of waterbirds, the overall subsite totals for several species are likely to be significant underestimates.

On the first two low tide counts, I counted S3, S4, S5 and S6 from vantage points within the development site. However, this caused logistical problems due to the time take to access the vantage points, and also caused disturbance to birds within S4 and S5 (although, due to the low numbers present, the disturbance did not significantly affect the overall counts).

On the ebb/flood and high tide counts, alternative vantage points were used when VP5 was not accessible due to the tide (Table 3).

I classified all birds that I counted by tidal zone (Table 4) and behaviour (feeding, flying or roosting/other).

Table 3. Vantage points used for the waterbird counts.

Vantage Point	Sectors covered	Notes
VP1	S10, S11 and S12 (part)	
VP2	S13 (part)	
VP3	S12 (part)	
VP4	S1 and S2	
VP5	S3-S6	
VP5a	[S3, S4] and S13 (part)	Used to count S3-S4 when VP5 was inaccessible on spring high tides
VP6 and VP7	S4 (marsh)	
VP8	S7 (part), S8 and S9	
VP9	[S5 and S6], S7 (part)	Used to count S5-S6 when VP5 was inaccessible on spring high tides

Table 4. Tidal zones.

Tidal zone	Definition
Supratidal	Above the maximum high water level, including birds roosting on the railway line, etc.
Saltmarsh	
Tideline	On, or close to the tideline
Shallow subtidal	The subtidal zone adjacent to the tideline that it shallow enough for birds to wade in at low tide.
Deep subtidal	The subtidal zone below the shoreline.

2.4. DISTURBANCE RECORDING

2.4.1. Activity

On each visit, a detailed record was kept of human activities with the potential to cause disturbance to waterbirds in the study area. This included all activity in the intertidal and subtidal zones, as well as any activity in adjoining supratidal zones (apart from along roads, etc.). The following parameters were recorded: time, location, number of people, number and type of animals (if any), type of vehicle (if any), nature of activity (e.g., walking the shoreline, bait-digging, etc.), and any disturbance responses caused by the activity.

2.4.2. Disturbance responses

On most visits, I recorded the responses of birds in intertidal habitat in the sectors adjoining the development site (S3-S6) to disturbance caused by my presence, and/or by other human activity. On the first two visits, these responses were recorded while I was carrying out the low tide count from the development site. On subsequent visits (when I carried out the low tide count from vantage points outside the development site), I visited the development site after the low tide count for the specific purpose of recording disturbance responses. I also recorded disturbance responses on 24/11/2015 while carrying out an Otter survey.

On each disturbance recording session, the positions (relative to the disturbance source) and responses of all birds in the intertidal zone of S3-S5 were recorded using the parameters listed in Table 5. During most sessions, there was no significant exposure of intertidal mud adjacent to the shoreline, and the response distance, and distance moved, were recorded 'as the crow flies' distances. On sessions where there was intertidal mud exposed adjacent to the shoreline, and the shoreline was walked, the response distance and distance moved were recorded as both direct ('as the crow flies' distances), and as lateral distances (i.e., the perpendicular distance from the shoreline).

Table 5. Disturbance parameters recorded.

Parameter	Definition
Time	Time of observation
Response distance	Distance of bird from disturbance source when it showed a disturbance response; if bird did not show a disturbance response the closest distance to which the bird was approached was recorded
Response	No response Alert response Walked away Flushed
Resettling location	Location where bird resettled after being disturbed. Where birds were flushed from S4 and flew north and east following the shoreline, they were assumed to have moved to S5. Similarly, where birds were flushed from S5 and flew east and south following the shoreline, they were assumed to have moved to S3/S4.

3. RESULTS

3.1. 2009/10 WATERBIRD SURVEY

The numbers of waterbirds recorded in the Ferrycarrig subsite in the 2009/10 WSP low tide counts are compared with the total Wexford Bay count in Table 6. The species that occurred in relatively high numbers in the Ferrycarrig subsite included Goldeneye, Black-tailed Godwit, Greenshank and Redshank. During the single high tide count (21/01/2010), only six species were recorded in the Ferrycarrig subsite, with a total of 24 counted across all these species. Information from this high tide count, a high tide roost survey on 08/03/2010 and various other sources was used to map the distribution of high tide roosts in the Wexford Bay site in NPWS (2011). This mapping shows four high tide roosts within the Ferrycarrig subsite, all located along the northern/eastern shore of the subsite. The species listed as using these roosts are Mallard, Little Egret, Oystercatcher, Black-tailed Godwit, Curlew and Black-headed Gull. No information is provided on the size of these roosts.

Table 6. Comparison of total waterbird numbers in Wexford Bay with the numbers in the Ferrycarrig subsite (0O407) during the 2009/10 low tide counts.

	15/10/2009		**20/11/2009**		**15/12/2009**		**15/02/2010**		**0O407 mean**	
	Total	**0O407**	**Total**	**0O407**	**Total**	**0O407**	**Total**	**0O407**	**count**	**% of total**
Mute Swan	124	0	97	4	75	3	49	4	33	4%
Shelduck	4	0	120	0	465	0	439	18	149	1%
Teal	552	0	535	0	376	0	88	2	143	1%
Goldeneye	7	0	50	1	46	8	20	18	20	36%
Red-breasted Merganser	314	0	135	0	86	14	73	2	44	5%
Great Crested Grebe	38	6	137	20	54	1	63	28	44	19%
Cormorant	626	17	272	2	170	15	206	4	98	4%
Little Egret	93	10	51	3	30	4	5	0	15	10%
Grey Heron	57	4	36	7	22	2	9	0	11	12%
Oystercatcher	1171	43	300	6	327	16	336	71	157	8%
Ringed Plover	76	0	52	0	25	12	0	0	13	16%
Grey Plover	45	0	97	0	128	5	246	3	68	1%
Lapwing	356	35	3669	0	3666	558	4113	691	1819	10%
Dunlin	646	0	927	1	2301	2	2607	2	834	0%
Black-tailed Godwit	1739	676	1849	0	323	74	240	182	478	34%
Bar-tailed Godwit	966	0	471	0	580	7	984	14	294	1%
Curlew	1062	38	843	4	456	22	973	172	358	7%
Greenshank	15	4	14	3	25	4	10	5	9	29%
Redshank	1016	256	432	43	569	66	576	258	314	23%
Turnstone	64	2	54	10	50	14	57	3	27	14%
Black-headed Gull	4086	1092	1816	150	820	23	1340	158	771	12%
Common Gull	241	4	423	0	412	0	1131	0	281	0%
Lesser Black-backed Gull	325	0	93	23	21	0	84	0	32	8%
Herring Gull	105	2	85	1	192	1	110	3	56	2%

	15/10/2009		20/11/2009		15/12/2009		15/02/2010		0O407 mean	
	Total	**0O407**	**Total**	**0O407**	**Total**	**0O407**	**Total**	**0O407**	**count**	**% of total**
Great Black-backed Gull	226	3	78	0	17	1	51	1	22	1%

Data source: 2009/10 Waterbird Survey Programme as undertaken by the National Parks & Wildlife Service.

3.2. 2015/16 WATERBIRD COUNTS

3.2.1. Tidal exposure patterns

The extent of intertidal habitat shown in Ordnance Survey mapping of Wexford Harbour, and used by NPWS in mapping for their conservation objectives, is based on historical data and bears no relationship to the current situation. The typical extent of intertidal habitat exposed at low tide on a moderate spring tide in the Ferrycarrig subsite is shown in Figure 4. The most extensive area of intertidal habitat is in S10 and S11 at the northern end of the subsite. Other significant areas of intertidal mudflat are regularly exposed in S1, S6 and S8. In S2, S3, S5, S6, S7 and S12 intertidal mudflat tends to only be exposed on the lower tides. The other sectors (S4, S9 and S13) hold shingle shorelines with minimal exposure of intertidal mudflats at low tide.

The degree of exposure of intertidal mudflat at low tide was very sensitive to the tidal conditions. On 29th September on a low spring tide (0.4 m), there was very extensive exposure of mudflat across the northern end of the subsite (S10-S12), with the remaining subtidal area only very shallowly flooded (birds were wading in the subtidal water in the middle of these sectors. Also, on this date there was extensive exposure of intertidal mudflat in S5, with a mud bar extending almost up to the spit at the eastern end of this sector.

The relative degree of exposure of intertidal mudflat in the sectors adjoining the development site on each count day is indicated in Table 7. It should be noted that the exposure pattern does not precisely follow the predicted low tide height, due to the influence of atmospheric conditions on the tide.

Table 7. Exposure of mudflat in the sectors adjoining the development site.

Date	Low tide height (m)	S3	S5	S6
15/09/2015	0.6	moderate	none	major
29/09/2015	0.4	major	major	major
08/10/2015	0.8	minor	none	major
29/10/2015	0.5	minor	none	major
23/11/2015	0.6	moderate	none	major
10/12/2015	0.6	minor	none	moderate
08/01/2016	0.7	none	none	none
27/01/2016	0.8	minor	none	minor

Tidal data from Admiralty EasyTide (www.ukho.gov.uk/).

3.2.2. Waterbird occurrence patterns in the Ferrycarrig subsite

Across all the low tide counts, 21 of the 32 SCI species of the Wexford Harbour and Slobs SPA were recorded in the study area (Table 8). The SCI species that were not recorded included species that mainly occur on the slobs (Bewick's Swan, Whooper Swan and Greenland White-fronted Goose), one species that is now rather rare in Wexford Harbour (Scaup), a raptor (Hen Harrier), a wader associated with more sandy sediments (Sanderling), and a breeding tern species (Little Tern). Somewhat more surprising were the absence of any records of the remaining two SCI species: Light-bellied Brent Goose and Golden Plover. However, neither of these species was recorded in the Ferrycarrig subsite during the 2009/10 WSP counts (see 3.1). A further 15 non-SCI species were recorded on the low tide counts (Table 9). These included four species that were present on all, or nearly all, of the counts: Little Egret, Greenshank, Herring Gull and Great Black-backed Gull.

General observations indicated that many waterbirds move out of the Ferrycarrig subsite at high tide. Flocks of Black-tailed Godwit were regularly observed flying into the subsite on the ebb tide and flying out of the subsite on the flood tide, either following the central channel to/from Wexford Bridge, or flying overland between the northern end of the subsite and the North Slob. Similar movement patterns were also observed (but less frequently) for Knot, Dunlin and Bar-tailed Godwit. At high tide, small roosts of Oystercatcher, Redshank and Greenshank sometimes occur in S3 and S4 (see Section 3.2.3). General searches of the subsite for high tide roosts away from S3-S6 were carried out on 08/10/2015 and 29/10/2015. On the first date, a roost of around 70 Oystercatcher, 100 Black-tailed Godwit and 50 Redshank was found on the shingle ridge at the southern end of S12. This roost was not occupied on 29/10/2015, and apart from this roost, the only other shoreline roosting waterbirds found were scattered individuals/small groups of Grey Heron, Little Egret, Oystercatcher, Greenshank and Redshank. These observations support the indications from the WSP counts that the Ferrycarrig subsite generally does not support significant numbers of shoreline roosting waterbirds at high tide.

3.2.3. Waterbird occurrence patterns in the sectors adjoining the development site

Across all counts the following SCI species were recorded in the sectors adjoining the development site: Shelduck, Mallard, Red-breasted Merganser, Cormorant, Grey Heron, Little Grebe, Oystercatcher, Lapwing, Curlew, Black-tailed Godwit, Bar-tailed Godwit, Redshank, Black-headed Gull, and Lesser Black-backed Gull (Table 10-Table 12). A further nine non-SCI species were also recorded: Cormorant, Little Egret, Turnstone, Spotted Redshank, Greenshank, Sandwich Tern, Common Gull, Herring Gull and Great Black-backed Gull (Table 10-Table 12). The species that occurred regularly (i.e., on 50% or more of the low tide counts) included: Cormorant, Little Egret, Grey Heron, Little Grebe, Oystercatcher, Curlew, Black-tailed Godwit, Greenshank, Redshank, Black-headed Gull, Herring Gull and Great Black-backed Gull. All further analyses are restricted to these species.

Across all the regularly occurring species there was a general pattern of more regular occurrence, and higher numbers, at low tide compared to the ebb/flood and high tides (Table 13). Most species also occurred more regularly, and in higher numbers, on the ebb/flood tide compared to at high tide (Table 13).

Feeding Cormorant and Little Grebe occurred in small numbers in the subtidal waters in these sectors. Roosting Cormorant also occurred on three dates at low tide on the gravel spit exposed off the north-eastern corner of the development site with a maximum count of 10 on 29/10/2015.

At low tide, Little Egret, Grey Heron, Curlew and Greenshank mainly occurred in small numbers distributed rather evenly across the intertidal and shallow subtidal zones throughout these sectors. However, a relatively high count of 12 Little Egrets was recorded at low tide on 15/09/2015 in S6. These species tended to occur less frequently on the ebb/flood and high tide counts due to the more restricted availability of intertidal habitat at these times. However, Greenshank was an exception to this pattern, with high counts on ebb/flood tides in S4 (8 on 29/10/2015 and 21 on 27/01/2016), and at high tide in S3 (13 on 29/10/2015 roosting with Redshank on broken stonework along the railway embankment).

At low tide, Oystercatchers particularly favoured the gravel spit at the eastern end of S5, and birds remained here on ebb/flood tides on some days. Oystercatchers also regularly occurred on the shingle bank in S4 on low tide and ebb/flood tides. At high tide, small roosts were recorded on the railway line in S3 (four dates) and on the shingle bank in S4 (on 23/11/2015).

Black-tailed Godwit showed variable patterns of occurrence, reflecting both variation in total numbers present within the subsite, as well as the patterns of tidal exposure. On 10/12/2015 and 08/01/2016, Black-tailed Godwits were almost completely absent from the Ferrycarrig subsite and no birds were recorded in the sectors adjoining the development site. On the other low tide counts small flocks were recorded in S3, S5 and S6. The high count in S5 on 29/09/2015 reflects the low spring tide conditions which allowed exposure of a mudbank in this sector. Black-tailed Godwit were only recorded once on the ebb/flood tide and were not recorded at all at high tide. This

reflects the fact that the Black-tailed Godwit that feed in the Ferrycarrig subsite at low tide move out to the main harbour and/or the North Slob at high tide (see Section 3.2.2).

At low tide, Redshank mainly occurred in S3 and S6 with relatively high numbers in these sector in September and October, reflecting the high numbers present in the subsite at this time. A high count occurred in S5 on 29/09/2015 when a mudbank was exposed on the low spring tide. The low numbers in S6 in the January counts reflected the minimal exposure of mudbank in this sector. Redshank usually remained present on ebb/flood tides, showing varying patterns of distribution between sectors. At high tide, Redshank roosted on broken stonework along the railway embankment in S3 in September and October and on the shingle bank near the southern end of S4 on 23/11/2015.

Small numbers of Black-headed Gull occurred in both intertidal and subitdal habitat throughout these sectors at low tide, with high numbers feeding in shallow subtidal habitat in S6 during the October low tide counts. During ebb/flood tide and high tide counts, small numbers roosted along the shoreline, and in subtidal water, in S3. The main nocturnal Black-headed Gull roost in Wexford Harbour appears to be in the main harbour off Ardcavan and I did not find any evidence of nocturnal gull roosts in the vicinity of the development site.

Herring Gull and Great Black-backed Gulls mainly occurred in small numbers feeding in intertidal and shallow subtidal habitat and roosting in subtidal habitat throughout these sectors, usually with smaller numbers/less frequent occurrence on ebb/flood tides and at high tide.

3.2.4. Importance of the sectors adjoining the development site

The most important areas of low tide habitat in the sectors adjoining the development site are the mudflats in S3 and S6, with the latter area extending into S5 on low spring tides. The gravel spit at the eastern end of S5 can hold small concentrations of waterbirds and may be used as a resting area by flocks moving through the estuary. Small high tide roosts of Oystercatcher, Greenshank and Redshank occur irregularly along the railway line in S3 (about 100-200 m east of the eastern side of the development site) and on the shingle bank at the southern end of S4.

The relative importance of the sectors (S3-S6) adjoining the development site for the regularly occurring waterbird species is shown in Table 17. This shows the mean percentage of the total Ferrycarrig low tide counts that occurred within these sectors. For most species, the sectors held around 15-30% of the total subsite count. However, only 2-3% of the Black-tailed Godwit and Curlew counts occurred within these sectors. If the overall distribution of waterbirds during the 2009/10 low tide counts is considered representative, then these sectors may hold 0-5% of the total Wexford Harbour population of these species (Table 17), while Sectors S4-S5 (the sectors directly adjacent to the development site), may hold 0.1-2.2% of the total Wexford Harbour population of these species.

Table 8. Total low tide numbers of SCI species in the 2015/16 waterbird counts.

Species	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Shelduck	0	0	0	2	7	0	0	0
Wigeon	0	0	0	0	2	0	0	0
Teal	0	2	0	0	31	13	0	0
Mallard	26	1	45	41	124	99	20	14
Goldeneye	0	0	0	1	8	27	54	25
Red-breasted Merganser	0	0	0	1	0	5	9	13
Cormorant	34	30	48	25	21	11	6	7
Grey Heron	33	9	20	29	15	13	7	5
Little Grebe	0	0	0	25	25	7	7	3
Great Crested Grebe	0	2	0	11	30	1	1	3
Oystercatcher	77	93	119	106	68	62	53	72
Grey Plover	0	0	11	21	2	0	0	0

Species	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Lapwing	3	38	68	3	754	48	313	0
Curlew	103	171	99	84	83	40	21	44
Black-tailed Godwit	845*	2972	840	1204	1527	3	2	1032
Bar-tailed Godwit	10	28	43	26	27	29	27	77
Knot	500	260	282	244	48	0	0	0
Dunlin	100	140	38	7	131	0	0	0
Redshank	169*	275	278	209	150	213	45	109
Black-headed Gull	355*	1150	1933	881	996	318	301	291
Lesser Black-backed Gull	4	6	36	5	0	1	0	2

* probably a significant undercount (see Section 2.3.4).

Table 9. Total low tide numbers of non-SCI species in the 2015/16 waterbird counts.

Species	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Mute Swan	0	0	0	0	5	6	0	0
Long-tailed Duck	0	0	0	0	0	0	1	0
Shag	1	0	0	0	0	0	0	0
Little Egret	38	22	21	16	3	5	9	5
Moorhen	1	0	0	0	0	0	0	0
Ringed Plover	0	0	0	0	1	0	0	0
Turnstone	0	0	8	0	0	2	0	0
Common Sandpiper	0	0	1	0	0	0	0	0
Greenshank	5	7	19	13	4	6	15	9
Wood Sandpiper	1	0	0	0	0	0	0	0
Sandwich Tern	4	0	0	0	0	0	0	0
Common Gull	0	21	3	1	0	18	0	0
Herring Gull	12	18	12	13	0	2	6	10
Great Black-backed Gull	18	61	22	44	1	3	1	5
Kingfisher	0	0	1	0	1	0	0	0

Table 10.Low tide totals for the sectors adjoining the development site (S3-S6) in the 2015/16 waterbird counts.

Species	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Shelduck*	0	0	0	0	3	0	0	0
Red-breasted Merganser*	0	0	0	1	0	0	1	0
Cormorant*	2	3	2	7	14	0	0	0
Little Egret	18	5	4	3	0	1	4	2
Grey Heron*	5	0	7	6	3	4	3	1
Little Grebe*	0	0	0	3	5	6	7	2
Oystercatcher*	20	9	29	23	8	11	0	10
Lapwing*	0	0	0	0	1	0	0	0
Curlew*	4	4	8	3	4	1	0	0
Black-tailed Godwit*	17	64	53	12	28	0	0	290
Bar-tailed Godwit*	2	0	1	0	0	0	0	0
Turnstone	0	0	5	0	0	0	0	0
Greenshank	2	2	6	2	2	3	3	3
Redshank*	48	43	46	31	15	19	8	15
Sandwich Tern	3	0	0	0	0	0	0	0
Black-headed Gull*	38	9	322	119	60	44	13	42

Species	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Common Gull	0	1	3	0	0	2	0	0
Lesser Black-backed Gull*	0	5	10	1	0	0	0	0
Herring Gull	2	2	3	4	0	1	2	2
Great Black-backed Gull	9	2	6	21	0	2	0	2

* SCI species.

Table 11.Ebb/flood tide totals for the sectors adjoining the development site (S3-S6) in the 2015/16 waterbird counts.

Species	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Shelduck*	0	0	0	0	4	0	0	0
Red-breasted Merganser*	0	0	0	1	0	3	0	0
Cormorant*	0	0	1	0	1	1	0	0
Little Egret	0	0	4	0	0	0	0	3
Grey Heron*	0	1	2	4	3	1	0	0
Little Grebe*	0	0	0	3	0	5	1	0
Great Crested Grebe*	0	0	0	0	0	2	0	0
Oystercatcher*	11	15	6	43	19	5	0	2
Curlew*	0	2	1	5	0	0	0	0
Black-tailed Godwit*	0	4	0	0	0	0	0	0
Bar-tailed Godwit*	3	0	0	0	0	0	0	0
Turnstone	0	0	0	0	5	0	0	0
Spotted Redshank	0	0	0	0	0	1	0	0
Greenshank	0	2	4	9	2	2	3	21
Redshank*	6	44	7	19	4	15	12	0
Sandwich Tern	1	0	0	0	0	0	0	0
Black-headed Gull*	5	21	9	14	2	7	0	32
Lesser Black-backed Gull*	0	2	0	0	0	0	0	0
Herring Gull	1	2	2	2	0	0	0	2
Great Black-backed Gull	14	3	0	6	0	0	0	0

* SCI species.

Table 12.High tide totals for the sectors adjoining the development site (S3-S6) in the 2015/16 waterbird counts.

Species	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Shelduck*		0	0	2	0		0	0
Mallard*		0	0	1	0		0	0
Red-breasted Merganser*		0	0	0	0		0	5
Cormorant*		1	0	0	0		0	1
Little Egret		1	0	2	2		0	0
Grey Heron*		3	0	2	2		0	1
Little Grebe*	No	0	0	2	1	No	3	1
Great Crested Grebe*	count	0	0	0	0	count	0	2
Oystercatcher*		7	3	9	15		0	5
Lapwing*		0	0	0	0		0	15
Curlew*		0	1	1	0		0	0
Turnstone		0	10	3	0		0	0
Greenshank		3	8	15	4		0	0
Redshank*		8	20	9	27		0	0

Species	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Black-headed Gull*		6	2	10	0		1	24
Lesser Black-backed Gull*		0	1	0	0		0	0

* SCI species.

Table 13. Summary of the numbers of regularly occurring waterbird species recorded at low, ebb/flood and high tides in the sectors adjoining the development site during the 2015/16 waterbird counts.

Species	Low tide			Ebb/flood tide			High tide		
	median	range	n > 0	median	range	n > 0	median	range	n > 0
Cormorant*	2	0-14	5	0	0-1	3	0	0-1	2
Little Egret	3.5	0-18	7	0	0-4	2	0.5	0-2	3
Grey Heron*	3.5	0-7	7	1	0-4	5	1.5	0-3	4
Little Grebe*	2.5	0-7	5	0	0-5	3	1	0-3	4
Oystercatcher*	10.5	0-29	7	8.5	0-43	7	6	0-15	5
Curlew*	3.5	0-8	6	0	0-5	3	0	0-1	2
Black-tailed Godwit*	14.5	0-64	5	0	0-4	1	0	0	0
Greenshank	2.5	2-6	8	2.5	0-21	7	3.5	0-15	4
Redshank*	25	8-48	8	9.5	0-44	7	8.5	0-27	4
Black-headed Gull*	43	9-322	8	8	0-32	7	4	0-24	5
Herring Gull	2	0-4	7	1.5	0-2	5	0	0	0
Great Black-backed Gull	2	0-21	6	0	0-14	3	0	0	0

* SCI species.

n > 0 = the number of non-zero counts.

Table 14. Distribution of regularly occurring waterbird species between the sectors adjoining the development site during the 2015/16 low tide counts.

Species	Sector	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Cormorant*	S3	0	0	0	0	1	0	0	0
	S4	0	0	0	0	1	0	0	0
	S5	2	0	1	4	10	0	0	0
	S6	0	3	1	3	2	0	0	0
Little Egret	S3	0	0	0	0	0	1	0	1
	S4	4	1	0	1	0	0	1	0
	S5	2	4	3	2	0	0	2	1
	S6	12	0	1	0	0	0	0	0
Grey Heron*	S3	1	0	0	1	1	1	0	0
	S4	1	0	0	0	1	2	1	0
	S5	1	0	2	2	1	0	1	0
	S6	2	0	5	3	0	1	0	1
Little Grebe	S3	0	0	0	3	0	2	2	1
	S4	0	0	0	0	5	3	2	1
	S5	0	0	0	0	0	0	3	0
	S6	0	0	0	0	0	1	0	0
Oystercatcher*	S4	4	3	7	6	0	2	0	2
	S5	16	6	21	17	8	9	0	8
	S6	0	0	1	0	0	0	0	0
Curlew*	S3	0	1	1	1	1	1	0	0
	S4	0	1	1	0	1	0	0	0
	S5	2	2	1	1	1	0	0	0
	S6	2	0	5	1	1	0	0	0

Species	Sector	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Black-tailed Godwit*	S3	3	28	4	1	12	0	0	0
	S4	1	0	3	0	3	0	0	0
	S5	0	36	14	2	1	0	0	0
	S6	13	0	32	9	12	0	0	0
Greenshank	S3	0	0	0	1	0	1	0	2
	S4	1	1	1	0	0	1	0	0
	S5	0	1	2	1	2	1	0	1
	S6	1	0	3	0	0	0	1	0
Redshank*	S3	11	15	13	6	6	3	0	14
	S4	1	2	2	0	1	1	0	0
	S5	4	26	7	1	1	0	4	0
	S6	32	0	24	24	7	15	0	1
Black-headed Gull*	S3	9	2	6	12	18	18	11	12
	S4	6	4	2	1	1	12	0	0
	S5	7	2	2	1	37	1	1	0
	S6	16	1	312	105	4	13	0	30
Herring Gull	S3	0	0	1	2	0	1	2	0
	S4	2	0	0	0	0	0	0	0
	S5	0	1	1	2	0	0	0	2
	S6	0	1	1	0	0	0	0	0
Great Black-backed Gull	S3	1	0	1	1	0	0	0	0
	S4	3	0	0	1	0	1	0	0
	S5	4	2	0	6	0	1	0	0
	S6	1	0	5	13	0	0	0	2

* SCI species. On 08 Jan, 1 Little Egret, 1 Grey Heron, 2 Greenshank, 4 Redshank and 1 Black-headed Gull were also recorded in S3m; not included in the above totals.

Table 15.Distribution of regularly occurring waterbird species between the sectors adjoining the development site during the 2015/16 ebb/flood tide counts.

Name	Sector	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Cormorant*	S4	0	0	0	0	1	0	0	0
	S5	0	0	1	0	0	1	0	0
Little Egret	S5	0	0	2	0	0	0	0	3
	S6	0	0	2	0	0	0	0	0
Grey Heron*	S4	0	0	0	1	0	0	0	0
	S5	0	1	0	2	1	0	0	0
	S6	0	0	2	1	2	1	0	0
Little Grebe*	S3	0	0	0	0	0	1	0	0
	S4	0	0	0	3	0	2	1	0
	S5	0	0	0	0	0	2	0	0
Oystercatcher*	S4	11	5	6	33	2	5	0	2
	S5	0	8	0	10	17	0	0	0
	S6	0	2	0	0	0	0	0	0
Curlew*	S3	0	1	0	1	0	0	0	0
	S4	0	0	0	1	0	0	0	0
	S5	0	1	1	2	0	0	0	0
	S6	0	0	0	1	0	0	0	0
Black-tailed Godwit*	S6	0	4	0	0	0	0	0	0

Name	Sector	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Greenshank	S3	0	0	1	0	0	0	0	0
	S4	0	1	0	8	0	2	2	21
	S5	0	1	2	1	2	0	1	0
	S6	0	0	1	0	0	0	0	0
Redshank*	S3	2	6	3	2	0	2	0	0
	S4	0	4	0	3	1	2	10	0
	S5	1	2	3	14	3	10	2	0
	S6	3	32	1	0	0	1	0	0
Black-headed Gull*	S3	0	19	9	3	2	7	0	19
	S4	0	1	0	5	0	0	0	0
	S5	3	0	0	5	0	0	0	0
	S6	2	1	0	1	0	0	0	0
Herring Gull	S3	0	0	0	1	0	0	0	2
	S4	0	0	0	1	0	0	0	0
	S5	0	2	2	0	0	0	0	0
	S6	1	0	0	0	0	0	0	0
Great Black-backed Gull	S5	14	3	0	6	0	0	0	0

* SCI species. On 27 Jan, 13 Black-headed Gulls were also recorded in S3m; not included in the above totals.

Table 16. Distribution of regularly occurring waterbird species between the sectors adjoining the development site during the 2015/16 high tide counts.

Name	Sector	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Cormorant*	S3	No count	1	0	0	0	No count	0	1
Little Egret	S5		1	0	1	2		0	0
	S6		0	0	1	0		0	0
Grey Heron*	S4		1	0	1	1		0	0
	S5		1	0	0	1		0	0
	S6		1	0	1	0		0	1
Little Grebe*	S3		0	0	2	0		1	1
	S4		0	0	0	1		2	0
Oystercatcher*	S3		5	3	9	0		0	5
	S4		2	0	0	15		0	0
Curlew*	S3		0	0	1	0		0	0
	S5		0	1	0	0		0	0
Greenshank	S3		2	4	13	0		0	0
	S4		0	2	0	3		0	0
	S5		0	2	0	1		0	0
	S6		1	0	2	0		0	0
Redshank*	S3		8	18	7	0		0	0
	S4		0	0	0	26		0	0
	S5		0	2	0	1		0	0
	S6		0	0	2	0		0	0

Name	Sector	15/09	29/09	08/10	29/10	23/11	10/12	08/01	27/01
Black-headed Gull*	S3		6	2	0	0		1	24
	S6		0	0	10	0		0	0

* SCI species.

Table 17.Relative importance of the sectors adjoining the development site.

	2009/10		2014/15					
	Ferrycarrig subsite		Ferrycarrig subsite		Sectors adjoining development site			
Species	mean	% of WB total	mean	non-zero counts	mean	qualifying counts	% of FC total	% of WB total
Cormorant	10	4%	23	8	3.5	6	19%	1%
Little Egret	4	10%	15	8	4.5	4	27%	3%
Grey Heron	3	12%	16	8	3.5	5	24%	3%
Little Grebe	0	0%	8	5	2.9	2	16%	0%
Oystercatcher	34	8%	81	8	13.8	8	16%	1%
Curlew	59	7%	81	8	3.0	8	3%	0%
Black-tailed Godwit	233	34%	1053	8	21.8	6	2%	1%
Greenshank	4	29%	10	8	2.6	3	18%	5%
Redshank	156	23%	181	8	27.6	8	15%	3%
Black-headed Gull	356	12%	778	8	80.8	8	10%	1%
Herring Gull	2	2%	9	7	2.0	5	21%	0%
Great Black-backed Gull	1	1%	19	8	5.3	4	32%	0%

Table 18.Comparison of waterbird importance (the percentage of the total Wexford Bay population) of various combinations of the sectors adjoining the development site.

Species	S4-S5	S3-S5	S3-S6
Cormorant	0.5%	0.5%	0.7%
Little Egret	1.8%	1.8%	2.7%
Grey Heron	1.2%	1.7%	2.9%
Little Grebe	0.0%	0.0%	0.0%
Oystercatcher	1.2%	1.2%	1.2%
Curlew	0.1%	0.1%	0.2%
Black-tailed Godwit	0.2%	0.4%	0.8%
Greenshank	2.2%	3.0%	5.1%
Redshank	0.8%	1.9%	3.3%
Black-headed Gull	0.2%	0.5%	1.2%
Herring Gull	0.2%	0.3%	0.3%
Great Black-backed Gull	0.2%	0.2%	0.4%

3.3. DISTURBANCE

3.3.1. Activities

The potentially disturbing shoreline activities recorded in the Ferrycarrig subsite during the 2015/16 counts are listed in Table 19. It should be noted that all the count days were weekdays and it is likely that higher levels of recreational activity occur at weekends. The development site is used as an informal recreation area, and people were observed walking in the site and/or along the eastern shoreline of the site on four of the eight count days. While some of these observations

only refer to people seen in the interior of the site, it is likely that all the visitors to the site would walk to one, or more, of the shoreline areas. People walking the shoreline were also recorded in S1 (three count days) and S13 (five count days). Bait digging was recorded on the spit off the north-eastern corner of the development site on the one count day with spring low tide conditions when extensive intertidal sediment were exposed here. Bait digging was also recorded in S1 on two count days, with six people bait digging here on one of these days.

Boat activity was only recorded in the Ferrycarrig subsite on one of the eight count days during the 2015/16 counts: on 8th October the Aisling J was recorded crab potting, working an area in mid-channel from just upstream of the old bridge to opposite the mid-point of S13.

Table 19.Potentially disturbing shoreline activities recorded in the Ferrycarrig subsite during the 2014/15 counts.

Date	Time	Sector	Location	People	Dogs	Activity	Notes
15/09/2015	12:40	S4/S5	interior	1	1		
15/09/2015	15:30	S13	shoreline	2		walking shoreline	
29/09/2015	16:00	S5	shingle spit	2		bait digging	c. 50 m below shoreline; birds feeding close by
29/09/2015	16:30	S5	shoreline	1	1	walking shoreline from VP1	
08/10/2015	09:53	S13	shoreline	2	2	walking shoreline	
08/10/2015	16:32	S4/S5	interior	1			
08/10/2015	16:40	S4/S5	interior	2		entering site	
29/10/2015	16:19	S4/S5	interior	1	1	leaving site	
29/10/2015	16:19	S4/S5	interior	2		leaving site	
23/11/2015	09:59	S13	south end	1	1	walking shoreline	
10/12/2015	08:29	S13	southern end	1	1	walking shoreline	
10/12/2015	11:46	S1	mid and eastern sections	2	4	walking shoreline	walking along top of intertidal along section adjacent to road
10/12/2015	11:46	S1	western end	1		bait digging in intertidal	
08/01/2016	08:56	S3	northern end	1	1	walking along railway line	
08/01/2016	10:56	S1	mid	1	4	walking shoreline	walking along top of intertidal along section adjacent to road
08/01/2016	11:38	S13	mid	1	1	walking shoreline	
08/01/2016	17:15	S13	southern end	1	1	walking shoreline	only short section of shoreline accessible due to high tide
27/01/2016	08:54	S3/S4		1	1	walking shoreline	walked along shoreline of S4, and then along railway adjacent to S3
27/01/2016	14:35	S13	mid	2		walking shoreline	separate group from next record
27/01/2016	14:35	S13	mid	1		walking shoreline	separate group from previous record

Date	Time	Sector	Location	People	Dogs	Activity	Notes
27/01/2016	15:10	S1	western end	6		bait digging in intertidal	

Activities on public roads adjacent to the shoreline, and activities within the Wexford Harbour Boat and Tennis Club, were not recorded.

3.3.2. Disturbance responses

The following analyses are based on the response distance (RD) data recorded during the 2015/16 waterbird survey. The RD is the distance of the bird from the disturbance source when it showed a disturbance response; if the bird did not show a disturbance response the closest distance to which the bird was approached was recorded as the RD. I distinguish between direct RDs (the straight line distance from the disturbance source) and lateral RDs (the perpendicular distance from the route taken by the disturbance source). The lateral RD was only recorded when the disturbance source was walking the shoreline, and when there was extensive exposed intertidal habitat below the shoreline (i.e,. the lateral escape distance was not constrained by the intertidal width). The lateral RD can never exceed the direct RD, and is usually less than the direct ED (as the direct RD is the hypoteneuse, and the direct RD is the opposite side, of a right-angle triangle). Where birds show no response to the disturbance source the direct and lateral RDs are the same.

The most common disturbance response recorded was flushing. I did not record any birds using walking as method of escaping disturbance. Some birds showed a brief alert response before flushing, but I did not record any birds showing an alert response and then not flushing. As the RDs at which alert responses occurred did not differ significantly from the RDs at which the birds flushed (within the level of precision that was possible in estimating distances in the field), the following analyses are restricted to RDs of flush responses.

Across all species, the modal direct RD of birds flushed by walking along the shoreline was 50-75 m, and 85% of observations of birds flushing were at direct RDs of 150 m or less (Table 20). Although the data was limited, Curlew appeared to have relatively large direct RDs with all four observations at distances of more than 150 m. The only other species with a direct RD of more than 150 m recorded was Shelduck. This is in accordance with the general pattern of RDs being positively related to body size that has been reported from disturbance studies in the scientific literature (e.g., Laursen et al., 2005). Observations of lateral RDs were limited, but, apart from Shelduck and Curlew, all the observations were at RDs of 75 m or less (Table 21).

The RDs of birds flushed from shoreline vantage points (Table 22) are likely to underestimate typical RD values: in this situation the disturbance source suddenly appears at the vantage point and the birds may have been much closer to the vantage point than they would normally have tolerated for an approaching disturbance source. However, all the RDs recorded in this situation were 75 m or less.

Across all species, the modal direct RD at which birds showed no response was 100-150 m, while birds could tolerate approach to within 25-50 m (Table 23). On 29/09/2015, there were two bait diggers working off the shingle spit and there were 6 Oystercatcher and 36 Black-tailed Godwit feeding within 25-50 m, and 26 Redshank feeding within 50-75 m of the bait diggers. Similarly, these did not flush when I walked along the shoreline at similar distances from the birds.

Where the destination to which flushed birds moved was recorded, 63% of observations involved birds moving out of the sector (Table 24). These usually involved birds moving between the two sectors immediately adjacent to the development site (S4 and S5; Table 25). Movements of birds to the sectors to the east and west (S3 and S6) and across the estuary to the opposite shore (S13) were also recorded quite frequently. There were only two observations of more distant movements: a group of 7 Oystercatchers flushed from S5 and flew out of the Ferrycarrig subsite intop the main harbour (possibly to the roost on the stone jetty off Ferrybridge), and a flock of 13 Black-tailed Godwit flushed from S5 and moved to the northern end of the Ferrycarrig subsite.

Table 20.Direct response distances of birds experimentally flushed by walking along the shoreline.

Species	Number of observations at direct escape distances (m) of:							n
	0-25	25-50	50-75	75-100	100-150	150-200	200-300	
Shelduck	0	0	0	0	1	1	0	2
Little Egret	0	0	0	0	1	0	0	1
Grey Heron	0	2	0	0	0	0	0	2
Oystercatcher	0	4	2	1	1	0	0	8
Curlew	0	0	0	0	0	2	2	4
Black-tailed Godwit	1	0	1	0	0	0	0	2
Common Sandpiper	1	0	0	0	0	0	0	1
Greenshank	0	0	4	0	2	0	0	6
Redshank	0	2	4	2	1	0	0	9
Totals	2	8	11	3	6	3	2	35

Table 21.Lateral response distances of birds experimentally flushed by walking along the shoreline.

Species	Number of observations at lateral escape distances (m) of:							n
	0-25	25-50	50-75	75-100	100-150	150-200	200-300	
Shelduck	0	0	0	0	1	1	0	2
Grey Heron	1	0	0	0	0	0	0	1
Oystercatcher	3	0	0	0	0	0	0	3
Curlew	1	0	0	0	0	1	2	4
Black-tailed Godwit	0	0	1	0	0	0	0	1
Greenshank	1	1	0	0	0	0	0	2
Redshank	1	2	0	0	0	0	0	3

Table 22.Direct response distances of birds flushed from shoreline vantage points.

Species	Number of observations at direct escape distances (m) of:			n
	0-25	25-50	50-75	
Cormorant	0	1	0	1
Little Egret	1	0	0	1
Grey Heron	2	0	0	2
Oystercatcher	4	3	0	7
Black-tailed Godwit	1	1	0	2
Bar-tailed Godwit	1	0	0	1
Greenshank	1	0	1	2
Redshank	2	2	2	6
Great Black-backed Gull	1	0	0	1

Table 23.Direct response distances of birds showing no response to disturbance.

Species	Number of observations at direct distances (m) of:							n
	0-25	25-50	50-75	75-100	100-150	150-200	200-300	
Little Egret	0	1	0	0	1	0	0	2
Grey Heron	0	0	0	0	1	1	0	2
Oystercatcher	0	2	0	2	3	0	1	8
Curlew	0	0	0	0	1	0	0	1
Black-tailed Godwit	0	2	0	0	3	0	2	7
Greenshank	0	1	0	1	2	0	0	4

Species	Number of observations at direct distances (m) of:							n
	0-25	25-50	50-75	75-100	100-150	150-200	200-300	
Redshank	0	0	2	2	3	0	2	9
Black-headed Gull	0	0	0	0	3	1	2	6
Lesser Black-backed Gull	0	0	0	0	1	0	1	2
Totals	**0**	**6**	**2**	**5**	**18**	**2**	**8**	**41**

Table 24.Movement types of birds after being flushed.

Species	Number of observations of movements:			n
	within sector	outside sector	not recorded	
Shelduck	0	1	1	2
Cormorant	0	0	1	1
Little Egret	0	2	2	4
Grey Heron	1	4	1	6
Oystercatcher	4	13	1	18
Curlew	2	0	3	5
Black-tailed Godwit	2	1	1	4
Bar-tailed Godwit	0	0	1	1
Turnstone	0	1	0	1
Common Sandpiper	0	1	0	1
Greenshank	8	8	1	17
Redshank	8	11	0	19
Black-headed Gull	0	0	1	1
Great Black-backed Gull	0	0	2	2
Totals	25	42	15	82

Table 25.Movement destinations of birds after being flushed.

Species	Number of observations of movements:					n
	S4 to/from S5	S4 to S3	S5 to S6	to S13	distant	
Shelduck	1	0	0	0	0	1
Little Egret	1	0	1	0	0	2
Grey Heron	2	0	2	0	0	4
Oystercatcher	11	0	0	1	1	13
Black-tailed Godwit	0	0	0	0	1	1
Turnstone	0	0	0	1	0	1
Common Sandpiper	1	0	0	0	0	1
Greenshank	1	3	2	2	0	8
Redshank	3	4	2	2	0	11
Totals	20	7	7	6	2	42

REFERENCES

Cummins, S and Crowe, O. (2010). Collection of baseline waterbird data for Irish coastal Special Protection Areas 2: Trawbreaga Bay, Lough Swilly, Donegal Bay, Blacksod & Broadhaven, Inner Galway Bay and Wexford Harbour & Slobs. A report commissioned by the National Parks and Wildlife Service, and prepared by BirdWatch Ireland.

Laursen, K., Kahlert, J. & Frikke, J. (2005). Factors affecting escape distances of staging waterbirds. Wildlife Biology, 11, 13–19.

Lewis, L.J. & Tierney, T.D. (2014). Low Tide Waterbird Surveys: Survey Methods and Guidance Notes. Irish Wildlife Manuals, No. 80. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

NPWS (2011). Wexford Harbour and Slobs Special Protection Area (Site Code 4076) & the Raven Special Protection Area (Site Code 4019) Conservation Objectives Supporting Document. Version 1. National Parks and Wildlife Service.

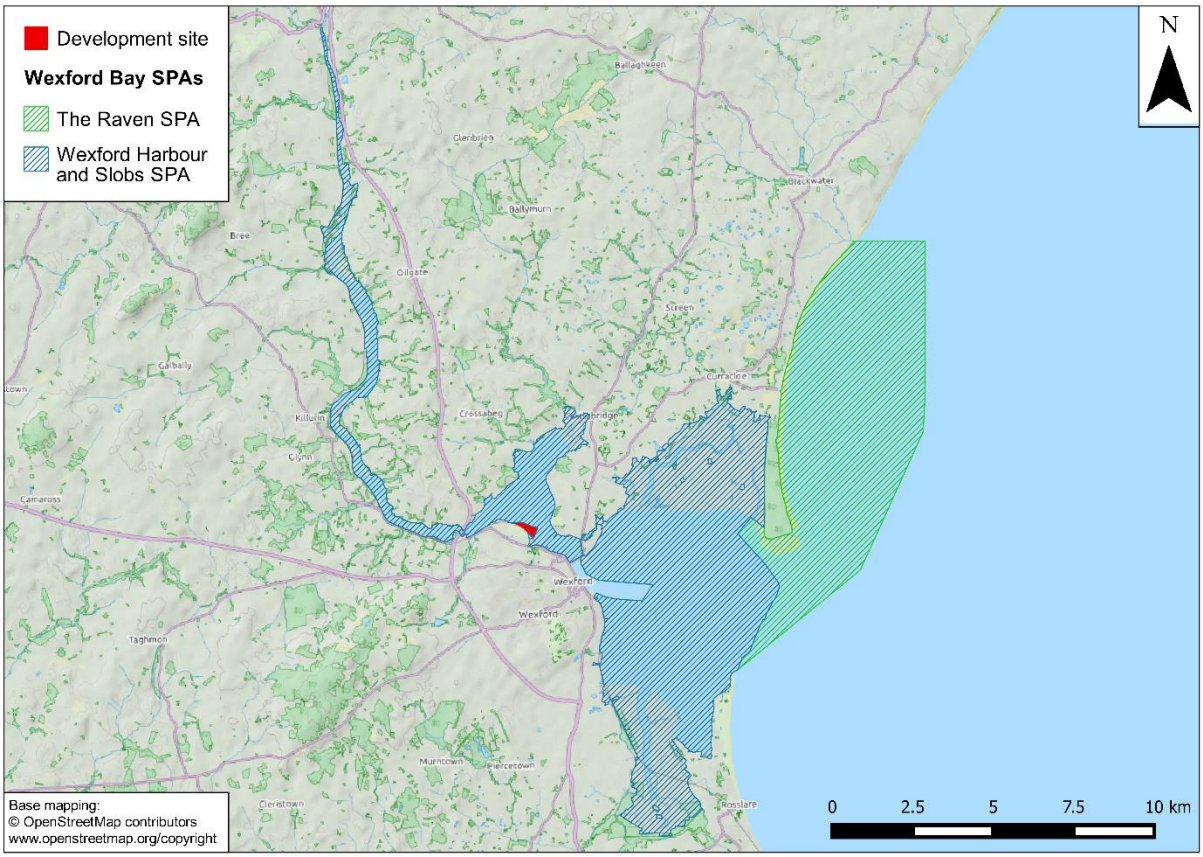

Figure 1. Wexford Bay SPAs.

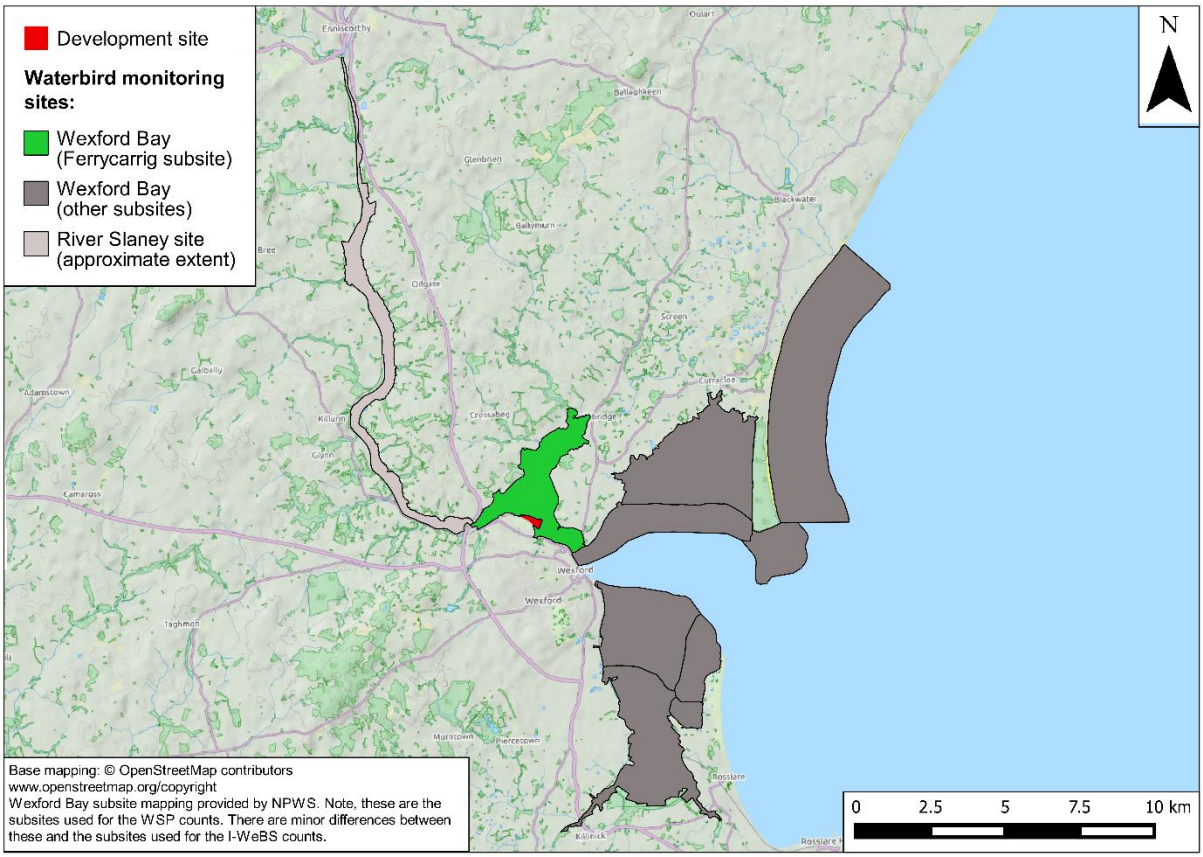

Figure 2. Waterbird monitoring sites used in Irish Wetland Bird Survey counts, and in the 2009/10 Waterbird Survey programme.

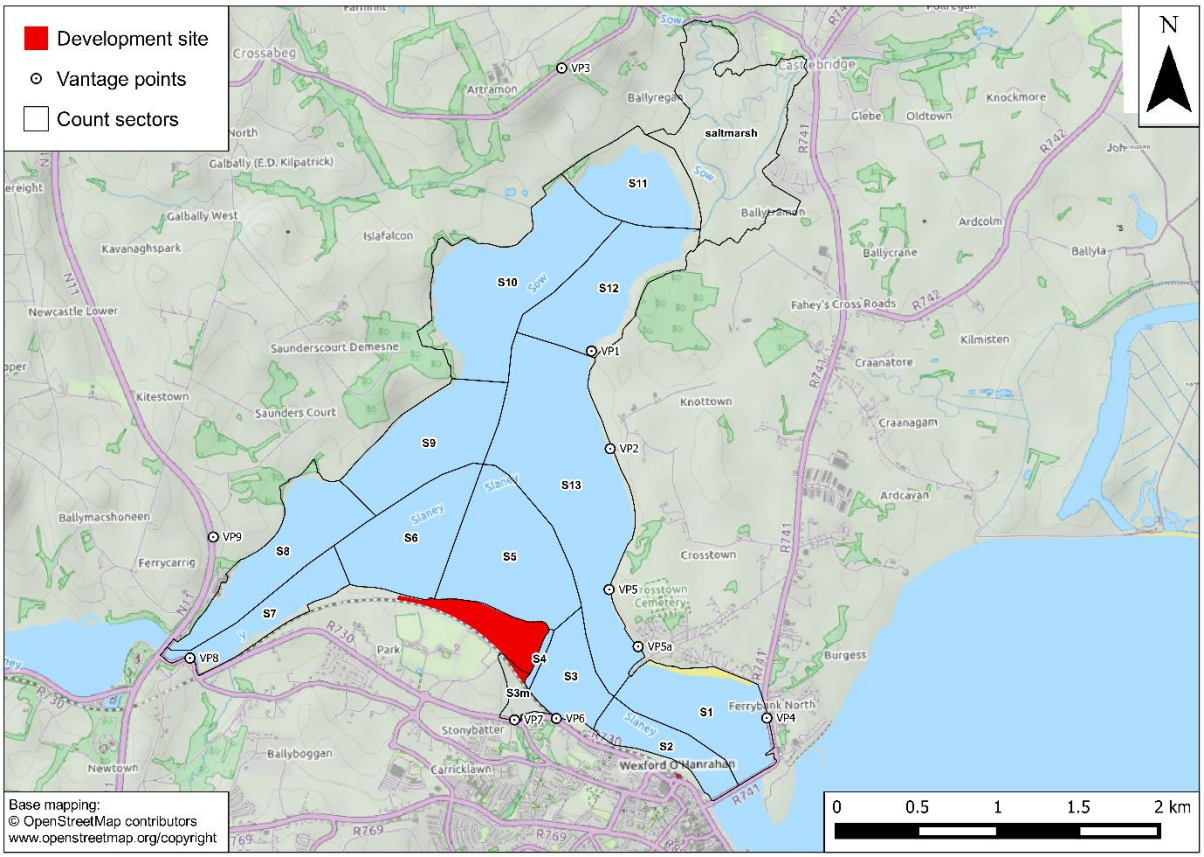

Figure 3. Vantage points and count sectors used for the 2015/16 waterbird counts.

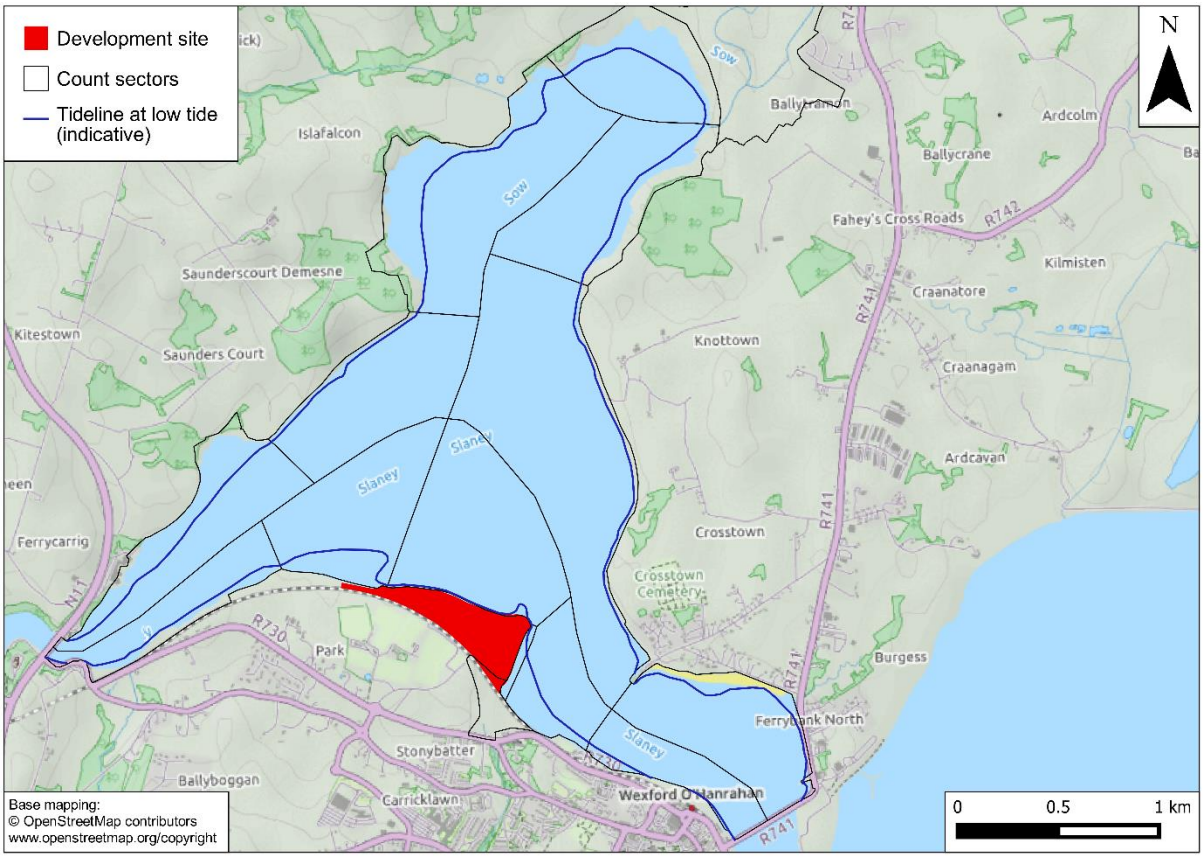

Figure 4. Typical extent of intertidal exposure at low tide.

Appendix C

Construction Management Plan

on

The Importation of Fill

and

Related Ecological Protection Measures.

July 31st, 2020.

Arthur Murphy & Co
Civil & Structural Engineering Consulting

Garryrichard, Foulksmills,
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Appendix C

July 31st, 2020.

Construction Management Plan on The Importation of Fill and Related Ecological Protection Measures.

Introduction

This report contains the following:

1. The Need for Fill and the Required Fill Quantities.
2. Description of Fill Material Proposed.
3. Placement of Fill and Building Foundations.
4. Phasing of Ecological and Site Filling Works.
5. Measures for the Prevention of Flooding and Water Contamination.

Waste disposal arrangements and various ecology measures in addition to standard construction matters are covered in the separate document submitted with this application entitled "Construction Management Plan For development at Park, Carcur, Wexford Incorporating Site Specific Safety, Health & Welfare Statement" by Wm. Neville & Sons Construction Ltd.

The Need for Fill and the Required Fill Quantities

Significant importation of fill is required to raise ground levels as part of the development of the site. The extent of fill required can be seen in Engineering Drawings PL10.

The nett volume of fill has been established first of all assessing the gross fill including imported building stone for construction and including the volume of the attenuation tanks. The volume of building stone and the attenuation tank volumes were separately assessed and subtracted from the gross volume to give the nett volume of soil fill.

The volume of building stone used for road build-up, trench backfill and hardstanding and house subfloor stone was assessed as shown in Table 1 below. The gross quantity of fill required was assessed by taking sections across the site at 50 metre intervals. Three sample sections are shown on engineering drawing PL10 as well as a longitudinal section through the site. Table 2 below gives the cross-sectional area of cut and fill at each section and shows the calculation of the gross fill and nett fill requirement.

Tables 1 and 2 show that the gross fill including building stone and attenuation stores is 137,500 cubic metres and the volume of stone and the attenuation stores is 61,000 cubic metres. The volume of soil fill is then 76,500 cubic metres. It can be seen from Table 2 that by assuming a 10 year building period and 48 no. 5 day working weeks that the average number of trucks bringing soil for site build-up per working day is 3.5.

Table 2 Calculation of Volume of Site Build-up Fill Required				
Section at Station (m)	Cross Section Area (m^2)		Volumes (m^3)	
	Cut Area	Fill Area	Cut	Fill
0	0	32	0	1600
50	0	295	0	14750
100	0	625	0	31250
150	0	740	0	37000
200	0	627	0	31350
250	20	550	1000	27500
300	43	270	2150	13500
350	79	180	3950	9000
400	153	110	7650	5500
450	193	60	9650	3000
500	148	110	7400	5500
550	139	0	6950	0
600	33	0	1650	0
650	35	0	1750	0
700	6	0	300	0
Total Volumes of Cut			42450	
Total Volume of Fill				179950
Gross Volume of Imported Fill Required (Fill Volume less On-site Cut Volume)				137500
Volume of Imported Building Materials				61000
Nett Volume of Clay Fill Required				76500
Equivalent No. of Trucks at 9 m^3 per truck				8500
Trucks per year over 10 year construction period				850
Average trucks per day (48 no. 5 day weeks, 240 days)				3.5

Description of Fill Material Proposed

The imported fill will be clean inert soil from green field building projects in the vicinity of Wexford town. The fill will for the most part be clay with perhaps some gravel fill as may become available. Before a site is approved for use as a source of fill material for the development it will be assessed for suitability.

Only green field site excavation material is to be used. Appropriate testing of the material will be carried out should this be warranted by any concerns raised by the visual assessment. In addition tests will carried out to inform appropriate compaction of the fill on site. Table 3 below gives the results of a number of tests on 3 samples taken from a large residential site currently operated by Wm. Neville & Sons Ltd. at Clonard near Wexford town.

Table 3 – Analysis Results for 3 Samples from Wm Neville & Sons Ltd at Clonard Wexford

Chemtest
The right chemistry to deliver results

Results - Soil

Project: P20030 Wm Neville

Client: Priority Geotechnical Ltd			**Chemtest Job No.:**		20-07359	20-07359	20-07359
Quotation No.:			**Chemtest Sample ID.:**		982059	982060	982061
			Sample Location:		Sample 2	Sample 3	Sample 4
			Sample Type:		SOIL	SOIL	SOIL
			Date Sampled:		04-Mar-2020	04-Mar-2020	04-Mar-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Moisture	N	2030	%	0.020	11	10	9.9
Nitrogen (Total)	N	2115	%	0.010	0.10	0.10	0.10
Cation Exchange Capacity	N	2400	meq/100g	0.10	1.0	1.3	1.3
Calcium	N	2400	mg/l	20	700	900	950
Magnesium (Extractable)	N	2400	mg/l	2.0	180	200	190
Sodium	N	2400	mg/l	2.0	18	26	17
Organic Matter	U	2625	%	0.40	0.83	0.57	0.55

Placement of Fill and Building Foundations .

The fill will be placed in 150mm layers and compacted to give a CBR of 3 percent. Fill under roads will be placed in line with NRA standards for Roads.

Where necessary with deeper fill, ground stabilization with lime may be employed depending on site conditions and the compaction characteristic of the fill.

All buildings will be constructed on piled foundations except where the fill is less that 1m and the existing soil has adequate bearing properties.

In buildings constructed on piles sewer and similar services will be suspended from the ground floor slab.

Development Phasing and Related Ecology Protection Measures

The site will be developed in four phases starting with Phase 1 at the eastern end of the site and continuing westward with the three later phases. In each phase measures will be put in place to protect the otter zone by the edge of the estuary and to prevent silt laden water from entering the estuary. The measures are set out in Engineering Drawing PL 12 and consist of the following:

Phase 1 Overview of Ecology Related Measures

1. Construct new otter pond 6 months before commencing the main development.
2. After confirmation that otters are using the it fill in the existing small otter pond.
3. Clear the line of the proposed berm for the full length of the berm and construct a 1 metre high berm with a top width of 1m and 1 in 3 side slopes on the line shown for the full extent of the site to prevent escape of silty water to the estuary and guide it to temporary siltation ponds as outlined below.
4. Construct a dog and intruder proof fence along access road and around the service compound to prevent site access and access to the beach.
5. Construct new otter pond and after its completion fill in the existing small otter pond.
6. Construct otter boundary fence for the Phase 1 area.

7. Install the five permanent storm water outfalls at Attenuation. This work to be done outside of the over-wintering period for water birds.
8. Construct siltation ponds at the future locations for the five Attenuation Stores all areas of the site grade to these ponds before discharge to the estuary after settlement via the installed outfalls.
9. Strip topsoil from Phase 1 and 2 areas and stockpile in Phase 3 area.
10. Import and consolidate fill in Phase 1 area.
11. Construct Phase 1 and as needed utilise topsoil from stockpile in Phase 3 area.
12. Replace the temporary siltation ponds in Phase 1 with the permanent attenuation stores and related silt traps and oil/petrol interceptors when most of the construction is completed and the danger of siltation of the stores has passed.
13. Remove berm in Phase 1, complete path and landscape.

Phase 2 Overview of Ecology Related Measures.

1. Construct a site security fence on the boundary between Phases 1 and 2
2. Reconfigure, and construct as necessary, the dog and intruder proof fence along access road and around the service compound to prevent site access and access to the beach.
3. Construct otter boundary fence for the Phase 2 area.
4. Strip topsoil from Phase 3 and stockpile in Phase 4 area.
5. Import and consolidate fill in Phase 2 area.
6. Construct Phase 2 and as needed utilise topsoil from stockpile in Phase 4 area and import additional topsoil as needed.
7. Replace the temporary siltation pond in Phase 2 with the permanent attenuation store, Attn. No. 3, and related silt trap and oil/petrol interceptor when most of the construction is completed and the danger of siltation of the store has passed.
8. Remove berm in Phase 2, complete path and landscape

Phase 3 Overview of Ecology Related Measures.

1. Construct a site security fence on the boundary between Phases 2 and 3.
2. Clear scrub from the remainder of Phase 3 and from the services compound for Phase 3 and the stockpile area in Phase 4..
3. Reconfigure and construct as necessary the dog and intruder proof fence along access road and around the service compound to prevent sPHASE 3 Preparatory Work.
4. Construct a site security fence on the boundary between Phases 2 and 3
5. Clear scrub from the remainder of Phase 3 and from the services compound for Phase 3 and the stockpile area in Phase 4..
6. Reconfigure and construct as necessary the dog and intruder proof fence along access road and around the service compound to prevent site access and access to the beach.
7. Construct otter boundary fence for the Phase 3 area.
8. Strip topsoil from Phase 4 service compound and stockpile in Phase 4 area.
9. Import and consolidate fill in Phase 3 area.
10. Construct Phase 3 and as needed utilise topsoil from stockpile in Phase 4 area and import additional topsoil as needed.
11. Replace the temporary siltation pond in Phase 3 with the permanent attenuation store are related silt trap and oil/petrol interceptor when most of the construction is completed and the danger of siltation of the store has passed.
12. Remove berm in Phase 3, complete path and landscape

Phase 4 Overview of Ecology Related Measures.

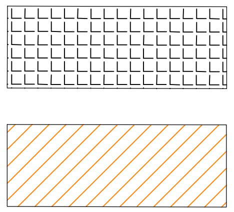
1. Construct a site security fence on the boundary between Phases 3 and 4.
2. Clear scrub from the remainder of Phase 4.
3. Construct otter boundary fence for the Phase 4 area.
4. Construct the service compound at the location shown. Modification and relocation will be necessary in the later stages. Construction of the buildings closest to the access bridge will take place last and plant and service will be reduced and relocated as necessary in the latter stages.
5. Import and consolidate fill in the local low areas of Phase 4.
6. Construct Phase 4 and import topsoil as needed.
7. Replace the temporary siltation pond in Phase 4 with the permanent attenuation store are related silt trap and oil/petrol interceptor when most of the construction is completed and the danger of siltation of the store has passed.
8. Remove berm in Phase 4, complete path and landscape.

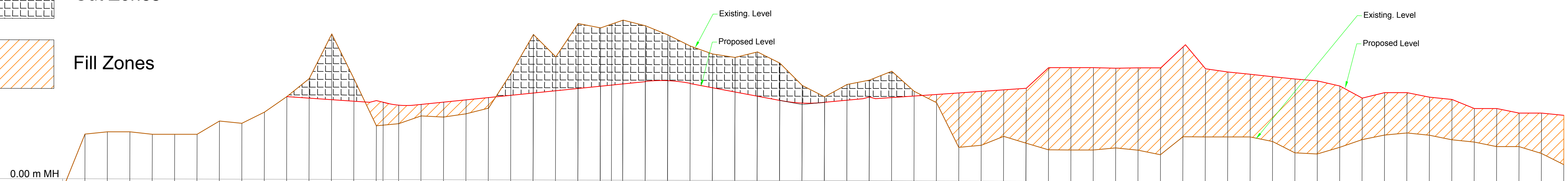
_____

Arthur Murphy B.E., M.Eng.Sc., C.Eng.

Cut Zones

Fill Zones



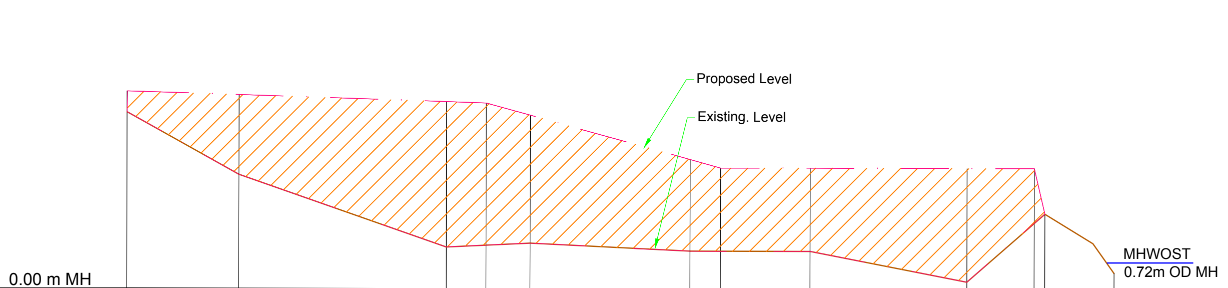


Proposed Level	-0.5	2	2.1	2.1	2	2	2	2.6	2.5	3	3.7	2.42	2.38	2.33	3.53	3.32	3.36	3.47	3.57	3.67	3.78	3.88	3.99	4.09	4.11
Existing Level	-0.5	2	2.1	2.1	2	2	2	2.6	2.5	3	3.7	4.5	6.5	4.5	2.4	2.5	2.85	2.8	2.95	3.2	4.75	6.5	5.5	7	
Distance	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	

Proposed Level	4.2	4.3 4.33	4.41	4.44	4.36 4.33	4.14	3.96	3.77	3.58	3.46	3.5	3.6	3.74	3.91	3.95	3.99	4.03	4.07	4.11	4.15	5.08	5.08	5.80
Existing Level	6.8	7.15	6.9	6.5	6	5.65	5.5	5.75	5.25	4.25	3.75	4.3	4.5	4.9	4	3.5	1.5	1.6	2	1.7	1.4	1.4	1.4
Distance	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460

Proposed Level	58.00	2.80	5.08	4.00	5.04	4.90	4.80	4.70	4.60	4.26	4.11	3.75	4.00	4.00	3.80	3.70	3.30	3.30	3.10	3.10	3.00
Existing Level	1.5	1.4	1.2	2	2	2	2	1.8	1.3	1.25	1.55	1.9	2.1	2.2	2.1	1.9	1.8	1.6	1.6	1.3	0.8
Distance	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650	660	670

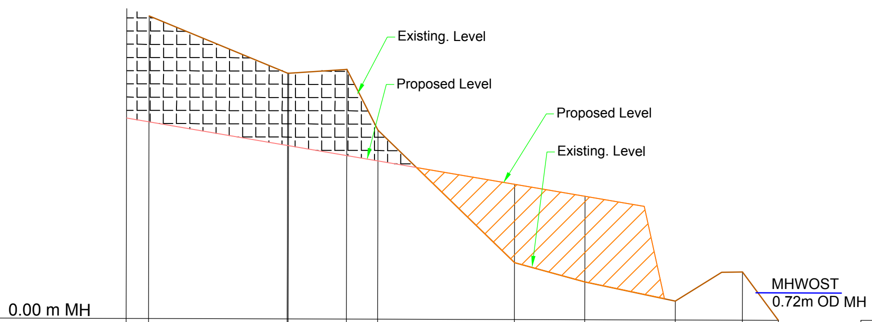
Long Section AA Through Site 1:1000H 1:100V



Pr. Level	5.2	5.11	4.93	4.9	4.58	3.42	3.2	3.2	3.2	3.2	2.0	0.44
Ex. Level	4.65	3	1.1		1.2	1		1	0.2	1.7	2.0	0.44
Distance	0	30	85		107	149		181	222	240	243	252

Cross-Setion at 200

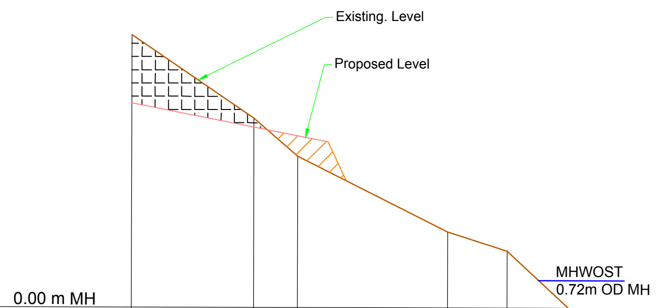
1:1000H 1:100V



Pr. Level	5.3	5.2	4.58	4.32	4.18	3.58	3.26	3.2			
Ex. Level	8.2	8	6.5	6.6	5	1.5	1		0.5	1.27	0
Distance	0	6	43	58	67	103	121		145	163	173

Cross-Section at 400

1:1000H 1:100V

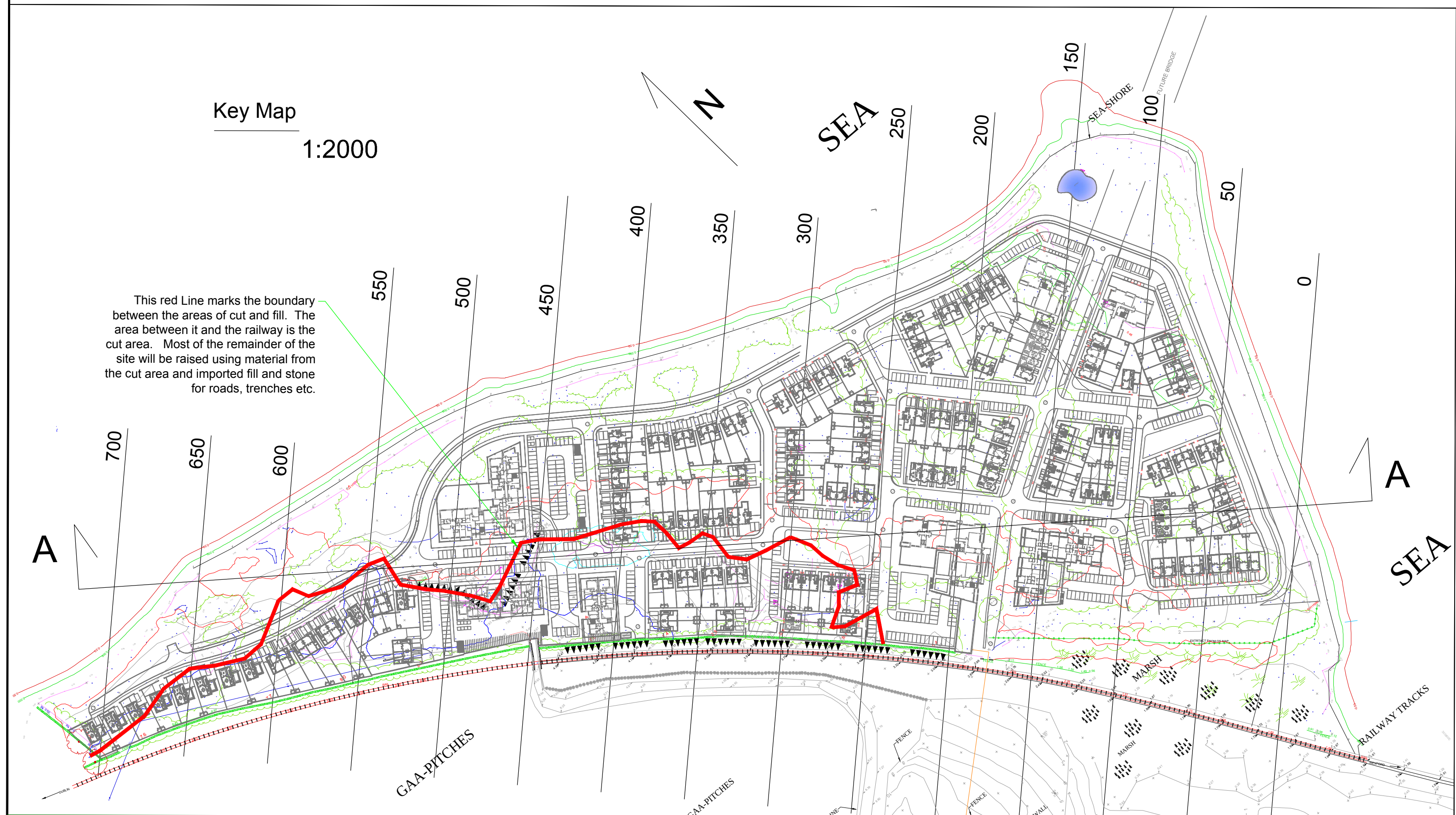


Pr. Level	5.4	4.7		2	1.5	0
Ex. Level	7.2	5	4	2	1.5	0
Distance	0	32	44	84	100	116

Cross-Section at 600

Key Map

1:2000



See Appendix C of the Engineering Report document for details of:

1. the cut and fill quantities
2. the nett volume of imported fill
3. a description of the fill
4. management of the fill
5. protection of the otter reserved area and
6. the settlement of site runoff to avoid silt gaining access to the estuary.

ALL DIMENSIONS ARE TO BE CHECKED ON SITE BEFORE COMMENCING AND AT ALL STAGES OF CONSTRUCTION

Do Not Scale. Check for reduction/increase in plotting size

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Client: William Neville & Sons Ltd. Rockfield House Spawell Road, Wexford

No	Revision Description	Date	By

Project: RESIDENTIAL DEVELOPMENT PARK WEXFORD

Sub Project: Civil Engineering Drawings

Title: SITE CUT AND FILL

First Issue Date:

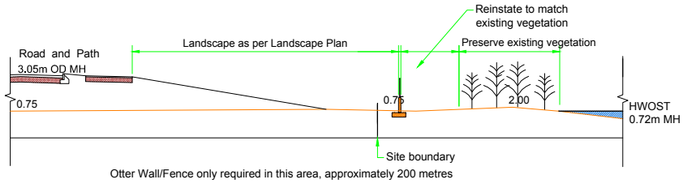
Drawing No.: PL 10

Design: AM

Revision:

Scale: As Shown

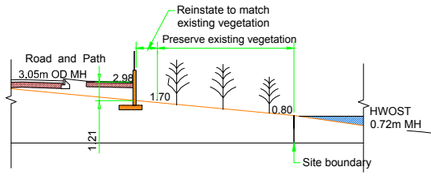
Status: Planning



Otter Wall/Fence only required in this area, approximately 200 metres

Section D

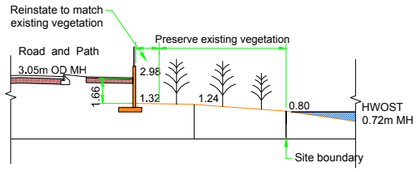
(1:200 H) 0 2 4 6 8 10m
(1:200 V) 0 2 4 6 8 10m



Approximately 60m of retaining wall and fence of this height required.

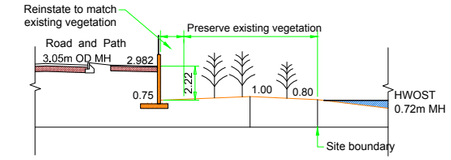
Section C

(1:200 H) 0 2 4 6 8 10m
(1:200 V) 0 2 4 6 8 10m



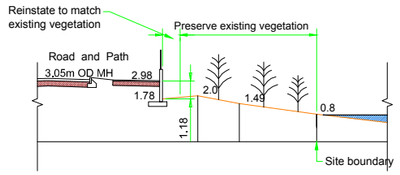
Approximately 35m of wall and fence of this height required, chainage 610 to 645

Section E



Approximately 20m of wall and fence of this height required, chainage 590 to 610.

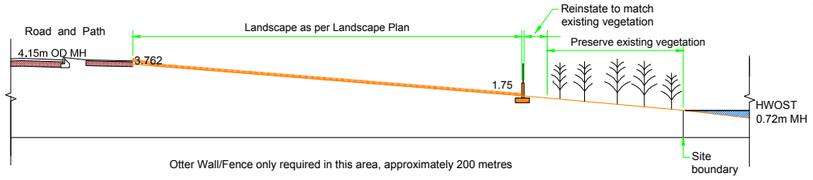
Section F



Approximately 30m of wall and fence of this height required, Chainage 560 to 590.

Section G

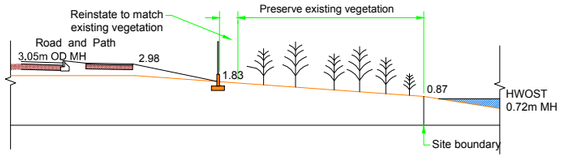
(1:200 H) 0 2 4 6 8 10m
(1:200 V) 0 2 4 6 8 10m



Otter Wall/Fence only required in this area, approximately 200 metres

Section B

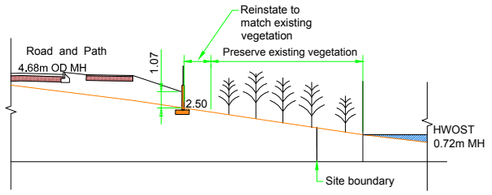
(1:200 H) 0 2 4 6 8 10m
(1:200 V) 0 2 4 6 8 10m



Otter Wall/Fence only required in this area, approximately 40 metres

Section H

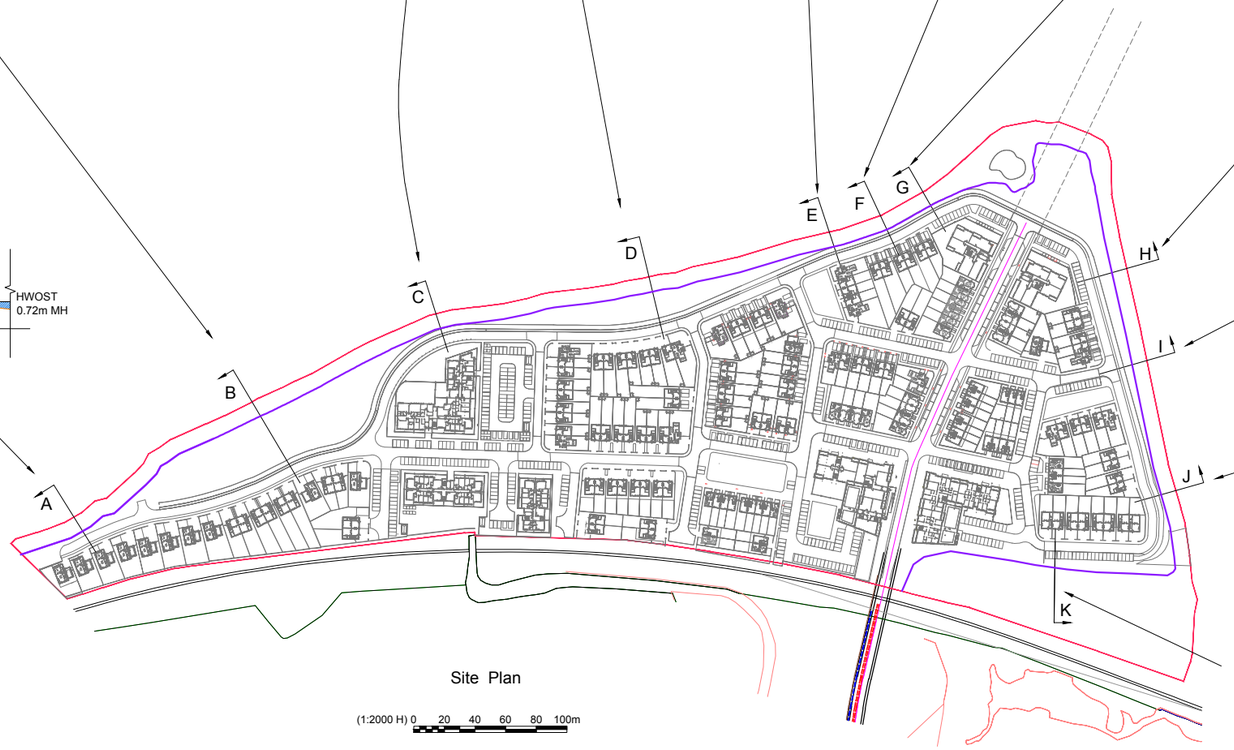
(1:200 H) 0 2 4 6 8 10m
(1:200 V) 0 2 4 6 8 10m



Approximately 40m of retaining wall and fence of this height required

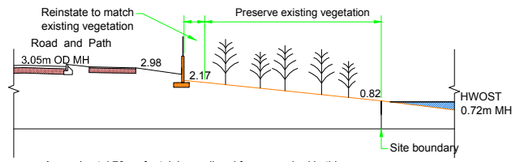
Section A

(1:200 H) 0 2 4 6 8 10m
(1:200 V) 0 2 4 6 8 10m



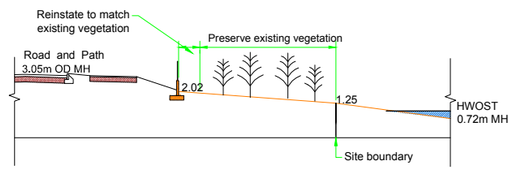
Site Plan

(1:2000 H) 0 20 40 60 80 100m



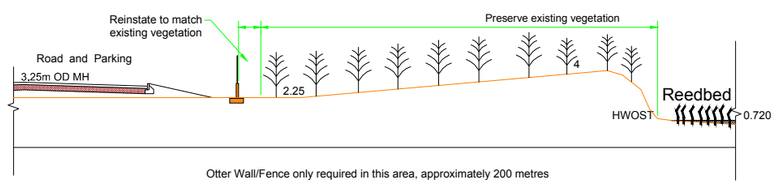
Approximatel 70m of retaining wall and fence required in this area.

Section I



Otter Wall/Fence only required in this area, approximately 60 metres

Section J



Otter Wall/Fence only required in this area, approximately 200 metres

Section K

(1:200 H) 0 2 4 6 8 10m
(1:200 V) 0 2 4 6 8 10m

Legend

HWOST	High water on Spring Tide
	Existing Ground Line
	Proposed Ground Line
2.92	Levels (m OD MH)

ALL DIMENSIONS ARE TO BE CHECKED ON SITE BEFORE COMMENCING AND AT ALL STAGES OF CONSTRUCTION

Do Not Scale. Check for reduction/increase in plotting size

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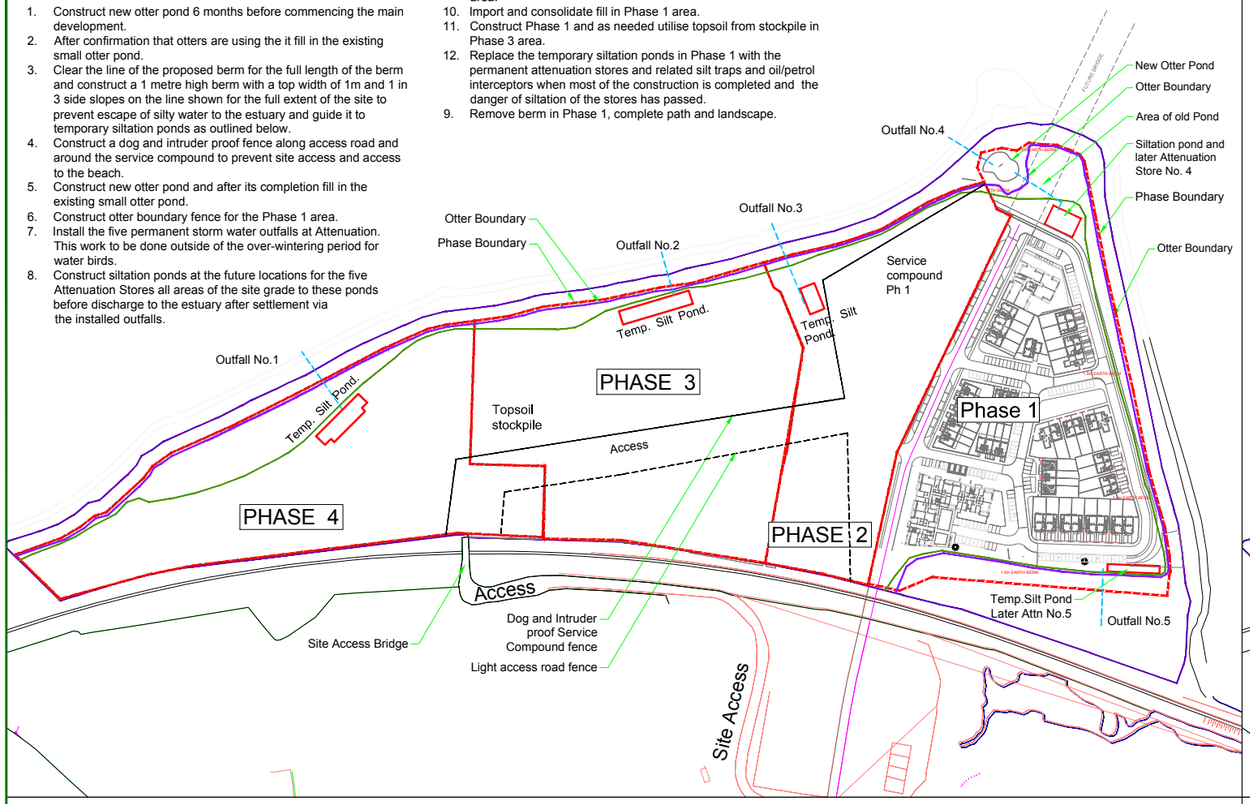
No	Revision Description	Date	By

Project: RESIDENTIAL DEVELOPMENT PARK WEXFORD

Sub Project: Civil Engineering Drawings
Title: SHORELINE SECTIONS
First Issue Date: July 2020
Drawing No.: PL 11
Design: AM
Revision:
Scale: As Shown
Status: Planning

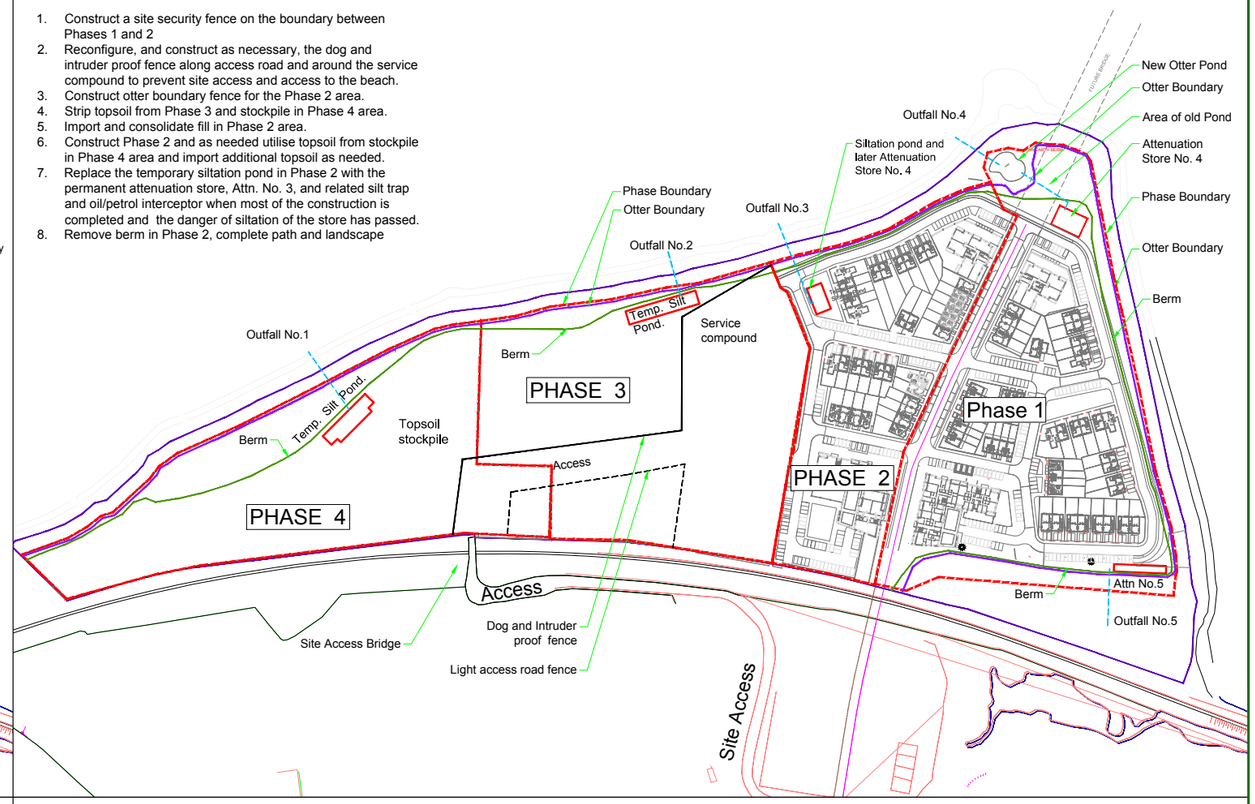
PHASE 1 Preparatory Work.

1. Construct new otter pond 6 months before commencing the main development.
2. After confirmation that otters are using the it fill in the existing small otter pond.
3. Clear the line of the proposed berm for the full length of the berm and construct a 1 metre high berm with a top width of 1m and 1 in 3 side slopes on the line shown for the full extent of the site to prevent escape of silty water to the estuary and guide it to temporary siltation ponds as outlined below.
4. Construct a dog and intruder proof fence along access road and around the service compound to prevent site access and access to the beach.
5. Construct new otter pond and after its completion fill in the existing small otter pond.
6. Construct otter boundary fence for the Phase 1 area.
7. Install the five permanent storm water outfalls at Attenuation. This work to be done outside of the over-wintering period for water birds.
8. Construct siltation ponds at the future locations for the five Attenuation Stores all areas of the site grade to these ponds before discharge to the estuary after settlement via the installed outfalls.
9. Strip topsoil from Phase 1 and 2 areas and stockpile in Phase 3 area.
10. Import and consolidate fill in Phase 1 area.
11. Construct Phase 1 and as needed utilise topsoil from stockpile in Phase 3 area.
12. Replace the temporary siltation ponds in Phase 1 with the permanent attenuation stores and related silt traps and oil/petrol interceptors when most of the construction is completed and the danger of siltation of the stores has passed.
9. Remove berm in Phase 1, complete path and landscape.



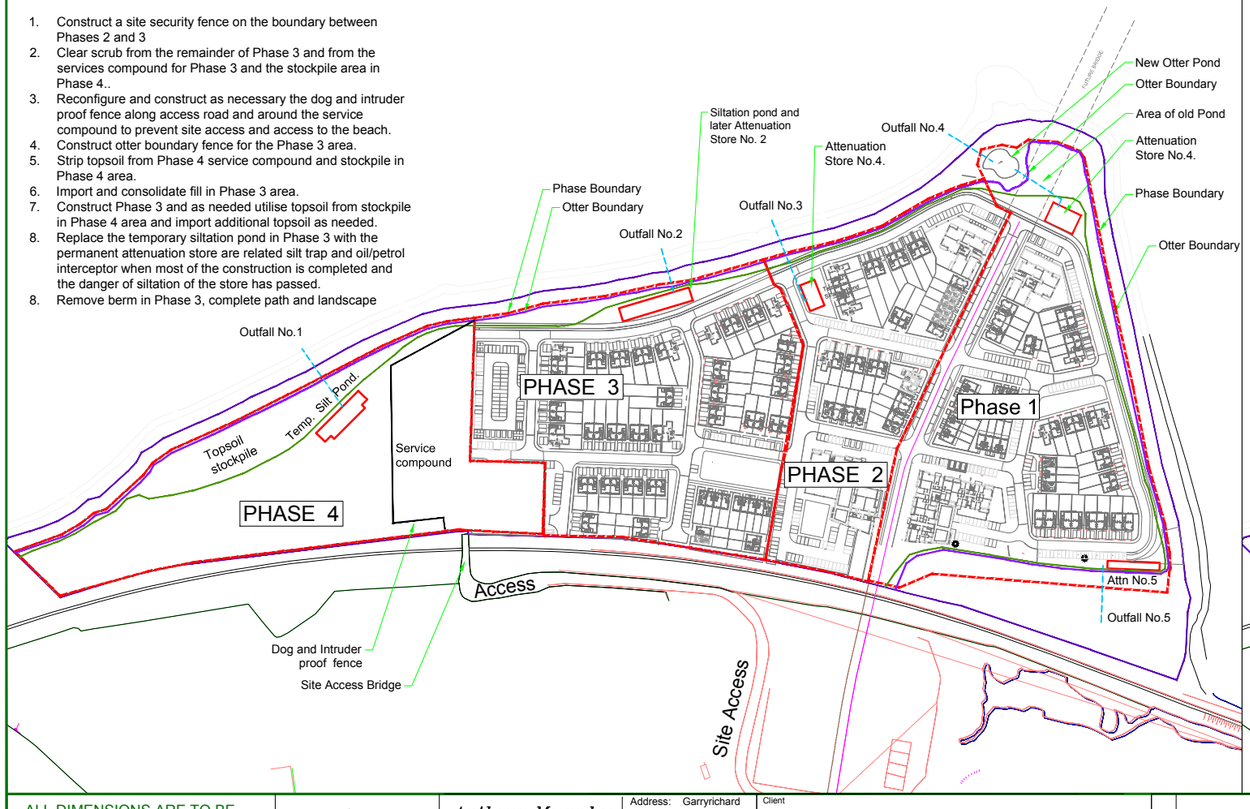
PHASE 2 Preparatory Work.

1. Construct a site security fence on the boundary between Phases 1 and 2
2. Reconfigure, and construct as necessary, the dog and intruder proof fence along access road and around the service compound to prevent site access and access to the beach.
3. Construct otter boundary fence for the Phase 2 area.
4. Strip topsoil from Phase 3 and stockpile in Phase 4 area.
5. Import and consolidate fill in Phase 2 area.
6. Construct Phase 2 and as needed utilise topsoil from stockpile in Phase 4 area and import additional topsoil as needed.
7. Replace the temporary siltation pond in Phase 2 with the permanent attenuation store, Attn. No. 3, and related silt trap and oil/petrol interceptor when most of the construction is completed and the danger of siltation of the store has passed.
8. Remove berm in Phase 2, complete path and landscape



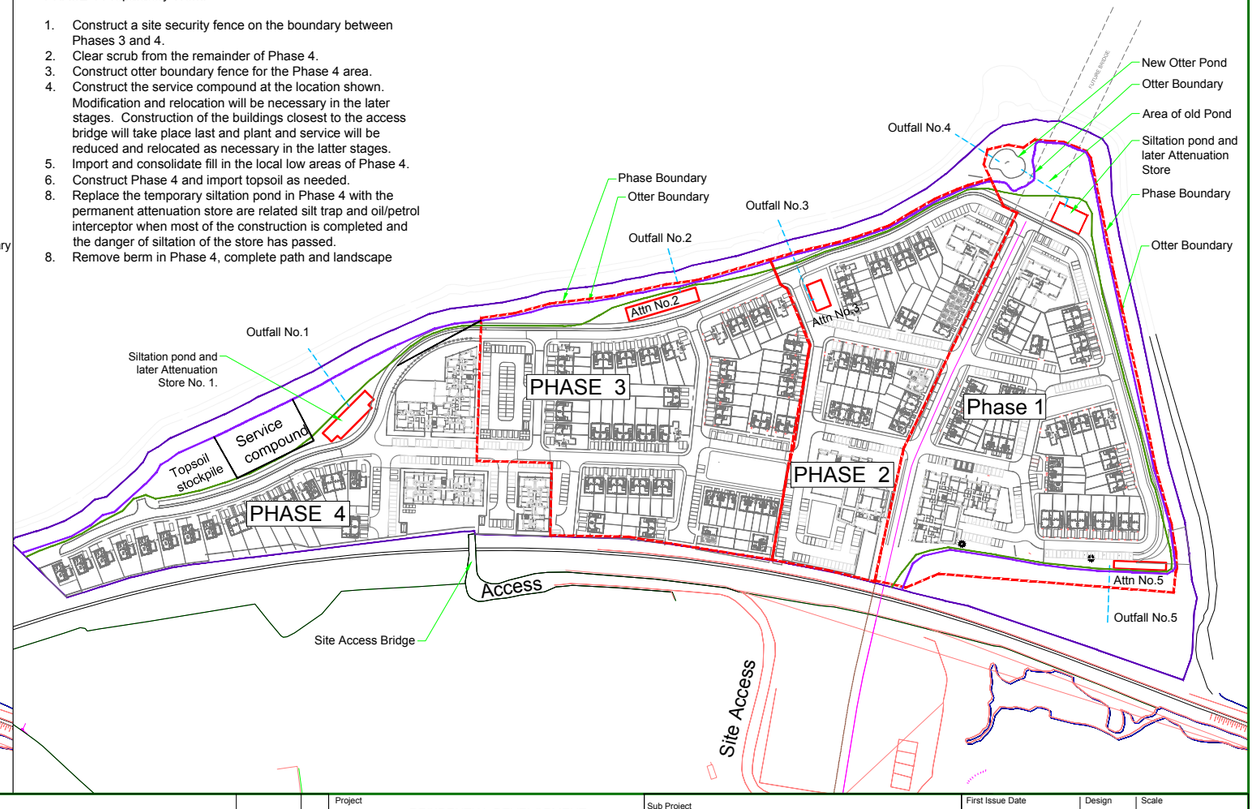
PHASE 3 Preparatory Work.

1. Construct a site security fence on the boundary between Phases 2 and 3
2. Clear scrub from the remainder of Phase 3 and from the services compound for Phase 3 and the stockpile area in Phase 4..
3. Reconfigure and construct as necessary the dog and intruder proof fence along access road and around the service compound to prevent site access and access to the beach.
4. Construct otter boundary fence for the Phase 3 area.
5. Strip topsoil from Phase 4 service compound and stockpile in Phase 4 area.
6. Import and consolidate fill in Phase 3 area.
7. Construct Phase 3 and as needed utilise topsoil from stockpile in Phase 4 area and import additional topsoil as needed.
8. Replace the temporary siltation pond in Phase 3 with the permanent attenuation store are related silt trap and oil/petrol interceptor when most of the construction is completed and the danger of siltation of the store has passed.
8. Remove berm in Phase 3, complete path and landscape



PHASE 4 Preparatory Work.

1. Construct a site security fence on the boundary between Phases 3 and 4.
2. Clear scrub from the remainder of Phase 4.
3. Construct otter boundary fence for the Phase 4 area.
4. Construct the service compound at the location shown. Modification and relocation will be necessary in the later stages. Construction of the buildings closest to the access bridge will take place last and plant and service will be reduced and relocated as necessary in the latter stages.
5. Import and consolidate fill in the local low areas of Phase 4.
6. Construct Phase 4 and import topsoil as needed.
8. Replace the temporary siltation pond in Phase 4 with the permanent attenuation store are related silt trap and oil/petrol interceptor when most of the construction is completed and the danger of siltation of the store has passed.
8. Remove berm in Phase 4, complete path and landscape



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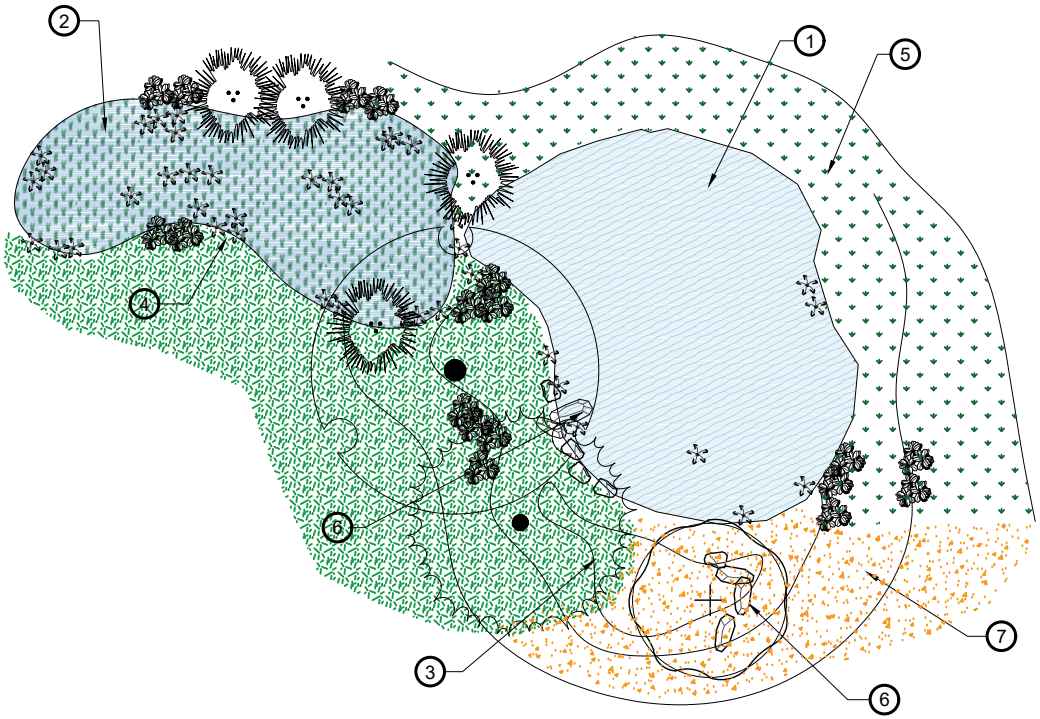
No	Revision Description	Date	By

Project: RESIDENTIAL DEVELOPMENT PARK WEXFORD

Sub Project: Civil Engineering Drawings

Title: CONSTRUCTION MANAGEMENT OVERVIEW

First Issue Date	Design	Scale
05/08/2020	AM	1:2000 on A1
Drawing No.	**Revision**	**Status**
PL 12		Planning

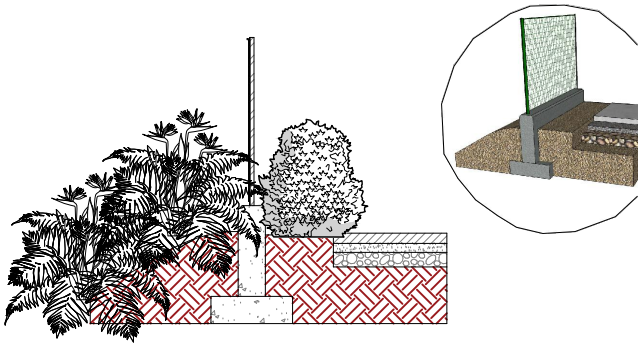


1 OTTER POND
2 MARGINAL WET LAND
3 ELEVATED EARTH AND GRAVEL EMBANKMENT
4 WETLAND PLANTING
5 MARGINAL GRASSES
6 ROCK OUT CROPS FOR BASKING
7 GRAVEL SLOPES

SUBJECT TO SITE CONDITIONS POND WILL BE CONSTRUCTED USING NATURAL CLAY / OR /MUD LINED.
IN THE EVENT THAT THE AREA DESIGNATED FOR A NATURAL POND CAPPING IS TOO PERMEABLE THAN THE OPTION TO USE A LINER IS PERCEIVED TO BE THE BEST METHOD OF CONSTRUCTION

3 OTTER POND

1:200

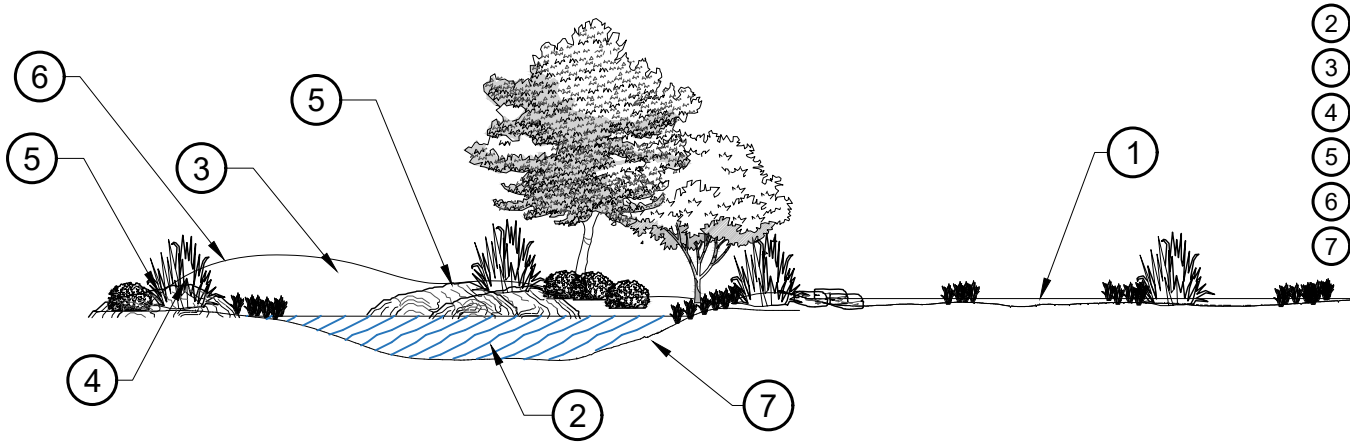


1 OTTER BOUNDARY FENCE

1:50

P-WA-(

P-LA-PON-01



1 MARGINAL WETLAND
2 OTTER POND
3 ELEVATED BANKS
4 NATIVE PLANTING
5 ROCK OUTCROPS
6 GRAVEL BANKS
7 NATURAL POND MUD LINED SUBJECT TO ON SITE CONDITIONS.
~~OPTIONAL LINER~~ IF CONDITIONS ARE NOT CONCLUSIVE TO HOLDING FRESH WATER

4 OTTER POND SECTION

1:200

P-LA-PON-02