

DBFL Consulting Engineers

**Proposed Boyne Greenway
(Drogheda to Mornington) Project**

**Appropriate Assessment:
Stage 2 NIS**

February 2022

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The logo for Inis, featuring the word "Inis" in a dark blue serif font. A small green leaf icon is positioned above the letter 'i'.





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The findings outlined within this report and the data we have provided are to our knowledge true, and express our bona fide professional opinions. This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct. Where pertinent, CIEEM Guidelines used in the preparation of this report include the *Guidelines for Ecological Report Writing* (CIEEM, 2017a), *Guidelines for Preliminary Ecological Appraisals* (CIEEM, 2017b) and *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2018). CIEEM Guidelines include model formats for Preliminary Ecological Appraisal and Ecological Impact Assessment. Also, where pertinent, evaluations presented herein take cognisance of recommended Guidance from the EPA such as *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017), and in respect of European Sites, *Managing Natura 2000 sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (European Commission, 2019).

Due cognisance has been given at all times to the provisions of the Wildlife Act, 1976, the Wildlife (Amendment) Act, 2000, the European Union (Natural Habitats) Regulations. SI 378/2005, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), EU Regulation on Invasive Alien Species under EU Regulation 1143/2014, the EC Birds Directive 2009/147/EC and Habitats Directive 92/43/EEC.

No method of assessment can completely remove the possibility of obtaining partially imprecise or incomplete information. Any limitation to the methods applied or constraints however are clearly identified within the main body of this document.

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Title		Proposed Boyne Greenway (Drogheda to Mornington) Project – Natura Impact Statement (NIS) Report		

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1. Introduction

This Natura Impact Statement (NIS) report has been prepared by Inis Environmental Consultants Ltd. in order to identify if the proposed Boyne Greenway project from Drogheda East to Mornington has the potential for any adverse effects on the integrity of any European designated sites.

This report includes the initial Screening for Likely Significant Effects stage (Stage 1), during which potential likely significant effects on designated European sites are evaluated and either screened out (i.e. there is no potential for likely significant effects) or are unable to be screened out, in view of the qualifying interests or special conservation interests and the respective conservation objectives of the European site(s), in which case Appropriate Assessment (Stage 2) is required. Where Appropriate Assessment identifies potential for adverse effects on the integrity of a European site, this NIS report prescribes mitigation measures for the avoidance of adverse effects on the site's integrity.

This NIS report has been prepared with regard to current legislation and best practice guidance (as described in Section 2 of this report) and in reference to supplementary data obtained during a desk study and field surveys (including bespoke surveys for designated bird features between 2018 and 2021).

This version of the NIS report (dated 17/02/2022) has been prepared in response to the further information request (FIR) by An Bord Pleanála dated 14/11/2020 (Case Number ABP-307652-20). This updated NIS report is accompanied by updates to the Ecological Impact Assessment (EclA) report for the project (dated 17/02/2022).

1.1 Description of the Proposed Development

Details of the proposed 'Boyne Greenway: Drogheda to Mornington' project, including works locations and construction methods, are described in detail within the EclA report for the project (Inis, 2022) and the Construction Methodology report (DBFL, 2022). In summary, the project comprises the development of a pedestrian and cycle access route which follows the River Boyne Estuary from east of Drogheda to the coast at Mornington, in order to provide a safe, traffic-free environment for tourists and local users to cycle or walk adjacent to the Boyne river, estuary and coast. The proposed route for the Boyne Greenway is approximately 5.9 kilometres (km) in length (see **Figure 1.1**). A significant portion of this route falls within the boundary of the Boyne Estuary Special Protection Area (SPA) and Special Area of Conservation (SAC), with approximately 2.4km of proposed Greenway route within the SPA/SAC areas, of which approximately 610 metres (m) would be within the intertidal zone. In order to accommodate the proposed Greenway, a total of 147 trees and ten hedges are to be removed from roadside verges and adjacent residential lands. Further details regarding the vegetation clearance proposals are provided in the Arboricultural Assessment, Arboricultural Impact and Tree Protection Strategy Report for the project (CMK Horticulture and Arboriculture Ltd, 2022).



Figure 1.1: Location of the proposed Boyne Greenway Drogheda to Mornington route

1.2 Legislative Context

Article 6(3) of the Habitats Directive requires that, in relation to European designated sites (i.e. SACs and SPAs that form the Natura 2000 site network) (also referred to within this report as 'Natura 2000 sites'), *"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"*.

A competent authority (e.g. a Local Authority) can only agree to a plan or project after having determined that it will not adversely affect the integrity of the site concerned. Under article 6(4) of the Directive, if adverse impacts are likely, and in the absence of alternative options, a plan or project must nevertheless proceed for imperative reasons of overriding public interest (IROPI), including social or economic reasons, in which case a Member State is required to take all compensatory measures necessary to ensure the overall integrity of the European site. The European Commission must be informed of any compensatory measures adopted, unless a priority habitat type or species is present and in which case an opinion from the European Commission is required beforehand (unless for human health or public safety reasons, or of benefit to the environment).

2. Methodology

Natura Impact Assessment is the process through which the possible nature conservation implications of any plan or project on the European sites within the Natura 2000 network is considered by a Competent Authority, before a decision is made to permit that plan or project to proceed.

For clarity, the term 'Natura Impact Assessment' has been used to refer to the overall process described in this report, whilst use of the term 'Appropriate Assessment' (as described below) has been restricted to the specific stage by that name (Stage 2).

2.1 Natura Impact Assessment Stages

Natura Impact Assessment involves a number of steps and tests that are applied using a stage-by-stage approach. Each stage in the assessment process precedes and provides a basis for the following stages. The four stages of the Natura Impact Assessment are described below.

Guidance on this assessment process was produced by the European Commission in 2002 and subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DEHLG) (2010). These guidance documents identify a staged approach as described below:

Stage 1 - Screening for Likely Significant Effects

This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant (i.e. whether effects can be 'screened out'). Where likely significant effects (LSE) cannot be screened out, it is necessary to proceed to Stage 2.

The threshold for a LSE is considered as being above *a de minimis* level¹. The opinion of the Advocate General in CJEU case C-258/11 outlines:

"The requirement that the effect in question be 'significant' exists in order to lay down a *de minimis* threshold. Plans or projects that have no appreciable effect on a European site are thereby excluded. If all plans or projects capable of having any effect whatsoever on the site were to be caught by Article 6(3), activities on or near the site would risk being impossible by reason of legislative overkill."

In this report, therefore, 'relevant' European sites are those within the potential Zone of Influence (Zoi) of activities associated with the proposed development, where LSE pathways to European sites were identified through the source-pathway-receptor model.

¹ Sweetman v. An Bord Pleanála (Court of Justice of the EU, case C-285/11). A *de minimis* effect is a level of risk that is too small to be concerned with when considering ecological requirements of an Annex I habitat or a population of Annex II species present on a European site necessary to ensure their favourable conservation condition. If low level effects on habitats or individuals of species are judged to be in this order of magnitude and that judgment has been made in the absence of reasonable scientific doubt, then those effects are not considered to be likely significant effects.

In 2018, the European Court of Justice ruled that measures intended to avoid or reduce the harmful effects of a proposed project on a European site (i.e. mitigation measures) may no longer be taken into account by the Competent Authority at the LSE stage². This is reflected within this NIS report.

Also in 2018, the European Court of Justice ruled that (within paragraph 39), “As regards other habitat types or species, which are present on the site, but for which that site has not been listed, and with respect to habitat types and species located outside that site, ... typical habitats or species must be included in the appropriate assessment, if they are necessary to the conservation of the habitat types and species listed for the protected area”³. This has been taken into account within this NIS report.

Stage 2 - Appropriate Assessment

In this stage, the impact of the project on the integrity of the Natura 2000 site is considered with respect to the conservation objectives of the site and its structure and function. ‘Embedded’ mitigation within the current project design is taken into account at this stage in assessing potential adverse effects on site integrity. If potential adverse effects remain, it is necessary to proceed to Stage 3. Where appropriate, supplementary data (e.g. field survey data) may be used to inform this Appropriate Assessment.

Stage 3 - Alternative Solutions and Mitigation

Should the Appropriate Assessment determine that adverse effects on the integrity of a Natura 2000 site are likely, avoidance and/or mitigation measures are recommended during Stage 3. These recommendations should be underpinned by best practice guidance (based on relevant literature and pre-existing or bespoke field data as appropriate) and may also be informed by professional judgement and stakeholder engagement.

Stage 4 - IROPI

Assessment where no alternative solutions exist and where adverse impacts remain following the application of mitigation: where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the Natura 2000 site will be necessary. European case law highlights that consideration must be given to alternatives outside the project area in carrying out the IROPI test. It is a rigorous test which projects are generally considered unlikely to pass. In any event, the developer does not purport to place any reliance on Stage 4.

2.2 Relevant Guidance and Sources of Information

European and national guidance exists in relation to Member States fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this assessment has regard to the following legislation and guidance:

- Managing Natura 2000 Sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC (known as MN2000), Office for Official Publications of the European Communities, Luxembourg (European Commission, 2018);

² People Over Wind and Sweetman v Coillte Teoranta (C-323/17).

³ Case C-461/17.

- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (European Commission, 2002);
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission (European Commission, 2007);
- Nature and biodiversity cases: Ruling of the European Court of Justice (European Commission, 2006);
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (European Commission, 2013);
- Article 6 of the Habitats Directive: Rulings of the European Court of Justice (Sundseth & Roth, 2014);
- Part XAB of the Planning and Development Act 2000;
- Birds Directive (Council Directive 2009/147/EC);
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended);
- Communication from the Commission on the Precautionary Principle (European Commission, 2000);
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government (2010); and
- National Parks and Wildlife Service (NPWS) Guidance for Planning Authorities (2010).

2.2.1. Desk Study

A desk study was completed to assess the potential for all Qualifying Interests (QI) and Special Conservation Interests (SCI) of European sites to occur, given their ecological requirements identified by Balmer *et al.* (2013) for SCIs, and the National Parks and Wildlife Service (NPWS) for QIs (NPWS, 2019a, b, c). SCI birds and mobile QI species can travel many kilometres from their core areas; as such, desk studies assessed the potential presence of such species beyond the boundaries of the European sites for which they are QIs/SCIs. Desk studies had particular regard for the following sources:

- Tabulated lists for all European sites in Ireland of SCIs and QIs, obtained through NPWS;
- Information on ranges of mobile QI populations in Volume 1 of NPWS' Status of EU Protected Habitats and Species in Ireland (NPWS, 2019), and associated digital shapefiles;
- Information on ranges of mobile SCIs bird populations from Bird Atlas 2007–11 (Balmer *et al.*, 2013); excluding birds of prey whose ranges were determined with reference to Hardey *et al.* (2013);
- Mapping of European site boundaries and Conservation Objectives for relevant sites and beyond, as relevant, available online from the NPWS;
- Distribution records for QI and SCI species of European sites held online by the National Biodiversity Data Centre (NBDC);
- Details of QIs/SCIs of European sites within the National Biodiversity Action Plan 2017-2021 (DoCHG, 2017);
- Waterbird data (including data for SCI species for relevant European sites) from the Irish Wetland Bird Survey (I-WeBS);

- Data including surface and ground water quality status, and river catchment boundaries available from the online database of the Environmental Protection Agency (EPA)⁴;
- Information on groundwater aquifers, recharge, and vulnerability available from the online database of Geological Survey Ireland (GSI)⁵;
- National and regional surveys of semi-natural habitats, including grasslands (O'Neill et al., 2013), saltmarsh (Devaney & Perrin, 2015; McCorry et al., 2009), and woodland (Perrin et al., 2008); and
- Boundaries for catchments with confirmed or potential freshwater pearl mussel (FWPM) (*Margaritifera margaritifera*) populations in GIS format available online from the NPWS⁶.

The identification of relevant European sites to be included in this report (as presented in Section 4.2) was based on the identification of the Zol of the proposed project, a source-pathway- receptor model of effects, and the likely significance of any identified effects.

2.2.2. Zone of Influence

The proximity of the proposed development area to European sites, and more importantly QIs/SCIs of European sites, is of importance when identifying potential LSEs. During the initial scoping of this report, a 15km Zol was applied for impact assessment. A conservative approach has been used, which minimises the risk of overlooking distant or obscure effect pathways, while also avoiding reliance on buffer zones within which all European sites should be considered. This approach assesses the complete list of all QIs/SCIs of European sites in Ireland (i.e. potential receptors), instead of listing European sites within buffer zones. This follows Irish departmental guidance:

“For projects, the distance could be much less than 15 km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in-combination effects” (DoEHLG, 2010, p. 32).

Following the guidance set out by the National Roads Authority (NRA, 2009), the proposed development has been evaluated based on an identified Zol with regard to the potential impact pathways to ecological features (e.g. mobile and static). The Zol of the proposed development on mobile species (e.g. birds, mammals, and fish) and static species and habitats (e.g. saltmarshes, woodlands, and flora) is considered differently. Mobile species have ‘ranges’ outside of the European site in which they are QI/SCI. The range of mobile QI/SCI species varies considerably, from several metres (e.g. in the case of whorl snails *Vertigo* spp.) to hundreds of kilometres (in the case of migratory wetland birds). Whilst static species and habitats are generally considered to have Zols within close proximity of the proposed development, they can be significantly affected at considerable distances from an effect source; for example, where an aquatic QI habitat or plant is located many kilometres downstream of a pollution source.

Hydrological linkages between the proposed development and European sites (and their QIs/SCIs) can occur over significant distances; however, any effect will be site-specific depending on the receiving

⁴ Available at <https://gis.epa.ie/EPAMaps/>. Accessed in May 2020.

⁵ Available at <https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx>. Accessed in May 2020.

⁶ Available at <https://www.npws.ie/maps-and-data/habitat-and-species-data>. Accessed in May 2020.

water environment and nature of the potential impact. A reasonable worst-case ZOI for water pollution from the proposed development is considered to be the surface water sub-catchment wherein the proposed works are to be located.

The potential effects of the proposed development on European sites have been appraised using a source-pathway-receptor model, where:

- A 'source' is defined as the individual element of the proposed development that has the potential to impact on a European site, its qualifying features and its conservation objectives;
- A 'pathway' is defined as the means or route by which a source can affect the ecological receptor; and,
- A 'receptor' is defined as the SCI of SPAs or QIs of SACs, for which specific conservation objectives have been set (as described in Section 5.2.1).

A source-pathway-receptor model is a standard tool used in environmental assessment. For an effect to be likely, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism results in no likelihood for the effect to occur. The source-pathway-receptor model was used to identify a list of European sites and their QIs/SCIs with potential links (i.e. impact pathways) to European sites. These are termed as 'relevant' European sites/QIs/SCIs throughout this report.

2.2.3. Field Surveys

Between 2018 and 2021, Inis Environmental Consultants undertook field surveys to inform the project. These included surveys to obtain bespoke data to inform assessment of potential impacts on European sites; notably surveys of designated habitats and waterbirds. Full methods and results for these surveys are provided in this NIS report. Full methods and results for field surveys undertaken for the project relating to biodiversity features that do not contribute to the designation of any European sites are provided within the EclA report for the project (Inis, 2022).

Habitats and Species

An ecological walkover survey of the proposed Greenway route was completed in April 2018, including land overlapping with and in close proximity to European sites. Annex I habitat evaluations were cross-referenced with the NPWS conservation objectives for the Boyne Coast and Estuary SAC (NPWS, 2012b), including mapping provided in the Supporting Documents⁷. Determinations were made during the field survey with regard to saltmarsh communities aligning with Annex I habitats listed as QIs for the SAC and where non-Annex habitat occurred within and outside of the SAC boundary. Searches for evidence of protected species and/or presence of suitable supporting habitats were also undertaken (including SCI species for relevant European sites).

Birds

Initial scoping and consultation, including with NPWS, highlighted the requirement for any route design and later evaluation to take cognisance of interactions with waterbird⁸ populations along the route which contribute to the designation of European sites. As such, to ensure a robust, up-to-date baseline is available to inform a reasoned analysis of effects, bespoke surveys of waterbirds were undertaken within and adjacent to the proposed Greenway route, including habitats within and in

⁷ Available at <https://www.npws.ie/protected-sites/sac/001957>. Accessed in May 2020.

⁸ As defined by the BTO, including Anseriformes, Charadriiformes and Kingfisher.

close proximity to European sites. The objective of these bird surveys was to supplement and update previous studies for which results are available in the public domain; previous studies which when viewed in isolation were considered unsuitable to inform Appropriate Assessment in relation to the proposed development. As such, the following further surveys and studies for waterbirds were undertaken to inform this NIS report.

Irish Wetland Bird Survey (I-WeBS)

The Boyne Estuary SPA is already subject to population monitoring surveys for waterbirds within the Irish Wetland Bird Survey (I-WeBS). The BirdWatch Ireland submission makes reference that these data are used in the determination of populations. I-WeBS data for the most recent five winter seasons (i.e. winter 2013-14 to winter 2017-18) for Boyne Estuary SPA were therefore reviewed to inform this assessment.

I-WeBS surveys are undertaken primarily on a rising tide, when birds are pushed closer to shore by the rising water or gather at roost sites, making them easier to count. As a primary focus of waterbirds during winter is to feed, it is therefore important to understand how waterbirds are distributed across a site when they are feeding. For many species feeding is concentrated around the low water stage of the tidal cycle, when tidal flats are exposed. The collection and analyses of low tide (LT) data, in addition to I-WeBS data, therefore promotes a better understanding of how these species use sites, and are important in informing the conservation management of these important areas.

2018 Wintering Waterbird Surveys for Boyne Estuary SPA

Bespoke survey methods for wintering waterbirds were designed to provide more detailed and up-to-date information on use of land in close proximity to the proposed Greenway route by waterbirds; notably SCI species for Boyne Estuary SPA. These surveys adopted previously established count-sectors (i.e. 'sub-sites') to enable more accurate spatial assessment in relation to the proposed Greenway route (see **Figure 2.1**).

Bird counts were completed at seven defined Vantage Points to fully cover the five sub-sites nearest to the proposed Greenway route (see

Table 2.1). These allowed visibility in 180 degrees of the relevant count sectors. In any given day, a single count sector was surveyed across a six-hour period. Target notes were made on other sectors during each count where required. Timings had to include, in at least one instance per count sector, a high tide (HT) period to allow the geo-referencing of HT roosts. Timings and days selected for surveys covered the tidal cycle (e.g. from LT to HT, HT to LT or mid flood to mid ebb, etc.) in order to establish a baseline for each count sector the proposed Greenway route passes through across varying states of the tidal cycle.

Table 2.1: Count sectors (sub-sites) and sector codes (after NPWS, 2021)

Sub-site Code	Sub-site
OZL02	Arp
OZL03	Port to Beaulieu
OZL05	Beaulieu Pier to Mornington
OVL01	Mornington West
OVL02	Mornington East

Hourly counts were undertaken (across the tidal cycle and within pre-defined count sectors) to plot distribution/numbers of foraging and roosting birds within the likely ZoI of the proposed Greenway corridor. As the proposed Greenway route effectively 'hugs' the shoreline, particular emphasis was given to plotting the distribution and numbers of feeding or roosting birds within specific

distance bands (i.e. the likely zone of effect). Counts took place on a total of 12 days during March 2018. Each count sector was counted on at least two occasions.

To establish numbers/distribution/usage of the likely zone of effect of the project, locations within distance bands out to 50m from the proposed Greenway route were plotted as accurately as possible on field maps. In addition to numbers for each bird species, data on the location of birds in relation to the proposed Greenway route (within 50m; between 50m and 100m and over 100m away) were recorded, as well as the behaviour of the birds (noted as either foraging or roosting/other) and habitat type they were using (either intertidal, subtidal, supratidal or terrestrial).

As well as the birds themselves, notes were also taken in relation to disturbance events recorded during the survey period that affected the birds observed, to establish any baseline trends of note. Disturbance event data included information on the disturbance type, response of the birds to the disturbance event and the duration of the disturbance event.

2021 Waterbird Surveys for Boyne Estuary SPA and River Boyne and River Blackwater SPA

To provide detailed recent field survey data (as requested by An Bord Pleanála) to inform the assessment within this NIS report, further bird surveys relating specifically to potential impacts on SCI species (as listed on the SPA citation⁹) for Boyne Estuary SPA and River Boyne and River Blackwater SPA were undertaken in 2021. SCI species and features for these surveys were as follows (* denotes Selection Species for the European site):

Boyne Estuary SPA:

- [A048] Shelduck (*Tadorna tadorna*);
- [A130] Oystercatcher (*Haematopus ostralegus*);
- [A140] Golden Plover (*Pluvialis apricaria*)*;
- [A141] Grey Plover (*Pluvialis squatarola*);
- [A142] Lapwing (*Vanellus vanellus*);
- [A143] Knot (*Calidris canutus*)*;
- [A144] Sanderling (*Calidris alba*);
- [A156] Black-tailed Godwit (*Limosa limosa*)*;
- [A162] Redshank (*Tringa totanus*);
- [A169] Turnstone (*Arenaria interpres*)*;
- [A195] Little Tern (*Sternula albifrons*); and
- [A999] Wetland and Waterbirds.

River Boyne and River Blackwater SPA:

- [A229] Kingfisher (*Alcedo atthis*)*.

Methods relating to these species are detailed below:

Wintering Waterbirds (Boyne Estuary SPA)

Targeted, bespoke surveys to examine SCI bird usage of habitat in proximity to the proposed Greenway route were undertaken on a monthly basis in January to March 2021 and October to December 2021. All surveys were undertaken at suitable times of day and in suitable weather conditions. Surveys focused on recording the SCI species for Boyne Estuary SPA listed above, and also recorded disturbance events for these species in order to provide supporting data for subsequent assessment of potential disturbance impacts within this NIS report. Again, these

⁹ Available at: <https://www.npws.ie/protected-sites/spa/004080> (accessed 03/02/22).

surveys focused on the VPs and sub-sites indicated in **Figure 2.1**, but counts were also recorded for wider sub-sites (i.e. beyond those included in

Table 2.1) in order to provide more comprehensive data to inform the assessment.

Birds were recorded at varying distance bands of 0-10m, 10-20m, 20-50m, 50-100m and 100+m, with duration of birds foraging or roosting within the zones recorded during fixed-period watches through a complete tidal cycle. Where birds were observed to be disturbed, the level of disturbance was recorded (e.g. 'high', in which birds fled and did not return for some time, or 'low', in which bird activity was relatively unaffected). The source of disturbance was also recorded (i.e. was the disturbance from a source which the proposed Greenway could contribute to (e.g. pedestrians, cyclists, dogs) or from some other source (e.g. boats, watersports, aircraft)). In addition to providing information on how readily species were disturbed, these data helped characterise the 'baseline' (i.e. pre-development) levels of disturbance and the existing sources of disturbance to which these bird populations are subject. These data are useful in considering the extent to which the proposed development could potentially contribute to bird disturbance along different sections of the Greenway route.

Migrating Waterbirds (Boyne Estuary SPA)

Waterbird surveys of Boyne Estuary SPA were also undertaken in September 2021 in order to provide supplementary information on the use of land in close proximity to the proposed Greenway route by SCI species on migration. Again, these adopted the VPs indicated **Figure 2.1**, with counts recorded for the sub-sites nearest the proposed Greenway route as indicated in **Table 2.1**. These surveys were conducted at an appropriate time of day and in suitable weather conditions. Again, any disturbance events were recorded and characterised based on the source of disturbance, the species affected and the severity of the disturbance response.

Little Tern (Boyne Estuary SPA)

A breeding survey for Little Tern was conducted to further inform assessment of potential impacts on Boyne Estuary SPA. As Little Terns are not known to nest in proximity to the proposed Greenway route, this primarily comprised an assessment of foraging areas. A standardised method for quantifying foraging areas of Little Terns around breeding colony SPAs during chick-rearing has been proposed by JNCC (Parsons et al., 2015). This employs a 30- minute monthly count at a series of VPs during the Little Tern nesting season (May to September; to include post-fledging foraging by adults and juveniles).

The methodology indicates spacing of approximately 1km between VPs along the shoreline (taking into account habitat suitability), with surveys undertaken during a single high-tide cycle (starting a maximum of 90 minutes before peak high tide and being completed a maximum of 90 minutes after peak high tide). Three VPs were therefore surveyed along the proposed Greenway route where it runs through the Boyne Estuary SPA. Any Little Tern sightings were recorded and mapped, with emphasis on recording foraging and (if observed) nesting behaviour.

Six survey visits were undertaken (i.e. one per month) between April and September 2021. All surveys were undertaken at appropriate times of day and in suitable weather conditions. Surveys incorporated estuary and river channel habitat through Boyne SPA adjacent to the proposed Greenway route, covering approximately 3km of suitable habitat (between grid references SB167334 to SB194335). This included the following three VPs (from west to east):

- VP1: SB173335 (overlooking river and estuary habitats, approximately 2.2km from the eastern end of the proposed Greenway route);
- VP2: SB183339 (overlooking the estuary, approximately 1.2km from the eastern end of the proposed Greenway route); and
- VP3: SB195336 (at the eastern end of the proposed Greenway route, near the estuary mouth).

Kingfisher (River Boyne and River Blackwater SPA)

A breeding survey for Kingfisher was conducted to further inform assessment of potential impacts on River Boyne and River Blackwater SPA. Best practice guidance (Gilbert et al., 1998; NRA, 2009) indicates that targeted transect surveys for Kingfisher should be carried out over at least four visits throughout the course of their breeding season (March-early July). The first of these should take place in mid-March to coincide with when birds are establishing breeding territories and undertaking nest burrow excavations. During this visit, features likely to be of importance to Kingfishers (such as feeding perches, potential rest sites, etc.) should be noted. During subsequent survey visits, the survey area should be walked at a slow pace and all Kingfisher activity recorded (including VP surveys of potential active nesting sites as required).

As such, five survey visits were undertaken between March and July 2021. These were undertaken at suitable times of day and in optimal weather conditions, with the exception of the visit on 21/05/2021, during which there were heavy showers¹⁰. Surveys incorporated river and saltmarsh habitat along the River Boyne covering approximately 5.8km of the proposed Greenway route (between grid references SB138330 to SB195335), divided into four sections (T1-4). A VP (VP1, at grid reference SB148331) was also selected and surveyed to allow observation of particularly suitable Kingfisher habitat.

¹⁰ Considering that four additional visits were undertaken, and in view of the findings of these visits, this is not deemed to significantly constrain the findings of these Kingfisher surveys or affect the recommendations of this report.

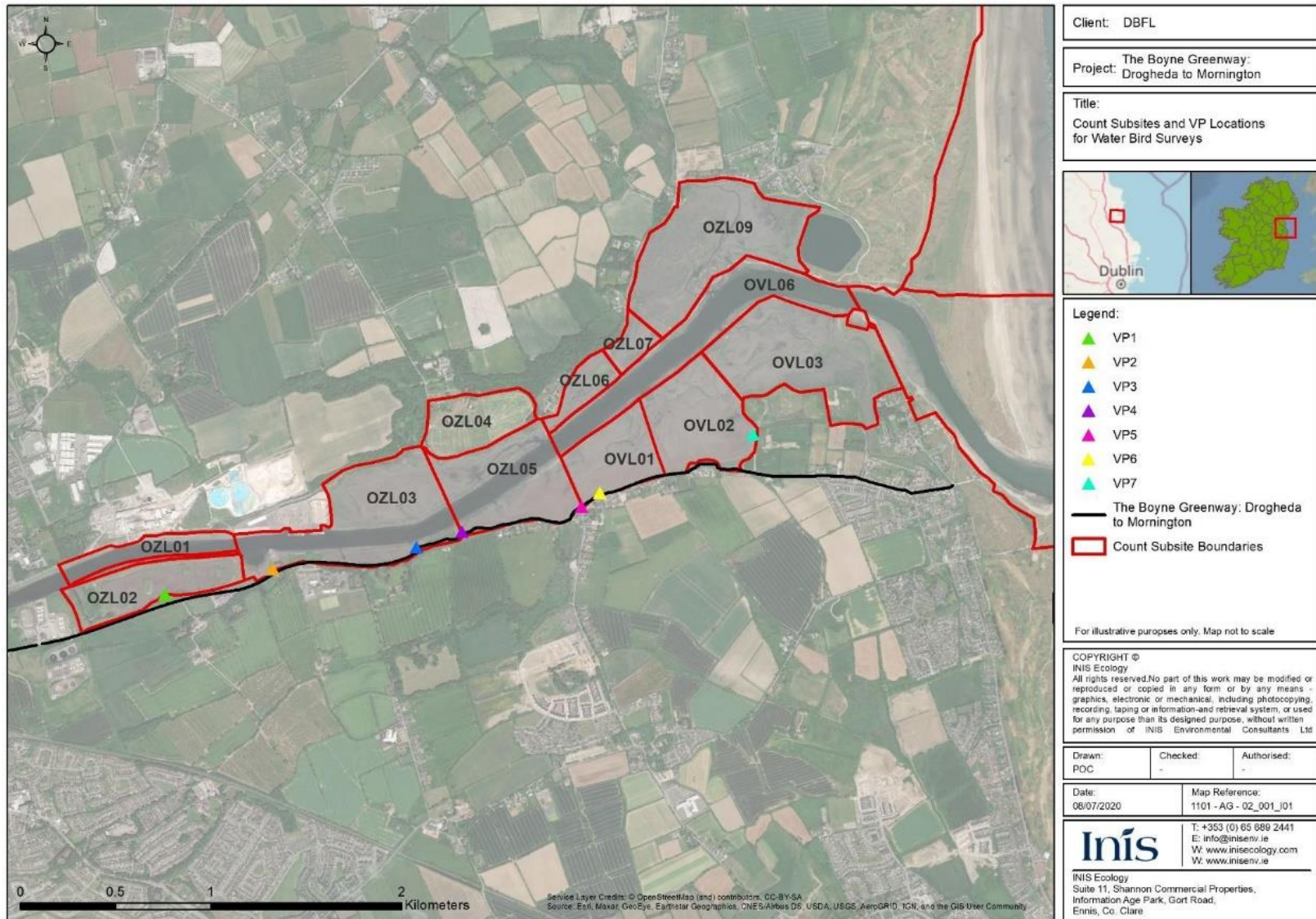


Figure 2.1: Sub-sites and Vantage Point locations for wintering and migrating waterbird surveys in relation to Boyne Estuary SPA

3. Consultation

A chronology of the consultation undertaken by Inis Environmental Consultants in relation to the proposed development and which is relevant to this NIS is provided below in **Table 3.1**. Minutes of the meeting held with NPWS in October 2018 are provided in full in Appendix B of this report.

Table 3.1: Consultation correspondence

Date of Consultation	Method	Parties involved	Topic
18/05/18	Telephone	Chris Cullen (CC) of Inis Environmental and Dr. Linda Patton (LP) of NPWS, Dept. Culture, Heritage and the Gaeltacht.	Boyne Greenway pre-consultation meeting. Dr. Patton commented to send in a meeting request with mention of routing it to herself on DATS.
18/05/18	Email	CC of Inis Environmental Consultants to DAU.	Request of consultation meeting in respect of Project Reference: G Pre00202/2017 (Proposed cycle/walkway greenway route along the South banks of the River Boyne, Drogheda, Co. Meath).
21/05/18	Email	DAU to CC of Inis Environmental	Acknowledgement of receipt of email.
27/09/18	Meeting at Knocksink Wood Education Centre	Inis Environmental Consultants, Meath County Council (MCC) and NPWS Attendees: Cormac Ross (CR) of MCC. Howard Williams (HW) and CC of Inis Environmental Consultants. LP of NPWS, Dept. Culture, Heritage and the Gaeltacht.	Discuss the Boyne Greenway.
10/10/18	Email	Sinead Ryan of DAU to CC of Inis Environmental.	Acknowledgement of receipt of meeting minutes.
07/05/21	Letter (ABP-307652-20)	Kieran Sommers of An Bord Pleanála to CR of MCC.	Response to requested clarifications.
13/11/21	Letter (ABP-307652-20)	Kieran Sommers of An Bord Pleanála to CR of MCC.	Request for further information.

4. Receiving Environment

The results of the bespoke surveys and desk study data relevant to potential impacts on European sites are presented below. Additional data relating to other ecological features are presented in the EclA report for the project (Inis, 2022). Methods for the data collection are described in Section 2.2.3 of this report. Considering the areas surveyed and methods adopted, and the use of long-term monitoring data from I-WeBS, these data are considered to be sufficient to suitably inform this NIS.

4.1 Desk study

A comprehensive ecological desk study has been undertaken to inform the proposed development, the results of which are presented in EclA report for the project (Inis, 2022). Those data that are relevant to this NIS are outlined below.

There are 13 records of Otter (*Lutra lutra*) identified; this species is protected under the Wildlife Act (2000), is listed on Annex II and Annex IV of the EU Habitats Directive (1992) and is included as a qualifying interest of the River Boyne and River Blackwater SAC, which adjoins the western portion of the proposed route corridor.

4.1.1. I-WeBS Data for Boyne Estuary SPA (2013-2018)

I-WeBS Data for the Boyne Estuary SPA for the five most recent winter seasons available are presented in **Table 4.1** below for the SCIs and the wintering waterbird assemblage as a whole¹¹. These data are compared with field survey data, also presented below. I-WeBS data are useful in providing a more recent indication of population trends of SCI species using an SPA, compared with SPA citation ('baseline') data which may be significantly different to current populations using an SPA due to temporal change.

Table 4.1: I-WeBS maxima (i.e. peak counts) for Boyne Estuary SPA SCI species and the waterbird assemblage as a whole, from the five most recent years for which data were available (2013-18)

Species	2013/14	2014/15	2015/16	2016/17	2017/18	5-year peak mean
Shelduck	150	182	186	192	239	189.8
Oystercatcher	655	644	610	657	1042	721.6
Golden Plover	3000	1100	5000	10000	3300	4480.0
Grey Plover	50	71	100	26	9	51.2

¹¹ I-WeBS data obtained from: [Site Summary Tables 2020 \(caspio.com\)](#) (accessed 03/02/21).

Species	2013/14	2014/15	2015/16	2016/17	2017/18	5-year peak mean
Lapwing	1200	1757	1354	1861	1514	1537.2
Knot	26	18	300	1000	1317	532.2
Sanderling	150	100	100	100	400	170.0
Black-tailed Godwit	331	457	406	360	428	396.4
Redshank	501	486	552	427	570	507.2
Turnstone	37	34	30	20	26	29.4
All waterbirds (total individuals)	8180	8207	11563	18882	11636	11693.6
All waterbirds (number of species)	28	28	30	32	32	30

4.2 Field Surveys

The study area is located in the upper portion of the Boyne Estuary extending east from Drogheda Town. Therefore, there is hydrological connectivity between the study area and the River Boyne and River Blackwater SAC (upstream) and the Boyne Coast and Estuary SAC (downstream). An ecological walkover survey of the proposed Greenway route was completed in April 2018, which involved habitat mapping and general mammal survey, as well as a targeted habitat assessment for potential occurrence of the Annex II listed Otter and the Annex I listed Kingfisher. A variety of habitats were recorded along the proposed route with Upper Salt Marsh, Lower Saltmarsh, Mud Flats and Improved Grasslands most frequently recorded in the western and central portion. Fixed Sand Dunes and Buildings and Artificial Surfaces were common in the eastern portion.

No suitable nesting or foraging Kingfisher habitat was found within the development area. The habitats within the development area were found to be of medium potential for Otter; one Otter spraint was recorded within the study area.

4.2.1. Habitat Description Along Proposed Route

The proposed Greenway commences approximately 100 m west of the viaduct in Drogheda Town and follows the corridor of the R150 road within the roadside grassy verges (**Figure 4.1**). This section of the route will be constructed from bituminous pavement.



Figure 4.1: Regional road R150 with grass verge and wall in the foreground and mud flats in the background.

Just east of the Drogheda Grammar School, the route crosses an area of species-poor Amenity Grassland (GA2 - Yorkshire Fog *Holcus lanatus*, Ribwort Plantain *Plantago lanceolata*, Daisy *Bellis perennis* and Dandelion *Taraxacum spp*), just across Upper Saltmarsh (CM2) habitat. This small section of the Boyne Greenway (ca. 60m) will be constructed using recycled plastic boardwalk. The Boyne Greenway route intersects the River Boyne and River Blackwater SAC and the Boyne Estuary SPA boundaries along this boardwalk section.

From the boardwalk mentioned above and already outside the SAC and SPA boundaries, another bituminous section follows the road margin, incorporating Amenity Grassland habitat (GA2). Arriving at an area where the R150 road is separated by Saltmarsh habitat (CM1 and CM2) by a grassed verge and a wall (**Figure 4.1**), the Boyne Greenway construction type reverts to recycled plastic boardwalk (ca. 103m). This section crosses estuarine muddy shoreline habitat (LS4) to the north of the Greenway corridor.

The route reverts to bituminous construction, intersecting habitats of lower ecological value (e.g. BL3, GA2, WS1). Still within the bituminous section, Scattered trees and parkland habitat (WD5) is crossed, with Ash trees (*Fraxinus excelsior*). At this section, the route intersects again the River Boyne and River Blackwater SAC and the Boyne Estuary SPA.



Figure 4.2: Example amenity grassland (GA2) and treelines (WL2) recorded outside Drogheda Grammar School.

From this point west, still within the WD5 habitat, the route transitions to boardwalk, continuing crossing habitats of Amenity Grassland (GA2). The habitats comprise scattered trees and parkland WD5 and GA2.

Moving east, still within the SAC and SPA boundaries, the Boyne Greenway changes to boardwalk construction and crosses estuarine muddy shoreline habitat to the north of the greenway corridor (CM2, FS1), while its majority is located within broadleaved woodland (WD1) and scrub (WS1) habitats. The woodland habitat (WD1) and mature treeline habitats are characterised by the presence of Beech (*Fagus sylvatica*), Horse Chestnut (*Aesculus hippocastanum*) and mature Hawthorn (*Crataegus monogyna*). Scrub (WS1) habitat is characterised by Willow spp. (*Salix spp.*) and European Gorse (*Ulex europaeus*), with a small section within reedbed (FS1) composed of Common Reed (*Phragmites australis*).

Continuing east, the route changes to bituminous type and runs parallel to the R150 road, outside the River Boyne and River Blackwater SAC but still within the Boyne Estuary SPA boundary, for approximately 125m. It re-enters the SAC and continues east for approximately 60m. This section of the Boyne Greenway crosses habitats of low ecological value (e.g. BL3, WS1 and GS2), dominated by European Gorse and Bramble, and Cock's Foot grass with some Meadowsweet, respectively.

The Greenway type of construction changes to boardwalk, crossing a scrub area (WS1), still within the Boyne Estuary SPA and the River Boyne and River Blackwater SAC boundary, where it crosses a section of hard standing with some scrub composed of Bramble, European Gorse and Buddleia (*Buddleja sp.*). This section of hard standing has an embankment to the north, which creates a border between the proposed route and lower saltmarsh (CM1) habitat present to the north of the embankment (**Figure 4.3**). The embankment is dominated by grasses including Red Fescue (*Festuca rubra*). The route then crosses a small section of upper saltmarsh (CM2), which transitions into scrub and amenity grassland habitat to the south, closer to the road.



Figure 4.3: Road looking west showing mud flats.



Figure 4.4: Example of lower salt marsh (CM1)

From this point, the route crosses a small section of upper saltmarsh (CM2), and borders lower salt marsh habitat (CM1) to the north (see illustrative examples in **Figure 4.4**), which is intersected further east, approximately at the location where the route crosses again the SAC and SPA's boundaries for a short length. The route continues east, re-entering the SAC and SPA, intersecting lower salt marsh (CM1) and, mostly, scrub habitat (WS1).



Figure 4.5: Example of upper salt marsh in the right of the photo and lower salt marsh (CM1) in the middle with mud flats to the left.

Further east, at a short distance from the intersection between the R151 road with the R150 road in the western direction, the Boyne Greenway route will be provided with a steel arch bridge, crossing the Stagrennan River traversing mudflat intertidal habitat (LS4) of the estuary within the SAC/SPA complex.

Still with boardwalk type of construction, the route then briefly leaves the SPA and SAC and crosses Amenity Grassland (GA2), re-entering the European sites shortly after (*ca.* 20m east), intersecting lower salt marsh (CM1) - not corresponding to Annex I Atlantic Saltmarsh – and Amenity Grassland (GA2) for *ca.* 705m. The route then continues east, transitioning to bituminous construction shortly after leaving the SAC and SPA boundaries. This bituminous section of *ca.* 290m intersects habitats of lower ecological value, as Amenity grassland (GA2), Ornamental/non-native shrub (WS3) and Dry meadows and grassy verges (GS2), mostly outside the Boyne Coast and Estuary SAC and the Boyne Estuary SPA. Approximately 180m east, the route re-enters the SAC and SPA, on Amenity grassland (GA2) habitat bordering Lower salt marsh habitat (CM1) to the north. This section is interrupted by the precast concrete beams bridge, which drives the Boyne Greenway route outside the SAC and SPA boundaries, and follows east intersecting Amenity Grassland (GA2), Improved agricultural grassland (GA1) and Buildings and artificial surfaces (BL3) habitats. This section of the route extends for *ca.* 910m and runs approximately parallel to the northern site of the R151 road, passing in front of gardens, grass verges and existing hard standing areas. The route then continues east, leaving the R151 Road and extending through the suburban area of Mornington. This section is the final section on the Boyne Greenway (i.e. the most eastern), where the construction method will consist of mixed or shared street facilities on Tower Road. This is a local/residential road, with very light traffic flows and slow traffic speeds, suitable for shared facilities.

Further details regarding the habitats present along the proposed development, together with habitat mapping are provided in the EclA report for the project (Inis, 2022).

4.2.2. Otter Surveys

An old Otter spraint was recorded along the upper salt marsh within the eastern section of the study area. No other evidence of Otter such as holts, prints, feeding remains or couches were recorded following comprehensive searching. The route alignment closely follows an active road corridor, with predominantly disturbed ground and amenity grassland. Although Otters are likely to utilise the Boyne Estuary for foraging and commuting, the baseline or background disturbance levels in the receiving

environment along the proposed Greenway route corridor are evaluated as a limiting factor when considering the potential for the corridor to be used for Otter breeding or holt sites.

4.2.3. Wintering Waterbird Surveys for Boyne Estuary SPA (March 2018)

The results of these surveys including geo-referenced distribution maps are included in full in Appendix A of this report.

Surveys focused on the potential for waterbirds birds to occur in close proximity to the proposed Greenway route, in association with the estuarine and intertidal habitats of the Boyne Estuary SPA. SCI species recorded during the bird surveys at high and low tide are summarised below (**Table 4.2**). Table 4.2 shows the maxima (i.e. peak counts) of birds recorded within each sub-site (see **Figure 2.1** for sub-site locations). Note that, as different sub-sites were surveyed on different days, these numbers are not necessarily additive but may reflect birds moving onto different sub-sites within the larger Boyne Estuary complex (e.g. the 2200 Golden Plover recorded at OVL01 on 12/03/18 may be part of the same flock of 2600 recorded at OZL05 on 16/03/18).

Of the species recorded during fieldwork, Golden Plover and Black-tailed Godwit are both listed as species upon which the SPA designation was made (i.e. 'Selection Species'). The other two SPA species are Knot and Turnstone, neither of which were recorded in the five sub-sites surveyed in 2018. A further four species recorded are also listed as SCIs for SPA, namely Shelduck, Oystercatcher, Lapwing and Redshank.

Table 4.2: Maxima for waterbird species recorded within each sub-site of Boyne Estuary SPA surveyed in 2018

Species	Sub-site				
	OVL01	OVL02	OZL02	OZL03	OZL05
Mute Swan	-	-	-	2	-
Brent Goose	108	-	-	46	40
Shelduck	12	35	13	48	9
Mallard	2	2	4	7	1
Wigeon	39	14	63	40	21
Teal	43	13	76	52	56
Tufted Duck	-	-	-	2	-
Cormorant	2	-	-	1	4
Grey Heron	-	-	-	-	1
Little Egret	-	-	-	2	1
Little Grebe	-	-	-	1	-
Oystercatcher	2	6	-	2	-
Lapwing	-	-	89	48	17
Golden Plover	2200	-	-	2	2600
Curlew	6	45	4	9	38
Black-tailed Godwit	69	270	-	199	407
Bar-tailed Godwit	-	1	-	-	1
Dunlin	115	28	-	-	200
Greenshank	2	2	4	5	1
Redshank	118	120	41	91	110
Snipe	-	-	31	-	-

Species	Sub-site				
	OVL01	OVL02	OZL02	OZL03	OZL05
Black-headed Gull	-	-	61	10	10
Common Gull	-	-	5	-	-
Lesser Black-backed Gull	-	-	9	-	2
Herring Gull	6	7	47	1	70
Great Black-backed Gull	-	-	1	2	-

Table 4.3 lists the percentage of the peak counts for the six recorded SCI bird species within each selected sub-site against the total baseline population of birds within the Boyne Estuary SPA (as listed within the SPA citation).

The results indicate that Oystercatcher and Lapwing were only recorded in relatively low numbers in any of the adjacent sub-sites to the proposed Greenway route, with a maximum of 0.6% of the baseline Boyne Estuary Oystercatcher population (in OVL02) and 1.9% of the Lapwing population (in OZL02). Approximately one-fifth of the baseline Boyne Estuary SPA populations of Shelduck (22% in OZL03) and Redshank (20.6% in OVL02) were recorded, along with higher proportions of Black-tailed Godwit (up to 86.4% of the baseline population level in OZL05).

Table 4.3: Percentage of the 2018 peak counts for the six SCI bird species for Boyne Estuary SPA recorded within each sub-site, compared with SPA baseline populations. Peak percentages recorded against SPA populations are in bold

SCI Species	Sub-site					Boyne Estuary SPA baseline population
	OVL01	OVL02	OZL02	OZL03	OZL05	
Shelduck	5.5%	16.1%	6.0%	22.0%	4.1%	218
Oystercatcher	0.2%	0.6%	-	0.2%	-	1090
Lapwing	-	-	1.9%	1.0%	0.4%	4657
Golden Plover	36.2%	-	-	0.0%	42.8%	6070
Black-tailed Godwit	14.6%	57.3%	-	42.3%	86.4%	471
Redshank	20.2%	20.6%	7.0%	15.6%	18.9%	583

The surveys at sub-sites adjacent to the proposed route corridor identified significant proportions of SCI waterbird species for Boyne Estuary SPA; particularly Black-tailed Godwit, as well as Golden Plover and Redshank. Of these species, Golden Plover and Black-tailed Godwit are 'Selection Species' for the designation of this European site.

4.2.4. Wintering Waterbird Surveys for Boyne Estuary SPA (2021)

Wintering waterbird surveys in Boyne Estuary SPA in 2021 focused on the potential for SCI species to occur adjacent to the proposed Greenway route, in association with the estuarine and intertidal habitats of the Boyne Estuary SPA. SCI bird species recorded during the bird surveys at high and low tide are summarised below (**Table 4.4**).

Table 4.4 shows the maxima for SCI bird species within each sub-site. Again, as different sub-sites were surveyed on different days, these numbers are not necessarily additive but may reflect birds moving onto different sub-sites within the larger Boyne Estuary complex. Data were gathered for a

greater number of sub-sites (including some further from the proposed Greenway route) to provide more comprehensive data to inform the Appropriate Assessment.

Table 4.5 shows the percentage of the maxima for the ten recorded SCI bird species within each sub-site relative to the baseline populations of these species within Boyne Estuary SPA.

The results indicate that all ten wintering SCI bird species for Boyne Estuary SPA were recorded during the 2021 wintering bird surveys. Of these ten species, nine were recorded in significant (i.e. >5% of the SPA citation population) numbers (i.e. all except Golden Plover). Four species were recorded in particularly high numbers relative to SPA citation data:

- Oystercatcher: peak count recorded in 2021 (560 in OVL06) equates to 51.4% of the SPA baseline population;
- Grey Plover: peak count recorded in 2021 (150 in OZL05) equates to 153.1%¹² of the SPA baseline population;
- Knot: peak count recorded in 2021 (1050 in OZL08) equates to 59.3% of the SPA baseline population; and
- Sanderling: peak count recorded in 2021 (50 in OZL08) equates to 72.5% of the SPA baseline population.

¹² Note that counts obtained during field surveys of SPAs may record larger populations than those present when the SPA was designated (e.g. due to population growth). As such, populations recorded during field surveys can exceed 100% of citation ('baseline') figures.

Table 4.4: Maxima of wintering SCI bird species recorded within each sub-site of Boyne Estuary SPA in 2021

SCI Species	Sub-site														
	OVL						OZL								
	01	02	03	04	05	06	01	02	03	04	05	06	07	08	09
Shelduck	19	9	20	-	-	-	-	7	36	-	24	3	5	-	5
Oystercatcher	33	14	13	315		560	-	-	2	-	10	-	-	71	120
Golden Plover	-	91	-	-	-	-	-	-	-	-	150	-	60	-	30
Grey Plover	-	7	-	23	-	-	-	-	-	-	-	-	-	150	30
Lapwing	224	345	20	1	-	29	-	74	25	-	376	9	50	-	21
Knot	-	12	47	150	-	-	-	-	0	-	25	-	-	1050	50
Sanderling	-	-	-	34	-	-	-	-	-	-	-	-	-	50	-
Black-tailed Godwit	63	5	-	-	-	-	-	14	3	-	13	-	-	-	6
Redshank	57	72	39	24	-	-	11	65	50	-	66	-	6	7	50
Turnstone	-	2	-	18	-	-	-	-	0	-	10	-	-	7	-

Table 4.5: Percentage of the 2021 wintering maxima counts for the ten bird species listed as SCIs for Boyne Estuary SPA recorded within each sub-site, compared with SPA baseline populations. Peak percentages recorded against SPA populations are in bold

SCI Species	Sub-site														
	OVL						OZL								
	01	02	03	04	05	06	01	02	03	04	05	06	07	08	09
Shelduck	8.7	4.1	9.2	-	-	-	-	3.2	16.5	-	11.0	1.4	2.3	-	2.3
Oystercatcher	3.0	1.3	1.2	28.9	-	51.4	-	-	0.2	-	0.9	-	-	6.5	11.0
Golden Plover	-	1.5	-	-	-	-	-	-	-	-	2.5	-	1.0	-	0.5
Grey Plover	-	7.1	-	23.5	-	-	-	-	-	-	-	-	-	153.1	30.6
Lapwing	4.8	7.4	0.4	0.0	-	0.6	-	1.6	0.5	-	8.1	0.2	1.1	-	0.5
Knot	-	0.7	2.7	8.5	-	-	-	-	0.0	-	1.4	-	-	59.3	2.8
Sanderling	-	-	-	49.3	-	-	-	-	-	-	-	-	-	72.5	-
Black-tailed Godwit	13.4	1.1	-	-	-	-	-	3.0	0.6	-	2.8	-	-	-	1.3
Redshank	9.8	12.3	6.7	4.1	-	-	1.9	11.1	8.6	-	11.3	-	1.0	1.2	8.6
Turnstone	-	1.1	-	10.3	-	-	-	-	-	-	5.7	-	-	4.0	-

4.2.5. Comparison between Field Survey Data and I-WeBS Data

Average peak counts for the entirety of the Boyne Estuary SPA between 2013 and 2018 (from I-WeBS data) are compared with 2018 and 2021 field survey data collected by Inis Environmental Consultants in **Table 4.6** below. Baseline SPA populations are also included for context.

Note that for nine of the ten SCI species, I-WeBS counts are lower than the cited SPA baseline populations. As such, for these species the counts recorded during 2018 and 2021 field surveys (and used to inform this Appropriate Assessment) may represent a more significant proportion of the actual populations currently using the SPA than that indicated when comparing 2018 and 2021 data with baseline data for the SPA.

Table 4.6: Comparison of peak counts recorded by I-WeBS (2013-2018), Inis Environmental Consultants wintering surveys in 2018 and 2021, and SPA citation populations for Boyne Estuary SPA

SCI Species	Boyne Estuary SPA baseline population	I-WeBS peak count (5-year average, 2013-2018)	Field survey peak count (2018)	Field survey peak count (2021)
Shelduck	218	189.8	48	36
Oystercatcher	1090	721.6	6	560
Golden Plover	6070	4480.0	2600	150
Grey Plover	98	51.2	-	150
Lapwing	4657	1537.2	89	376
Knot	1771	532.2	-	1050
Sanderling	69	170.0	-	50
Black-tailed Godwit	471	396.4	407	63
Redshank	583	507.2	120	72
Turnstone	175	29.4	-	18

4.2.6. Migrating Waterbird Surveys for Boyne Estuary SPA (2021)

As during the wintering waterbird surveys, the migrating waterbird surveys undertaken in September 2021 focused on the potential for SCI waterbird species to occur adjacent to the proposed Greenway route, in association with the estuarine and intertidal habitats of the Boyne Estuary SPA. SCI bird species recorded during the bird surveys at high and low tide are summarised below (**Table 4.7**). **Table 4.7** shows the maxima for SCI bird species recorded within each sub-site. Again, as different sub-sites were surveyed on different days, these numbers are not necessarily additive but may reflect birds moving onto different sub-sites within the larger Boyne Estuary complex. Surveys focused on sub-sites nearest to the proposed Greenway route.

Of the 11 SCIs potentially present on migration, five were recorded. All of these were recorded in relatively low numbers when viewed in comparison with wintering populations (both those recorded during 2018 and 2021 field surveys and based on I-WeBS and SPA baseline data).

Table 4.7: Maxima for migrating SCI bird species recorded within each sub-site in September 2021 for Boyne Estuary SPA

SCI Species	Sub-site				
	OVL01	OVL02	OZL02	OZL03	OZL04
Shelduck	-	-	-	-	-
Oystercatcher	21	5	-	18	48
Golden Plover	-	-	-	-	-
Grey Plover	-	-	-	-	-
Lapwing	1	-	-	21	28
Knot	-	-	-	-	-
Sanderling	-	-	-	-	-
Black-tailed Godwit	6	5	2	6	5
Redshank	31	42	-	12	21
Turnstone	-	-	1	-	-
Little Tern	-	-	-	-	-

4.2.7. Disturbance Data for Waterbirds within Boyne Estuary SPA (2021)

The waterbird surveys undertaken in 2021 also recorded disturbance events of wintering waterbirds, focusing on SCIs for Boyne Estuary SPA. During each visit (i.e. the same visits as for the peak counts described above), the number of observed disturbance events was recorded, along with the source of disturbance and the species affected. The severity (i.e. response) of each disturbance event was also recorded, ranging from 'low' (i.e. bird activity did not appear to be significantly affected, with birds remaining in their pre-disturbance location) to 'high' (i.e. bird activity was significantly affected, with birds fleeing and not returning for some time). Disturbance data are summarised in **Table 4.8** below.

Disturbance events were recorded for six of the nine wintering waterbird SCI species for the Boyne Estuary SPA: specifically Shelduck, Oystercatcher, Lapwing, Golden Plover, Black-tailed Godwit and Redshank. The severity of responses varied according to the proximity and degree of the disturbing activity, although moderate-high responses were consistent with disturbance by dogs, and moderate-high responses were also observed in response to human presence (e.g. pedestrians and birdwatchers). Responses appeared to be comparatively low for boats and other watercraft (with the exception of a ship proceeding down the channel at OVL01), which may suggest a level of tolerance to baseline disturbance levels from such activity in this area. Regarding spatial patterns of waterbird disturbance, greater numbers of disturbance events (including many with moderate-high responses) were recorded at sub-sites OVL01 and OVL02 when compared with other sub-sites in close proximity to the proposed Greenway route.

Table 4.8: Waterbird disturbance events recorded during waterbird surveys in 2021

Sub-site	Date	Disturbance by pedestrians, cyclists, dog walkers			Other sources of disturbance (i.e. disturbance that would not arise from the proposed Greenway)			Summary of responses
		Number of disturbance events (SCI species)	SCI species affected (BTO species code)	Number of disturbance events (non-SCI species)	Number of disturbance events (SCI species)	SCI species affected (BTO species code)	Number of disturbance events (non-SCI species)	
OVL01	19/02/21	1	BW	-	-	-	-	Low response
OVL01	08/03/21	5	RK, BW, SU, OC	4	-	-	-	Moderate response to photographer
OVL01	05/05/21	-	-	-	-	-	1	Weak response to boat
OVL01	14/10/21	-	-	-	2	RK	-	High response to ship
OVL01	13/12/21	-	-	-	2	L., GP	-	Low response to shooting
OVL02	22/01/21	9	KN, L., RK	-	-	-	-	Around 50/50 high/low responses
OVL02	22/02/21	8	KN, L., RK	-	-	-	-	Mix of low, moderate and high responses
OVL02	22/03/21	1	GP	-	-	-	-	High response to two dogs
OVL02	19/04/21	-	-	-	-	-	3	High responses to boat
OVL03	22/01/21	1	KN	-	-	-	-	High response
OVL03	13/10/21	-	-	-	-	-	2	Low responses to boats
OVL03	14/10/21	-	-	-	2	RK	-	Moderate responses to boats
OVL05	22/01/21	1	KN	-	-	-	-	Moderate response

Sub-site	Date	Disturbance by pedestrians, cyclists, dog walkers			Other sources of disturbance (i.e. disturbance that would not arise from the proposed Greenway)			Summary of responses
		Number of disturbance events (SCI species)	SCI species affected (BTO species code)	Number of disturbance events (non-SCI species)	Number of disturbance events (SCI species)	SCI species affected (BTO species code)	Number of disturbance events (non-SCI species)	
OVL07	22/01/21	1	RK	-	-	-	-	Low response
OVL08	22/01/21	1	KN	-	-	-	-	Low response
OVL10	22/01/21	1	L.	-	-	-	-	Low response
OZL03	22/01/21	-	-	2	-	-	-	One high/one low response
OZL03	19/04/21	-	-	-	-	-	2	High responses
OZL05	15/10/21	-	-	-	2	L.	-	Weak response to aircraft
OZL05	13/12/21	-	-	-	1	L.	-	Moderate response to shooting
OZL07	29/12/21	3	RK, BW, L.	4	-	-	-	Moderate response to fishing
OZL09	28/12/21	15	BW, GP, L., RK, OC	21	-	-	-	Moderate to high responses to birdwatchers (birds returned after 15mins), dogs (chasing birds off) and a family

4.2.8. Little Tern Surveys for Boyne Estuary SPA (2021)

The results of the Little Tern surveys in relation to Boyne Estuary SPA (see methods in Section 2.2.3, including survey locations) are presented in **Table 4.9** below. Two observations of Little Tern were recorded during these surveys; two individuals fishing and calling near VP2, and one individual calling near VP3. The observation from VP2 was approximately 260m north of the proposed Greenway route. The observation from VP3 was approximately 250m north-east of the eastern end of the proposed Greenway route. No active nests or evidence of breeding was recorded.

Table 4.9: Summary of 2021 Little Tern survey results

Survey date	Survey location(s)	Little Tern observations
08/04/21	Boyne Estuary, VP1, VP2, VP3	None
19/05/21	Boyne Estuary, VP1, VP2, VP3	None
16/06/21	Boyne Estuary, VP1, VP2, VP3	Two calling and fishing from VP2 (at grid reference SB1828433993)
12/07/21	Boyne Estuary, VP1, VP2, VP3	One calling and travelling north-west along the estuary near VP3 (at grid reference SB 19684 33663)
27/08/21	Boyne Estuary, VP1, VP2, VP3	None
27/09/21	Boyne Estuary, VP1, VP2, VP3	None

4.2.9. Fisheries and Aquatic Biodiversity

During the site walkover survey along the proposed route corridor, a visual assessment was carried out along the Boyne estuary transitional water body (IE_EA_010_0100) and at the Stagrennan_10 river water body (IE_EA_07S320550), specifically at the Stagrennan stream (EPA Code: 07S32) crossed by the proposed route.

All waterbodies within the study area are transitional, tidally influenced and directly affected by downstream inputs from the Boyne estuary, as well as from saline influxes. The banks of the Boyne estuary are composed of mud flats and lower salt marsh. The Stagrennan stream meets the Boyne estuary directly adjacent to the proposed alignment and is tidal in nature, affected by fluctuations in the Boyne. At the crossing point, the Stagrennan stream was approximately 5m in width. The Stagrennan river water body is unassigned for the WFD monitoring network and, due to its tidal nature, was deemed unsuitable for biological sampling. Based on an evaluation of the flow and tidal character, in addition to the physical habitat present, the fish community utilising the tidal lower reaches are evaluated as being contingent and directly connected with the fish community of the Boyne estuary, immediately adjacent.

5. Stage 1: Screening for Likely Significant Effects

5.1 Background to European Sites

The Habitats Directive (92/43/EEC) (together with the Birds Directive 2009/147/EC) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection, together protecting over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.) which are of European importance.

With the introduction of the EU Habitats Directive and Birds Directive, which were transposed into Irish law as S.I. No. 94/1997 European Communities (Birds and Natural Habitats) Regulations 1997, the European Union formally recognised the significance of protecting rare and endangered species of flora and fauna and their habitats. The 1997 Regulations and their amendments were subsequently revised and consolidated in S.I. No. 477/2011 – European Communities (Birds and Natural Habitats) Regulations 2011. This legislation requires the establishment and conservation of a network of sites of particular conservation value that are to be termed 'European sites'.

5.1.1. Habitats Directive/Special Areas of Conservation

Articles 3-9 of the EU Habitats Directive (92/43/EEC) provide the EU legislative framework for protecting rare and endangered species of flora, fauna and habitats. Annex I of the Directive lists habitat types whose conservation requires designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, that are in danger of disappearing within the EU territory, are also listed in Annex I. Annex II of the Directive lists animal and plant species whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection, such as Lesser Horseshoe Bat and Otter. Finally, Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish Hare, Common Frog and Pine Marten.

Species can be listed in more than one Annex, as in the case of Otter and Lesser Horseshoe Bat, which are listed on both Annex II and Annex IV.

5.1.2. Birds Directive/Special Protection Areas

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive) has been substantially amended several times. In the interest of clarity and rationality, the Birds Directive was codified in 2009 and is now cited as Directive 2009/147/EC. The Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3).

A subset of bird species has been identified in the Directive and is listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction, vulnerability to specific changes in their habitat and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to

be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

5.2 Relevant European Sites to the Proposed Development

As mentioned in Section 2.2.2, a ZoI of 15km has been identified for evaluation of LSE of this project on European sites. From a review of the NPWS protected sites data¹³, there are six European sites within a 15km radius of the proposed Greenway route:

- Boyne Coast and Estuary SAC (001957);
- Boyne Estuary SPA (004080);
- River Boyne and River Blackwater SAC (002299);
- River Boyne and River Blackwater SPA (004232);
- Clogher Head SAC (001459); and
- River Nanny Estuary and Shore SPA (004158).

The locations of these European Sites are illustrated in **Figure 5.1**, with the distances from the proposed Greenway route provided in **Table 5.1**.

Table 5.1: Proximity of European sites to the proposed development.

European Site	Distance from the proposed development
River Boyne and River Blackwater SPA (site code: 004232)	3.90km
Boyne Coast and Estuary SAC (side code: 001957)	0.00km
Clogher Head SAC (site code: 001459)	7.45km
Boyne Estuary SPA (site code: 004080)	0.00km
River Nanny Estuary and Shore SPA (site code: 004158)	3.90km
River Boyne and River Blackwater SAC (site code: 002299)	0.04km

¹³ Available at <https://www.npws.ie/maps-and-data>. Accessed in May 2020.

5.2.1. Description of European Sites under Consideration

The QIs and SCIs and descriptions for each of the European sites examined in this report are provided in **Table 5.2** below.

Table 5.2: Description of European sites within a 15km radius of the proposed development

European Site	Qualifying Interest/Special Conservation Interest and Code *denotes a priority habitat	Description
River Boyne and River Blackwater SPA (site code: 004232; NPWS, 2020b)	<ul style="list-style-type: none"> [A229] Kingfisher (<i>Alcedo atthis</i>) 	Linear site comprising stretches of the River Boyne and several of its tributaries; most of the site is in Co. Meath, but it extends also into Co Cavan, Louth and Westmeath. The site includes the river channel and marginal vegetation. Designated for its important population of Kingfisher (19 pairs recorded in 2010). Other waterbird species in significant numbers include Snipe and Sand Martin.
Boyne Coast and Estuary SAC (site code: 001957; NPWS, 2012b)	<ul style="list-style-type: none"> [1130] Estuaries [1140] Tidal Mudflats and Sandflats [1210] Annual vegetation of drift lines [1310] <i>Salicornia</i> Mud [1330] Atlantic Salt Meadows [2110] Embryonic Shifting Dunes [2120] Marram Dunes (White Dunes) [2130] Fixed Dunes (Grey Dunes)* 	<p>Coastal site which includes most of the tidal sections of the River Boyne, intertidal sand- and mudflats, saltmarshes, marginal grassland, and the stretch of coast from Bettystown to Termonfeckin that includes the Mornington and Baltray sand dune systems.</p> <p>Designated for a range of ecologically important estuarine habitats including mudflats and sandflats that are of particular importance as feeding grounds for wildfowl and waders, Atlantic salt meadows where <i>Aster tripolium</i> can be present or abundant in most subdivisions, and fixed coastal dunes that are colonised by more or less closed perennial grasslands and abundant carpets of lichens and mosses.</p>
Clogher Head SAC (site code: 001459; NPWS, 2017)	<ul style="list-style-type: none"> [1230] Vegetated Sea Cliffs [4030] Dry Heath 	Clogher Head is a promontory of Silurian quartzite, located approximately 10 km north-east of Drogheda in Co. Louth. The rocks are covered with a thin layer of soil that, in places, supports a coastal heath community. Areas of sea cliff, bedrock shore and dry grassland also occur within the site. Vegetated cliffs exhibit a complex pattern of variation reflecting the degree of maritime exposure, geology and geomorphology, biogeographical provenance and pattern of human management.

European Site	Qualifying Interest/Special Conservation Interest and Code *denotes a priority habitat	Description
Boyne Estuary SPA (site code: 004080; NPWS, 2013)	<ul style="list-style-type: none"> • [A048] Shelduck (<i>Tadorna tadorna</i>) • [A130] Oystercatcher (<i>Haematopus ostralegus</i>) • [A140] Golden Plover (<i>Pluvialis apricaria</i>) • [A141] Grey Plover (<i>Pluvialis squatarola</i>) • [A142] Lapwing (<i>Vanellus vanellus</i>) • [A143] Knot (<i>Calidris canutus</i>) • [A144] Sanderling (<i>Calidris alba</i>) • [A156] Black-tailed Godwit (<i>Limosa limosa</i>) • [A162] Redshank (<i>Tringa totanus</i>) • [A169] Turnstone (<i>Arenaria interpres</i>) • [A195] Little Tern (<i>Sternula albifrons</i>) • [A999] Wetland and Waterbirds 	Moderately-sized coastal site situated west of Drogheda on the border of Counties Louth and Meath. The site comprises most of the estuary of the Boyne River, a substantial river which drains a large catchment. Apart from one section which is over 1km wide, its width is mostly less than 500m. The river channel, which is navigable and dredged, is defined by training walls, these being breached in places. Intertidal flats occur along the sides of the channeled river. The sediments vary from fine muds in the sheltered areas to sandy muds or sands towards the river mouth. The linear stretches of intertidal flats to the north and south of the river mouth are mainly composed of sand. Designated on account of its internationally important populations of waterbirds; notably wintering wader populations, and Little Tern.
River Nanny Estuary and Shore SPA (site code: 004158; NPWS 2012a)	<ul style="list-style-type: none"> • [A130] Oystercatcher (<i>Haematopus ostralegus</i>) • [A137] Ringed Plover (<i>Charadrius hiaticula</i>) • [A140] Golden Plover (<i>Pluvialis apricaria</i>) • [A143] Knot (<i>Calidris canutus</i>) • [A144] Sanderling (<i>Calidris alba</i>) 	Comprises the estuary of the River Nanny and sections of the shoreline to the north and south of the estuary (c. 3km in length), in Co. Meath. The estuarine channel, which extends inland for almost 2km, is narrow and well sheltered. Sediments are muddy in character and edged by saltmarsh and freshwater marsh/wet grassland. The saltmarsh is best developed in the eastern portion of the estuarine channel, with species such as Sea Plantain (<i>Plantago maritima</i>), Sea Aster (<i>Aster tripolium</i>), Red Fescue (<i>Festuca rubra</i>) and Sea Purslane (<i>Halimione portulacoides</i>) occurring. Further up the estuary, the marsh habitats support species such as Bulrush (<i>Typha latifolia</i>) and Yellow Flag (<i>Iris pseudacorus</i>).

European Site	Qualifying Interest/Special Conservation Interest and Code *denotes a priority habitat	Description
	<ul style="list-style-type: none"> • [A184] Herring Gull (<i>Larus argentatus</i>) • [A999] Wetland and Waterbirds 	<p>The shoreline, which is approximately 500m in width to the low tide mark, comprises beach and intertidal habitats. It is a well-exposed shore, with coarse sand sediments. The well-developed beaches, which are backed in places by clay cliffs, provide high tide roosts for the birds. The site is designated on account of its internationally important waterbird populations.</p>
<p>River Boyne and River Blackwater SAC (site code: 002299; NPWS, 2020a)</p>	<ul style="list-style-type: none"> • [7230] Alkaline Fens • [91E0] Alluvial Forests* • [1099] River Lamprey (<i>Lampetra fluviatilis</i>) • [1106] Atlantic Salmon (<i>Salmo salar</i>) • [1355] Otter (<i>Lutra lutra</i>) 	<p>Comprises the freshwater element of the River Boyne as far as the Boyne Aqueduct, the Blackwater as far as Lough Ramor and the Boyne tributaries including the Deel, Stoneyford and Tremblestown Rivers. These riverine stretches drain a considerable area of Meath and Westmeath, and smaller areas of Cavan and Louth. The Alkaline fens and Alluvial Forests support important populations of three Habitats Directive Annex II species: River Lamprey, Atlantic Salmon and Otter.</p>

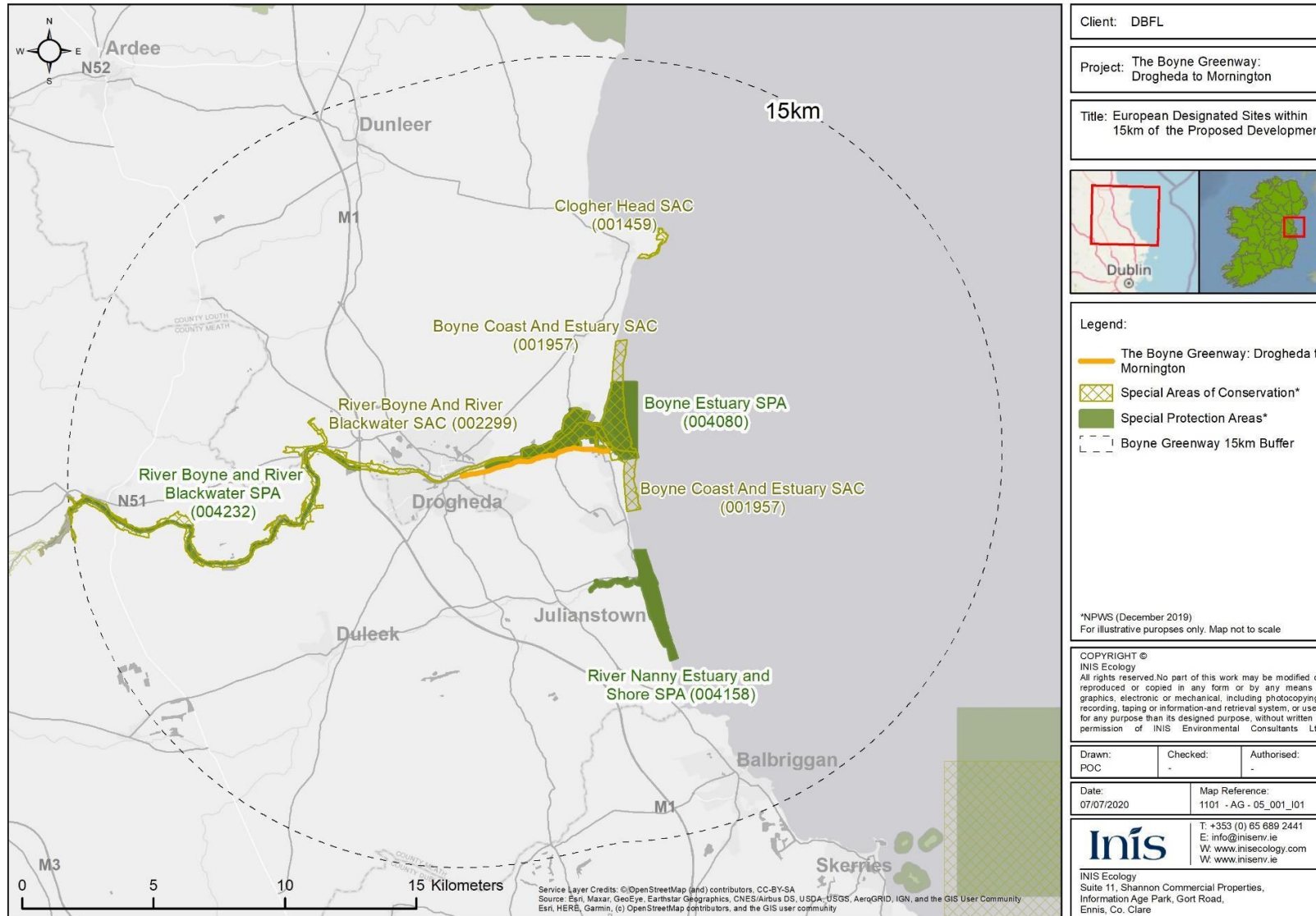


Figure 5.1: European sites within 15km of the proposed development

5.3 Source-Pathway-Receptor Model

The test of LSE below is based on a source-pathway-receptor conceptual model, which identifies potential impact pathways between the proposed development and European sites. The following sections elaborate on the sources and pathways for the assessment of LSE.

5.3.1. Direct Habitat Loss, Fragmentation or Disturbance Effects

Sources: landcover change, movement of machinery, earthworks, excavations, use of fuels, chemicals, cement-based compounds, vegetation clearance, placement of bridges and piling.

Pathway: land cover, soils, water flow paths and air.

Potential Effects: these sources could remove, disturb or fragment habitats or species, reduce habitat connectivity within a European site, or reduce aquatic habitat quality through sediment/contaminant/ nutrient-laden runoff.

5.3.2. Indirect Terrestrial or Aquatic Habitat Loss or Degradation

Sources: movement of machinery, earthworks, excavations, use of fuels, chemicals, cement-based compounds, excavation dewatering, vegetation clearance and placement of bridges.

Pathway: water runoff flow paths, watercourses and air.

Potential Effects: these sources could reduce water quality or habitat quality in hydrologically connected European sites through sediment/contaminant/nutrient-laden runoff which could in-turn, cause indirect habitat loss or degradation effects to QIs. Potential effects are ameliorated by limited magnitude of sources, duration of works and dilution capacity within estuarine environments subject to daily tidal inundation. The movement of materials may act as a vector for the spread of roadside invasive species (such as Japanese Knotweed) within the zone of works.

Timing of Effects: the potential for indirect effects mainly relates to the construction stage, when the vast majority of any excavations or use of machinery will take place. Once constructed, the Greenway will require minimal maintenance.

5.3.3. Indirect or Ex-Situ disturbance or displacement effects to Animal species of Qualifying Interest

Sources: construction works, movement of construction machinery and vehicles, presence of construction personnel and noise and vibration from construction works and construction machinery in or in close proximity to the estuarine environment.

Pathway: land cover, contact, air and visibility.

Potential Effects: these sources could cause disturbance or displacement effects to species of QIs such as Otter in SACs or SCIs such as birds in SPAs.

Timing of Impacts: effects may occur during the construction and decommissioning stages of the Greenway project and/or during the operational stage (i.e. through use of the Greenway by pedestrians, cyclists etc.).

5.4 Test of Likely Significant Effects on European Sites from the Boyne Greenway

Initial screening (i.e. the test of Likely Significant Effects) is carried out in **Table 4.4** to determine which (if any) of the relevant European sites within the ZOI can be excluded from further consideration due to appraised unlikelihood of significant effects to their QIs or SCIs (or to features which may be important to the integrity of these QIs and SCIs).

Table 5.3: Initial Screening of the Greenway project for Likely Significant Effects on European sites.

European Site	Separation Distance to Boyne Greenway	Evaluation of potential for the proposed development to cause any of the following effects to the European Sites under consideration: 1. Direct Habitat Loss, Fragmentation or Disturbance, 2. Indirect terrestrial or aquatic habitat loss or degradation, 3. Indirect/Ex-Situ disturbance or displacement of animal species
Boyne Coast and Estuary SAC (site code: 001957)	0.04km	<p>1. Yes, Screened in - There is potential for direct habitat loss, habitat degradation and/or disturbance effects due to the location of the Greenway overlapping the SAC boundary.</p> <p>2. Yes, Screened in - There is potential for indirect habitat loss, habitat degradation and/or disturbance effects due to the location of the Greenway overlapping the SAC boundary.</p> <p>3. Yes, Screened in - There is potential for indirect or ex-situ disturbance effects on SAC habitats.</p>
Clogher Head SAC (site code: 001459)	7.45km	<p>1. No, Screened out - No potential for direct habitat loss, habitat degradation or disturbance effects due to separation distance.</p> <p>2. No, Screened out - No potential for indirect habitat degradation effects due to the absence of hydrological connectivity and the separation distance between construction works, or any operational stage work, and Clogher Head SAC.</p> <p>3. No, Screened out - No potential for indirect or ex-situ disturbance or displacement effects as QIs only relate to habitats and plant species, and considering the separation distance.</p>

European Site	Separation Distance to Boyne Greenway	Evaluation of potential for the proposed development to cause any of the following effects to the European Sites under consideration: 1. Direct Habitat Loss, Fragmentation or Disturbance, 2. Indirect terrestrial or aquatic habitat loss or degradation, 3. Indirect/Ex-Situ disturbance or displacement of animal species
River Boyne and River Blackwater SAC (site code: 002299)	0.04km	<p>1. No, Screened out - No potential for direct habitat loss, habitat degradation or disturbance effects due to the location of the Greenway outside of this site.</p> <p>2. Yes, Screened in - There is potential for indirect habitat loss, habitat degradation or disturbance effects due to the location of the Greenway in close proximity to the site boundary (ca. 40m at its closest point).</p> <p>3. Yes, Screened in - There is potential for indirect or ex- situ disturbance effects due to the location of the Greenway in close proximity to the site boundary (ca.40m at its closest point).</p>
River Boyne and River Blackwater SPA (site code: 004232)	3.90km	<p>1. No, Screened out - No potential for direct habitat loss, habitat degradation or disturbance effects due to separation distance.</p> <p>2. No, Screened out - No potential for indirect habitat degradation effects to SCIs (specifically Kingfisher) due to the upstream nature of hydrological connectivity and the separation distance between construction works, or any operational stage work, and the SPA.</p> <p>3. No, Screened out - No potential for significant indirect or ex-situ disturbance or displacement effects to SCIs (specifically Kingfisher) due to separation distance and availability of abundant displacement habitat. Bespoke 2021 surveys did not identify any Kingfisher activity adjacent to the proposed Greenway route (see Section 4.2). During Operation disturbance to Kingfisher are evaluated as insignificant – Kingfisher show tolerance to human activity (MAD of 25m) and infrastructure and the operational Greenway is adjacent to an existing source of disturbance/displacement in the form of a public road. No significant contrast to baseline conditions is expected.</p>
Boyne Estuary SPA (site code: 004080)	0.00km	<p>1. Yes, Screened in - There is potential for direct habitat loss, habitat degradation or disturbance effects due to the location of the Greenway overlapping the SPA boundary.</p> <p>2. Yes, Screened in - There is potential for indirect habitat loss, habitat degradation or disturbance effects due to the location of the Greenway overlapping the SPA boundary.</p> <p>3. Yes, Screened in - There is potential for indirect or ex-situ disturbance or displacement to birds due to the location of the Greenway overlapping the SPA boundary.</p>

European Site	Separation Distance to Boyne Greenway	Evaluation of potential for the proposed development to cause any of the following effects to the European Sites under consideration: 1. Direct Habitat Loss, Fragmentation or Disturbance, 2. Indirect terrestrial or aquatic habitat loss or degradation, 3. Indirect/Ex-Situ disturbance or displacement of animal species
River Nanny Estuary and Shore SPA (site code: 004158)	3.90km	<p>1. No, Screened out - No potential for direct habitat loss, habitat degradation or disturbance effects due to separation distance.</p> <p>2. No, Screened out - No potential for indirect habitat degradation effects due to separation distance.</p> <p>3. No, Screened out - No potential for significant indirect or ex-situ disturbance or displacement effects to SCIs due to separation distance, timing of construction works (outside the winter months when any possibility of inter-movement of SCI Species between European sites may occur) and availability of abundant displacement habitat. During Operation, disturbance to potentially interconnected birds or species which may undertake movements between areas is evaluated as insignificant, since the Nanny Shore (Site Synopsis) is primarily of importance for roosting birds which will be unaffected by the use of the Greenway.</p>

5.5 Other Projects and Plans with Potential to Cause In-combination effects

A search of Meath and Louth County Council's online planning enquiry database¹⁴ was undertaken to identify other projects and plans that are consented within the past five years that are proximal or within the proposed works area.

The following plans were identified:

- The Drogheda Southern Environs Plan (2009-2015);
- East Meath Local Area Plan (2014-2020);
- The Drogheda Development Plan (2005-2011); and
- Variation No. 1: Drogheda Borough Council Development Plan (2011-2017).

In addition to a number of planning applications for minor alterations and/or development of individual domestic housing, planning applications presented in **Table 5.4** were identified within the study area. The cumulative assessment takes account of the potential development of these projects with regard to pathways for impacts and potential in combination or cumulative effects arising due to the proposed Boyne Greenway project.

¹⁴ Available at <http://www.eplanning.ie/MeathCC/searchtypes>. Accessed in May 2020.

Table 5.4: Planning applications within the local study area which may interact in combination or cumulatively with the Boyne Greenway project.

File Number	Application Status	Decision Due Date	Decision Date	Decision Code	Received Date	Applicant Name	Development Address	Development Description	Local Authority Name
FS18136	Decision Made	16/01/2019	17/12/2018	Conditional	17/10/2018	Mornington New Homes	Mornington Retail Centre, Corner of Buttergate Way and R150 Donacarney Little Mornington Co Meath	Construction of a single storey retail block retail unit and a coffee shop.	Meath Co. Co.
LB180242	Application Finalised	13/09/2018	12/09/2018	Conditional	14/03/2018	Joe Connolly	Lands at Donacarney House (Protected Structure) Donacarney Little, Mornington County Meath	Construction of 49 no. houses comprising no. detached storeys 4-bedroom houses.	Meath Co. Co.
LB180389	Application Finalised	12/08/2018	09/08/2018	Conditional	23/04/2018	Rybo Partnership	Maydenhayes Road Donacarney Little Mornington, Co. Meath	A 433m ² single storey commercial building for retail and café use with 17 off-street car parking spaces	Meath Co.Co.

File Number	Application Status	Decision Due Date	Decision Date	Decision Code	Received Date	Applicant Name	Development Address	Development Description	Local Authority Name
LB180899	Incomplete Application	N/A	N/A	N/A	10/08/2018	Boyneside Camping Ltd.	Coast Road Mornington County Meath	Change of use from golf driving range permitted under planning reference SA/40248 to Touring Campsite	Meath Co. Co.
LB18091	Appealed	17/10/2018	16/10/2018	Conditional	23/08/2018	Boyneside Camping Ltd.	Coast Road Mornington County Meath	Change of use from golf driving range permitted under planning reference SA/40248 to Touring Campsite.	Meath Co. Co.

5.5.1. Assessment of In-combination effects

The potential for in-combination effects was assessed by examining the projects and plans outlined above. No significant projects of a similar nature or scale, specifically those that would be likely to attract additional visitors or tourists to the area and/or those that would be likely to impact the relevant European sites through direct habitat loss, fragmentation or disturbance, indirect terrestrial or aquatic habitat loss or degradation, or indirect/ex-situ disturbance or displacement of animal species and which could contribute to LSE where identified. The planning applications identified in **Table 5.4** are generally small-scale developments, which also do not directly impact the estuarine or riverine environments of the relevant European sites or their associated SCIs/QIs. Based on the geographical distance between the respective projects and their nature, any cumulative impact that could contribute to LSE with the proposed development is considered highly unlikely.

Whilst it is understood that additional greenway projects and improvements to the existing highways network may be forthcoming within the local area, in the absence of formal information for such projects available within the public domain, in-combination effects with these projects cannot be considered in detail. It will therefore be important for any such projects to consider the cumulative effects they may have on European sites in combination with the proposed Boyne Greenway as well as any other relevant planned projects or developments. Nonetheless, it is prudent to be precautionary when considering potential impacts from the proposed development and making recommendations regarding required mitigation and monitoring; particularly for impact pathways which could develop in-combination effects with forthcoming greenway proposals. This has been considered further in Sections 5, 6 and 7 of this report.

The Drogheda Borough Council Development Plan 2011-2017¹⁵ is the most recently published development plan published by Meath Co. Co. for the southern portion of Drogheda Town, within the Co. Meath border. There are no current development plans available to inform an overview of the development of Drogheda Town.

However, Meath Co. Co. have published the East Meath Local Area Plan (2014-2020)¹⁶ which incorporates the areas of Mornington and Mornington East, within the current study area. This plan was subject to an Appropriate Assessment in accordance with Article 6(3) of the EU Habitats Directive, as well as a Strategic Environmental Assessment (SEA) in accordance with Article 5(4) of the EC SEA Directive. The Natura Impact Report to inform the Appropriate Assessment process for the East Meath Local Area Plan concluded that, assuming the successful implementation of the Policies and Objectives set out in the Plan, there will be no likely significant effects on the European sites in the zone of influence of the Plan in isolation or in combination with other Plans and Projects acting in the same area.

On this basis, taking account of the measures in the Plan to avoid significant effects, there are no pathways for interactions which could potentially result in in combination or cumulative effects arising from the proposed development, either during construction or operation.

This conclusion takes account of the policies and objectives contained within the East Meath Local Area Plan for environmental protection. Furthermore, this evaluation recognises the scale and extent

¹⁵ Available at https://www.louthcoco.ie/en/publications/development-plans/drogheda-development-plan-/drogheda_borough_council_development_plan_2011-2017.html. Accessed in May 2020.

¹⁶ Available at <https://www.meath.ie/system/files/upload/East%20Meath%20Local%20Area%20Plan%202014-2020%20-%20Vol%201%20Written%20Statement.pdf>. Accessed in May 2020.

of the proposed development with cognisance of the nature of the Greenway amenity development, which aims to manage and control public access within sensitive habitat areas.

From a review of the published Part 8 Applications submitted by Meath County Council, there are no projects listed on the public file¹⁷ which would have the potential to interact cumulatively or in combination with the current proposal, taking account of the geographic zone of influence, in addition to the temporal timing of the project, and any potential for likely significant effects, wither during construction or operation is thereby excluded.

The Drogheda Port Company is currently working on a Master Plan for the future of the Port that will run from 2020-2050; the Master Plan is currently in development phase and will be subject to public consultation and stakeholder submissions. Given the timeline of the process, in addition to necessary impact assessment, Appropriate Assessment and environmental protective measures that will be in-built in compliance with legislative requirements, it is considered that there are no pathways for this Master Plan to interact in combination or cumulatively with the proposed Boyne Greenway Project, either during construction or operation, and it is accordingly excluded from further evaluation.

5.6 Stage 1 Screening Conclusion

The Stage 1 Screening for Likely Significant Effects provided herein has examined potential effects via source-pathway linkages on European sites within 15km of the proposed development, either alone or in combination.

In summary, six European sites were identified within the 15km zone of consideration and therefore requiring screening for LSE from the proposed development:

1. River Boyne and River Blackwater SPA (site code: 004232);
2. Boyne Coast and Estuary SAC (site code: 001957);
3. Clogher Head SAC (site code: 001459);
4. Boyne Estuary SPA (site code: 004080);
5. River Nanny Estuary and Shore SPA (site code: 004158); and
6. River Boyne and River Blackwater SAC (site code: 002299).

Following screening, it can reasonably be concluded that there is no likelihood of significant effects on three of the above European sites as a result of the proposed development, either alone or in combination with other plans or projects, namely:

- Clogher Head SAC (site code: 001459);
- River Nanny Estuary and Shore SPA (site code: 004158); and
- River Boyne and River Blackwater SPA (site code: 004232).

Therefore, the above three European sites have been 'Screened Out' at Stage 1 of the Natura Impact Assessment process. These three European sites are therefore not subject to further assessment (e.g. Appropriate Assessment) in this report.

Following the screening process, it has been determined that the potential for significant effects on three European sites cannot be screened out at Stage 1 of the Natura Impact Assessment process. It is therefore necessary to proceed to Stage 2 (Appropriate Assessment) for the following three European sites:

¹⁷ Available at <http://www.meath.ie/CountyCouncil/Planning/Part8s/>. Accessed in May 2020.

- River Boyne and River Blackwater SAC (site code: 002299);
- Boyne Coast and Estuary SAC (site code: 001957); and
- Boyne Estuary SPA (site code: 004080).

6. Stage 2: Appropriate Assessment

LSE from the proposed development on the following European sites could not be screened out during Stage 1 and are therefore subject to Appropriate Assessment to identify any potential adverse effects on the integrity of these European sites:

- River Boyne and River Blackwater SAC (site code: 002299);
- Boyne Coast and Estuary SAC (site code: 001957); and
- Boyne Estuary SPA (site code: 004080).

During this Appropriate Assessment it is necessary to consider the following impact pathways:

- Direct habitat loss, fragmentation or disturbance;
- Indirect terrestrial or aquatic habitat loss or degradation; and
- Indirect/ex-situ disturbance or displacement of animal species.

6.1 Iterative Design

The design of the proposed development includes ‘integral’ (i.e. embedded) measures to avoid or minimise adverse effects on the integrity of European sites, as summarised in Section 6.1.2. In accordance with best practice (see Section 2.1 of this NIS report), these measures are described and taken into account within this Appropriate Assessment where relevant. Appropriate Assessment also takes into consideration supplementary data (e.g. bespoke bird survey data collected by Inis Environmental Consultants) when identifying whether there is potential for adverse effects on site integrity.

A review for recommended measures likely to result in positive effects was also undertaken. For example, in a publication on approaches to measuring the effects of human disturbance on birds, Gill (2007) suggests:

“Actively encouraging public education and responsible access to the countryside is a crucial element of local conservation efforts, and of developing the interests of current and future generations. In this context, restricting public access should only be considered when the conservation impact of human presence is demonstrably severe”.

Similarly, it should be noted that in providing a designated walking route, recreational use within ecologically sensitive areas (with regard to QI habitats and SCI species) would likely be reduced, as pedestrians, cyclists and dogs (including users already frequenting these areas prior to the construction of the proposed development) may be more likely to remain within the Greenway route than stray into wider sensitive areas within these European sites. Similarly, when viewed in combination with information signage identifying the value of biodiversity features and the need for users to avoid sensitive areas, the Greenway route may discourage members of the public from straying into more sensitive areas.

Inis Environmental Consultants carried out a comprehensive gap analysis on available biodiversity data for the route, covering the following:

1. Any previously commissioned baseline surveys and reporting;
2. The route iteration proposed for development;
3. Results of consultation undertaken with statutory consultees such as NPWS.

6.1.1. Research

Similar Projects

Research was undertaken to demonstrate precedent in terms of the development of greenways, or projects of a similar size and nature, within or adjacent to European sites – in particular those designated for similar species and habitats as present along the River Boyne (notably waterbirds). A desktop review was undertaken to identify similar projects in proximity to European designated sites, both within the current jurisdiction but also within the wider European context.

Table 6.1 presents a summary of similar projects (comprising greenways, cycleways, national trails or a combination of all) which are located within European sites similar to those present adjacent to the proposed development. A photo glossary of greenways/cycleways referenced is provided for reference as **Appendix C**.

Table 6.1: Selected European sites where greenways/cycleways occur in close proximity

Country	European Site	Degree of Overlap with Existing Greenway/Cycleway/Walkway
UK	The Exe Estuary SPA ¹⁸	The Exe Estuary Trail is a cycle path and walkway, which is immediately adjacent to the Exe Estuary SPA for much of its route.
Netherlands (Schierlonnikoog Island)	Waddenzee SPA	Within EU site boundary
Netherlands (Terschelling Island)	Waddenzee SPA & Duinin Terschelling SAC	Within EU site boundary
Portugal	Sintra/Cascais SAC	Within EU site boundary/adjacent
Belgium	Het Zwin SPA	Within EU site boundary/adjacent
Denmark	Harboore Tange SPA	Within EU site boundary
Netherlands (Rotterdam)	Haringvliet SPA	Within EU site boundary/adjacent
Italy	River Po Delta SPA	Within EU site boundary/adjacent

¹⁸ The Exe Estuary is internationally important for wintering birds and qualifies as a SPA for Avocet and Slavonian grebe, and also as it regularly supports an assemblage of at least 20,000 waterfowl. Dunlin, oystercatcher, lapwing, wigeon and dark-bellied brent goose are the most abundant species within this assemblage. Wintering bird numbers start building from August, peaking in December.

Research on Designated Bird Features

By way of a case study on the operational effects of greenways on birds, possible disturbance impacts from a cycleway on shorebirds in an SPA have been studied for several years at the Exe Estuary in Devon, England. In advance of this cycleway being opened, modelling simulations of increased levels of disturbance from the proposed cycle path along the side of the estuary were undertaken (Durell et al., 2007). The modelling in this study removed the areas of habitat where disturbance was likely to arise, therefore this simulation represents a “worst-case scenario” as it assumes that disturbance is continuous and constant throughout daylight hours, and that shorebirds never habituate to disturbance events. The Durell et al. (2007) study predicted that disturbance of upper mudflat areas was unlikely to affect shorebird survival.

Further studies on shorebirds and disturbance at the Exe Estuary arising from the cycle path also evaluated habituation once the cycle path was opened (Gross-Custard, 2008). This study determined that Redshank within 25m of the cycle path were largely habituated (i.e. no longer took flight) to disturbance arising from the use of the cycle path after 10 days and had completely habituated after 20 days, suggesting that adverse effects on the conservation status of the redshank population and subsequently site integrity had not occurred as a result of the cycle path.

6.1.2. Integral Project Features and Mitigation

Integral project features (i.e. ‘embedded’ mitigation measures) relevant to the Appropriate Assessment are described below and discussed within the Appropriate Assessments for specific potential adverse effects within **Table 6.2**, **Table 6.3** and **Table 6.4**. Further details of these embedded mitigation measures are provided in the EclA report for the project (Inis, 2022).

Timing of Works

The majority of construction work within and proximal to intertidal sections will be restricted to outside the period of October – March at all sensitive sites where disturbance of wintering waterbirds could occur (i.e. within the intertidal habitats of the SAC/SPA or immediately adjacent). Therefore, all works will be undertaken between March and September at times when wintering waterbirds (i.e. the SCIs of the Boyne Estuary SPA) are absent. The timing restriction will not apply to public road sections where disturbance is constant. Camouflage netting will be utilised on all roadside works outside the period March to September to minimise disturbance, as a matter of course.

In order to reduce impact on breeding birds, any removal of hedgerows and trees will be outside of the bird breeding season (which runs from 1st March to 31st August).

In addition to the above, all works will be overseen by a suitably qualified Ecological Clerk of Works (ECoW), who shall have ‘stop works’ authority.

Landcover Change

There are approximately 2.5km of proposed Greenway within the intertidal zones. In these areas, the Greenway will be elevated onto a boardwalk structure to: a) avoid impact on foraging birds through habitat loss as designed through consultation with the consultant ecologist and NPWS; and b) avoid any significant landcover change. The boardwalk will be constructed approximately 1.5m above the current highest astronomical tide level. The width of the boardwalk will be limited to 4m (maximum). Following a review of the options, and in consultation with the ecological consultant, it has been agreed that the elevated boardwalk be formed using propriety recycled plastic elements. Design and construction details are further outlined in the EclA report for the project (Inis, 2022).

Ecological Clerk of Works

Regular monitoring of the works will be provided by a suitably qualified ECoW with a 'stop works' authority. This coverage will be full time onsite for the first four months of the project and two days per week thereafter, until the project is complete. Post-construction ecological monitoring will be carried out in order to assess any potential changes from baseline conditions, as established during the bird surveys and habitat surveys that informed this assessment. Bird surveys will be in line with precedents set at other operational Greenways such as within the Exe Estuary. The efficacy of the proposed habitat restoration/creation measures within the protected areas will be evaluated by a suitably qualified ecologist and any potential improvements will be put forward for implementation. The representative will have knowledge of working on construction programmes within SAC and SPA areas where significant bird populations exist and habitat restoration/creation within protected areas.

Where construction is to take place in suitable habitat, the ECoW will undertake pre-construction checks for features on which destruction, damage or disturbance impacts are prohibited by legislation and policy; for example, active Otter dens or active bird nests (especially Little Tern and Kingfisher).

Noise Screening during Construction

The timing of the works and the measures intrinsic to the design as specified within the design proposal, have been selected to minimise the potential for impacts.

Any piling required during construction will be undertaken using reduced noise equipment in accordance with best practice. Where the requirement for piling arises within intertidal areas, this will proceed under direct supervision from the onsite ECoW and piling will take place from the road, to minimise the scale and extent of works within the boundary of European sites.

Operational Lighting Design

Operational lighting, where necessary for security and safety, will be LED based (to avoid emission of UV light) and will be cowed away from estuarine habitats with no light spillage allowed, in line with best practice for bats and birds. Low energy LED luminaires incorporating a solar power source and motion detectors will be used throughout. Furthermore, to minimise the requirement for lighting all access features, bollards and gates shall have reflector strips in line with best practice guidance. Bird-sensitive lighting or no lighting will be provided where birds forage within 50m of the Greenway to avoid any disturbance. Lighting will be subject to health and safety requirements (Liley et al., 2011). Bird-sensitive lighting design will be required where the route passes over or is within 50m of mudflat habitat. Detailed lighting design information is provided within the Outdoor Lighting Report (Sabre Electrical Services Ltd, 2022).

Noise/disturbance Prevention during the Operational Phase

To counteract disturbance from users and dogs, in particular, and minimise noise transfer to birds and other species which may occur, signage outlining the accepted 'code of conduct' for dogs will be instated, in line with best practice for similar greenway projects. These project elements will reduce the risk of significant effects from off-leash dogs which have been shown to be the single highest source of disturbance in similar scenarios (Liley et al., 2011).

Embedded landscape planting within the design of the proposed development (notably along the northern side of the Greenway) will also provide a visual barrier between Greenway users and ecological receptors adjacent to the Greenway; particularly regarding visual disturbance from pedestrians, cyclists and dogs on wintering waterbirds). Landscape planting details for the proposed development are provided in the Landscape Visual Impact Assessment Report for the project (JBA Consulting, 2022).

6.2 Conservation Objectives for Relevant European Sites

Conservation Objectives for relevant features (e.g. QIs, SCIs) of European sites subject to Appropriate Assessment are detailed below. Full details are provided in the cited NPWS Conservation Objectives reports.

River Blackwater and River Boyne SAC¹⁹

- To maintain the favourable conservation condition of Alkaline Fens in River Boyne and River Blackwater SAC.
 - To maintain and restore the area, distribution, soil pH, hydrology and vegetative communities of this habitat (subject to natural processes).
- To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) in River Boyne and River Blackwater SAC.
 - To maintain and restore the area, distribution and vegetative structure of this habitat.
- To restore the favourable conservation condition of River Lamprey in River Boyne and River Blackwater SAC.
 - To restore access to watercourses by removing/minimising artificial barriers to lamprey passage and avoiding the creation of new barriers to lamprey passage; and
 - To avoid a decline in the distribution and abundance of lamprey at its various life stages.
- To restore the favourable conservation condition of Atlantic Salmon in River Boyne and River Blackwater SAC.
 - To restore access to watercourses by removing/minimising artificial barriers to salmon passage and avoiding the creation of new barriers to salmon passage;
 - To avoid a decline in the distribution and abundance of salmon at its various life stages; and
 - To restore water quality.
- To restore the favourable conservation condition of Otter in River Boyne and River Blackwater SAC.
 - To avoid an increase in barriers to otter movement; and
 - To avoid a significant decline in the distribution of otter, to be achieved by avoiding a significant decline in the extent of terrestrial and freshwater (river and lake) habitat, dens and fish biomass.

Boyne Coast and Estuary SAC²⁰

- To maintain the favourable conservation condition of Estuaries in Boyne Coast and Estuary SAC.

¹⁹ From NPWS (2021) Conservation Objectives: River Boyne and River Blackwater SAC 002299. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltracht. [Available at: <https://www.npws.ie/protected-sites/sac/002299> - accessed 01/02/2022].

²⁰ From NPWS (2012) Conservation Objectives: Boyne Coast and Estuary SAC 001957. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltracht. [Available at: <https://www.npws.ie/protected-sites/sac/001957> - accessed 01/02/2022].

- To ensure the permanent area of this habitat is stable or increasing (subject to natural processes); and
 - To conserve the following community types in a natural condition: intertidal estuarine mud and fine sand with *Hediste diversicolor* and *Corophium volutator* community, and Subtidal fine sand dominated by polychaetes community.
- To maintain the favourable conservation condition of mudflats and sandflats not covered by seawater at low tide in Boyne Coast and Estuary SAC.
 - To ensure the permanent area of this habitat is stable or increasing (subject to natural processes); and
 - To conserve the following community types in a natural condition: intertidal estuarine mud and fine sand with *Hediste diversicolor* and *Corophium volutator* community, and Subtidal fine sand dominated by bivalves community complex.
- To restore the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in the Boyne Coast and Estuary SAC.
 - To maintain and restore the area, distribution, tidal regime, physical structure (including the level of structural variation) and vegetative structure of these habitats (subject to natural processes).
- To maintain the favourable conservation condition of Atlantic salt meadows (*Glaucopiccinellietalia*) in Boyne Coast and Estuary SAC.
 - To maintain and restore the area, distribution, tidal regime, physical structure (including the level of structural variation) and vegetative structure of these habitats (subject to natural processes).
- Objectives for Mediterranean salt meadows (*Juncetalia maritimi*) are currently under review; these are likely to include the maintenance or restoration of the favourable conservation status of this habitat (including the maintenance and/or restoration of the area, distribution, physical structure and vegetative structure of this habitat).
- To restore the favourable conservation condition of Embryonic shifting dunes in Boyne Coast and Estuary SAC.
 - To maintain and restore the area, distribution, tidal regime, physical structure (notably the circulation of sediment and organic matter) and vegetative structure (including avoiding increased cover of negative indicator species) of this habitat (subject to natural processes).
- To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) in Boyne Coast and Estuary SAC.
 - To maintain and restore the area, distribution, tidal regime, physical structure (notably the circulation of sediment and organic matter) and vegetative structure (including avoiding increased cover of negative indicator species) of this habitat (subject to natural processes).
- To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (grey dunes) in Boyne Coast and Estuary SAC.
 - To maintain and restore the area, distribution, tidal regime, physical structure (notably the circulation of sediment and organic matter) and vegetative structure (including avoiding increased cover of negative indicator species) of this habitat (subject to natural processes).

Boyne Estuary SPA²¹

- To maintain the favourable conservation condition of the non-breeding (i.e. wintering) waterbird SCI species listed for Boyne Estuary SPA; namely Shelduck, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank and Turnstone.
 - To be favourable, the long-term population trend for each waterbird SCI should be stable or increasing. Waterbird populations are deemed to be unfavourable when they have declined by 25% or more.
- To maintain the favourable conservation condition of Little Tern.
 - As assessed from breeding population abundance (apparently occupied nests), productivity rate (fledged young per year) and distribution of breeding colonies (i.e. number, location and area of breeding colonies).
 - For this to be achieved, there must be no significant increase in barriers to connectivity between breeding and foraging areas, and significant disturbance at breeding sites should be avoided (i.e. human activities should occur at levels that do not adversely affect the breeding Little Tern population).
- To maintain the favourable conservation condition of the wetland habitat in Boyne Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it.
 - The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 594ha (other than that occurring from natural patterns of variation).

6.3 Impact Pathways Assessed

The Appropriate Assessment is based on a conceptual site model which identifies potential source-pathways effects between the proposed development and each European site.

The following matters are included in the Appropriate Assessment:

1. Construction of the Proposed Development (alone and in combination with planning applications identified in **Table 4.4**).
2. Operation of the Proposed Development (alone and in combination with planning applications identified in **Table 4.4**) in respect of disturbance to birds and mammals (e.g. Otter).

The following matters are excluded from further consideration in the Appropriate Assessment:

1. Operation of the Proposed Development (alone and in combination with planning applications identified in **Table 4.4**) in respect of disturbance to fisheries. Disturbance to fisheries during operation can reasonably be excluded due to the separation distance from the operational Greenway to the main channel of the river, the habituation of fisheries present to existing sources of disturbance, such as regular shipping, and in the absence of any known sensitivities from species such as Atlantic Salmon and Lamprey within an estuarine environment.
2. In-combination effects with Plans/Part 8 applications (during construction and/or operation) (see Section 5.5.1). The size and scale of the proposed Boyne Greenway development results in a

²¹ From NPWS (2013) Conservation Objectives: Boyne Estuary SPA 004080. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. [Available at: <https://www.npws.ie/protected-sites/spa/004080> - accessed 01/02/2022].

restricted potential zone of influence during both the construction and operational (utilisation) phase of the proposed development. An evaluation of other plans and projects, whether operational, in construction, or progressing through planning, has been undertaken. The potential for impact pathways arising from these developments which could potentially interact, either in combination or cumulatively with the Greenway project is a function of the potential overlap between the proposed project and other such plans and projects within the wider study area. A review of these plans and projects within the study area is presented in Section 5.5.1, evaluating potential pathways for interaction which may arise with the Greenway.

6.4 Assessment of Likely Significant Effects

The potential for adverse effects on site integrity exists for River Boyne and River Blackwater SAC, Boyne Coast and Estuary SAC and Boyne Estuary SPA. As such, these potential effects are subject to Appropriate Assessment in **Table 6.2**, **Table 6.3** and **Table 6.4** respectively, below.

Table 6.2: Appropriate Assessment for River Boyne and River Blackwater SAC

River Boyne and River Blackwater SAC Qualifying Interests (QI) (*Priority Annex I habitat)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
[7230] Alkaline Fens [91E0] Alluvial Forests* [1099] River Lamprey (<i>Lampetra fluviatilis</i>) [1106] Atlantic Salmon (<i>Salmo salar</i>) [1355] Otter (<i>Lutra lutra</i>)	Construction/operation	Landcover change Movement of soils and machinery Earthworks and excavations Use of fuels, chemical or cement-based compounds Vegetation clearance/tree felling Placement of bridges/piling	Run off/overland flows Air	Secondary habitat loss or degradation Disturbance

Effects of the proposed development (alone and in-combination):

Alkaline Fens/Alluvial Forests

No direct landcover change of these habitats is likely as none were recorded in the baseline studies (refer to the for the project (Inis, 2022). Known locations of these habitats all occur upstream of the proposed development. Secondary cross factor effects via water quality degradation during construction are considered unlikely due to the scale of dilution factor present and the downstream location of works. Similarly, no in-combination effects during construction are anticipated. Embedded mitigation within the proposed construction methods and development design will further minimise the potential for impacts on nearby SAC-designated habitats (and on the designated species discussed below). Such measures include a sensitive lighting design (Section 6.1.2), in which lighting will be using LED sources and cowled away from potentially sensitive habitats. The lighting design details regarding the precise location and specification of lighting is available within the Outdoor Lighting Report (Sabre Electrical Services Ltd, 2022), with the final lighting locations being agreed in consultation with the project Ecologist.

River Lamprey/Atlantic Salmon

The construction works to deliver the Greenway will require works within the intertidal habitats of the River Boyne estuary. The lower reaches of this watercourse are utilised by River Lamprey, Sea Lamprey and Atlantic Salmon for holding and passage upstream to spawning grounds. Sea Trout also occur through the estuary and into freshwater habitats. There are no potential impacts affecting fish passage, as works are limited to the upper tidal zone of the riparian margin along the southern bank of the river. Any potential impacts affecting fish and fisheries in the estuary are limited to indirect disturbance and water quality impacts, which will be temporary and spatially restricted to the immediate proximity of the construction works and are considered unlikely to be significant. Best practice methods are to be adopted during the construction of the Greenway to minimise the potential for

River Boyne and River Blackwater SAC Qualifying Interests (QI) (*Priority Annex I habitat)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
<p>such impacts on sensitive species such as fish, as well as Otter (see below). Of the projects considered for in-combination effects, none are considered to occur in sufficient proximity to result in in-combination effects.</p>				
<p><u>Otter</u></p> <p>No Otter holts were recorded in close proximity (within 50m) of the proposed Greenway route. Limited evidence was recorded of actual presence and the receiving habitat adjacent to the public roadway is largely unsuitable with no permanent loss of breeding habitat predicted. Considering the low habitat suitability for Otter (particularly regarding the potential presence of dens), disturbance effects during construction of any significance are considered unlikely. Provision of screen planting in the landscape design to minimise visual intrusion (see Section 6.1.2), particularly from dogs, will further minimise disturbance risks. Biodiversity-sensitive lighting or no lighting is proposed within intertidal sections where Otter are likely to occur, and human usage is likely to be at peak during daylight hours (i.e. at a time when disturbance of otters is less likely). Otters have also been recorded foraging in close proximity to human disturbance (Kruuk, 2006). Significant effects, alone or in combination, are unlikely.</p>				
<p>Appropriate Assessment findings: Adverse effects on the integrity of the European site can reasonably be excluded.</p>				

Table 6.3: Appropriate Assessment for Boyne Coast and Estuary SAC

Boyne Coast and Estuary SAC Species of Conservation Interest (SCI)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
[1130] Estuaries [1140] Tidal Mudflats and Sandflats [1210] Annual vegetation of drift lines [1310] Salicornia Mud [1330] Atlantic Salt Meadows [2110] Embryonic Shifting Dunes [2120] Marram Dunes (White Dunes) [2130] Fixed Dunes (Grey Dunes) *	Construction/operation	Landcover change Movement of soils and machinery Earthworks and excavations Use of fuels, chemical or cement-based compounds Vegetation clearance/tree felling Placement of bridges/piling Habitat creation works	Landtake Runoff/overland flows Air	Direct habitat loss, fragmentation or disturbance Indirect habitat loss or degradation
<p>Effects of the proposed project (alone and in combination):</p> <p><u>Annual Vegetation of Drift Lines</u></p> <p>Can be excluded from any significant effects considered due to location, separation distance and dilution factor.</p> <p><u>Estuaries: Tidal Mudflats and Sandflats: Salicornia Mud, Atlantic Salt Meadows</u></p> <p>Whilst the footprint of the proposed Greenway route does overlap with these habitats, the route has been designed to avoid Annex I Quality Saltmarsh for which the site is designated. In providing a designated walking route, recreational use within ecologically sensitive areas (with regard to QI habitats and SCI species) would likely be reduced, as pedestrians, cyclists and dogs (including users already frequenting these areas prior to the construction of the proposed development) may be more likely to remain within the Greenway route than stray into wider sensitive areas within these European sites. Significant effects on this habitat type through direct habitat loss can therefore be excluded.</p> <p>In total, the construction of the proposed Greenway will result in the potential shading of approximately 1.0km length of Tidal Mudflats and Sandflats, covering an estimated area of 4000m² (based on a boardwalk width of 4m). This Appropriate Assessment acknowledges the Conservation Objectives for these habitats, which state that the area, distribution, vegetative structure and function of these QI habitats should be retained and/or restored. Considering the areas of habitat affected (both during construction and operation), the proportions of QI habitats affected would be very small within</p>				

Boyne Coast and Estuary SAC Species of Conservation Interest (SCI)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
<p>the context of the European site. Citation information for Boyne Coast and Estuary reports 403.1ha of Tidal Mudflats and Sandflats, of which 4000m² would constitute approximately 0.1%. Whilst shading is likely to affect certain characteristics of this habitat (notably vegetative structure), it should be recognised that the effects of shading are not necessarily the same as those of habitat removal, and that in view of the characteristics of this highly dynamic tidal mudflat and sandflat habitat, the level of biodiversity value is likely to be maintained when shaded. Any habitat subject to temporary direct disturbance and/or modification (i.e. within works areas) during construction would be allowed to re-establish once construction is complete.</p> <p>During construction, secondary effects are limited to potential habitat degradation from the use of fuels, earthworks and excavations in close proximity and activities such as the placement of bridges (piling done from roadside). Dilution factor and assimilation capacity will avoid sediment runoff effects, and also avoid significant effects from the use of fuels and/or cement-based compounds in close proximity. A suitably qualified ECoW will be on site at all times to supervise works. Without placing any reliance on this, it is still considered that significant effects are unlikely. Usage during operation of e.g. oils is considered insignificant in terms of bicycle usage or required maintenance. Embedded project measures include the adoption of best practice construction methods.</p> <p>Habitat degradation through the spread of invasive species is considered. Japanese Knotweed was only recorded at a single location within 5m of the study area (refer to the EclA report for the project (Inis, 2022)) and is currently under treatment. Continued management of this is important to avoid potential for spread of this invasive species along the Greenway route. No <i>Spartina</i>, Buckthorn or Sea Buckthorn is present within the route footprint, and significant effects via transfer of these invasive species can be excluded.</p> <p>The project design includes a sensitive lighting design (see Section 6.1.2), in which lighting will be using LED sources and cowled away from potentially sensitive habitats. Current lighting design details regarding the precise location and specification of lighting are available within the Outdoor Lighting Report (Sabre Electrical Services Ltd, 2022), with indicative lighting locations agreed in consultation with the project Ecologist. The project Ecologist will continue to be consulted regarding any changes to final lighting locations to ensure adverse effects on site integrity are avoided.</p> <p>In combination effects during construction are unlikely as none of the developments listed in Section 5.5 occur in sufficiently close proximity. Intertidal sections of boardwalk will be raised above intertidal muds and the structure and function of habitats present will not be impaired through operation.</p> <p><u>Embryonic Shifting Dunes: Marram Dunes (White Dunes): Fixed Dunes (Grey Dunes):</u></p> <p>The current design of the proposed Greenway route terminates near Tower Road immediately west of the SAC, in close proximity to QI dune habitat. Considering the location of the terminus of the Greenway route, Appropriate Assessment must take into account the potential for operational impacts from increased public activity within/adjacent to this habitat; specifically the potential for users of the Greenway route to disperse into sensitive dune habitat and cause subsequent degradation of this habitat (as well as potential impacts on features of ecological value (e.g. breeding birds) which are not subject to EU designation). Whilst the area of affected dune habitat is anticipated to be relatively small, current embedded mitigation and design measures for the project are not considered to be sufficient to reasonably exclude this potential adverse effect on site integrity. As such, alternative solutions and mitigation are to be considered (see Section 7 of this report).</p>				

Boyne Coast and Estuary SAC Species of Conservation Interest (SCI)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
<p>Appropriate Assessment findings: Adverse Effects on the integrity of the European site can reasonably be excluded, with the exception of potential operational impacts on dune habitats at the Greenway terminus. This is subject to further assessment in Stage 3 (see Section 7 of this report).</p>				

Table 6.4: Appropriate Assessment for Boyne Estuary SPA

Boyne Estuary SPA Species of Conservation Interest (SCI)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
[A048] Shelduck (<i>Tadorna tadorna</i>) [A130] Oystercatcher (<i>Haematopus ostralegus</i>) [A140] Golden Plover (<i>Pluvialis apricaria</i>) [A141] Grey Plover (<i>Pluvialis squatarola</i>) [A142] Lapwing (<i>Vanellus vanellus</i>) [A143] Knot (<i>Calidris canutus</i>) [A144] Sanderling (<i>Calidris alba</i>) [A156] Black-tailed Godwit (<i>Limosa limosa</i>) [A162] Redshank (<i>Tringa totanus</i>) [A169] Turnstone (<i>Arenaria interpres</i>) [A195] Little Tern (<i>Sternula albifrons</i>) [A999] Wetland and Waterbirds	Construction/ operation	Landcover change Movement of soils and machinery Earthworks and excavations/ Use of fuels, chemical or cement- based compounds Vegetation clearance/tree felling placement of bridges/piling habitat creation Works	Land take Runoff/overland flows Air	Direct habitat loss, fragmentation or disturbance (e.g. from pedestrian/cyclist use, lighting design) Indirect habitat loss or degradation Indirect of ex-situ disturbance or displacement effect on waterbirds

Effects of the proposed project (alone and in combination):

Direct Habitat Loss, Fragmentation or Disturbance:

The majority of the route corridor occurs above the supra-tidal zone, thus avoiding direct habitat loss. Loss or modification of designated habitats on which these SCI bird populations rely is discussed in relation to the overlapping Boyne Coast and Estuary SAC in

Table 6.3 above. The area of intertidal habitat to be shaded by boardwalk is not considered to be significant in the context of the total area of this habitat within the SAC. Where the boardwalk is located within the intertidal zone over mudflat, the boardwalk composition and height above ground will allow sufficient light penetration to maintain habitat structure and function.

Indirect Habitat Loss or Degradation:

As the timing for works is outside the winter period (October to March), this will avoid secondary habitat degradation which could be associated with heavy rainfall/runoff during the winter months. However, the dilution and assimilation factor of the estuarine environment in close proximity is the main determinant in evaluating no likelihood for significant effects. The daily inundation cycle will ensure any degradation is avoided from runoff of

Boyne Estuary SPA Species of Conservation Interest (SCI)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
<p>sediment, fuels or chemicals associated with construction and, in light of this, no in-combination effects are similarly predicted. Effects during operation are considered insignificant in terms of bicycle usage or required maintenance.</p> <p>Habitat degradation through the spread of invasive species is considered. Japanese Knotweed was only recorded at a single location within 5m of the study area and is currently under treatment. No <i>Spartina</i>, Buckthorn or Sea Buckthorn is present within the route footprint, and significant effects via transfer of these invasive species can be excluded.</p> <p><u>Indirect or ex-situ Disturbance or Displacement effect on Waterbirds:</u></p> <p>Together, field surveys and I-WeBS data identified the presence adjacent to the proposed Greenway route of all 11 SCI waterbird species for the Boyne Estuary SPA; specifically ten wintering species and Little Tern. Bespoke field data collected in 2021 to inform this Appropriate Assessment (described in detail in Section 4.2) recorded peak counts adjacent to the proposed Greenway route as follows:</p> <ul style="list-style-type: none"> • Shelduck: 36, equating to 16.5% of the SPA citation population. • Oystercatcher: 560, equating to 51.4% of the SPA citation population. • Golden Plover: 150, equating to 2.5% of the SPA citation population. • Grey Plover: 150, equating to 153.1% of the SPA citation population. • Lapwing: 376, equating to 8.1% of the SPA citation population. • Knot: 1050, equating to 59.3% of the SPA citation population. • Sanderling: 50, equating to 72.5% of the SPA citation population. • Black-tailed Godwit: 63, equating to 13.4% of the SPA citation population. • Redshank: 72, equating to 12.3% of the SPA citation population. • Turnstone: 18, equating to 10.3% of the SPA citation population. <p>These population data are broadly consistent with I-WeBS data (2013-18) and bespoke field data from 2018, with the following notable exceptions:</p> <ul style="list-style-type: none"> • I-WeBS and 2018 bespoke field data indicate much higher Golden Plover populations in proximity to the proposed Greenway route (42.8% of the SPA population was recorded during 2018 field surveys); • I-WeBS and 2018 bespoke field data indicate much higher Black-tailed Godwit populations in proximity to the proposed Greenway route (86.3% of the SPA population recorded during 2018 field surveys); • I-WeBS data indicate higher numbers of Shelduck within the SPA as a whole (potentially including areas in close proximity to the proposed Greenway route) (average 87.1% of the SPA population recorded annually in 2013-18). <p>Regarding spatial patterns of waterbird usage in relation to the proposed Greenway route, the proposed Greenway route extends adjacent to sub-sites OZL02 and OZL03 and extends within OZL05, OVL01 and OVL02 (see Figure 2.1). Peak counts for these sub-sites are indicated in Section 4.2. The</p>				

Boyne Estuary SPA Species of Conservation Interest (SCI)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
<p>relative importance of these sub-sites for SCI wintering waterbirds (as recorded during 2021 field surveys, with additional notes for relevant 2018 field survey data) are summarised below:</p>				
<ul style="list-style-type: none"> • OVL01: peak counts were significant for Shelduck (8.7%), Black-tailed Godwit (13.4%) and Redshank (9.8%). Five of the ten wintering SCI species were recorded. <ul style="list-style-type: none"> ○ Note that significant peak counts were recorded in 2018 for Shelduck (5.5%), Golden Plover (36.2%) Black-tailed Godwit (14.6%) and Redshank (20.2%). • OVL02: peak counts were significant for Grey Plover (7.1% of the baseline SPA population), Lapwing (7.4%) and Redshank (12.3%: the highest peak count for Redshank recorded at any sub-site). Nine of the ten wintering SCI species were recorded. <ul style="list-style-type: none"> ○ Note that significant peak counts were recorded in 2018 for Shelduck (16.1%), Black-tailed Godwit (57.3%) and Redshank (20.6%). • OZL05: peak counts were significant for Shelduck (11.0%), Lapwing (8.1%) and Turnstone (5.7%). Eight of the ten wintering SCI species were recorded. <ul style="list-style-type: none"> ○ Note that significant peak counts were recorded in 2018 for Golden Plover (42.8%), Black-tailed Godwit (86.3%) and Redshank (18.9%). • OZL02: peak counts were significant for Redshank (11.1%) only. Four of the ten wintering SCI species were recorded. <ul style="list-style-type: none"> ○ Note that significant peak counts were recorded in 2018 for Shelduck (6.0%) and Redshank (7.0%). • OZL03: peak counts were significant for Shelduck (16.5%: the highest peak count for Shelduck recorded at any sub-site) and Redshank (8.6%). Five of the ten wintering SCI species were recorded. <ul style="list-style-type: none"> ○ Note that significant peak counts were recorded in 2018 for Shelduck (22.0%), Black-tailed Godwit (42.3%) and Redshank (15.6%). 				
<p>When viewed together, these five sub-sites within/in close proximity to the proposed Greenway route were found to contain significant proportions of the SPA populations for seven of the ten SCI waterbird species in 2018 and/or 2021: specifically Shelduck, Golden Plover, Grey Plover, Lapwing, Black-tailed Godwit, Redshank and Turnstone. Generally, peak counts were slightly higher in sub-sites further from the proposed Greenway route, including the peak counts recorded in 2021 for Oystercatcher, Grey Plover, Knot, Sanderling and Turnstone. Of particular note were: OVL04, in which peak counts exceeding 20% of SPA baseline populations were recorded for Oystercatcher (28.9%), Grey Plover (23.5%) and Sanderling (49.3%); and OZL08, in which peak counts exceeding 50% were recorded for Grey Plover (153.1%), Knot (59.3%) and Sanderling (72.5%), comprising the peak counts for these species recorded in any sub-site.</p>				
<p>Disturbance data collected during these field surveys in 2018 and 2021 indicate that both SCI and non-SCI waterbird species within Boyne Estuary SPA adjacent to the proposed Greenway route are already subject to disturbance events from a range of sources including pedestrians (including birdwatchers/photographers), dogs and large and small watercraft. Disturbance events were recorded in sub-sites OVL01, OVL02 and OZL05 (within the proposed Greenway route) and OZL02 and OZL03 (immediately adjacent to the proposed Greenway route). SCI species observed to be disturbed in these sub-sites comprised Shelduck, Grey Plover, Lapwing, Oystercatcher, Knot, Black-tailed Godwit and Redshank. Responses to potential sources</p>				

Boyne Estuary SPA Species of Conservation Interest (SCI)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
<p>of disturbance varied between low (i.e. no significant change in bird activity) to high (i.e. birds took flight and did not immediately return), suggesting a limited level of habituation to disturbance. Particularly strong responses were recorded to the presence of dogs.</p> <p>No disturbance during construction will occur on wintering waterbirds as the timing for works is outside the winter period (October to March). This will also avoid secondary habitat degradation. However, the dilution and assimilation factor of the estuarine environment in close proximity is the main determinant in evaluating no likelihood for significant effects.</p> <p>Based on the two observations of Little Tern fishing approximately 250m from the proposed Greenway route, and no active nests were recorded, adverse impacts on Little Tern populations due to construction disturbance are considered highly unlikely. Adoption of best practice construction methods where the proposed Greenway route nears the river channel will further minimise the potential for disturbance. Embedded mitigation includes pre-works checks for active Little Tern nests where construction works are to take place near suitable nesting habitat.</p> <p>The influence of any disturbance during operation (i.e. the distance at which disturbance effects disrupt bird behaviour or activities) will be based upon a number of influencing factors, including species, weather, tide conditions and the exact nature of the disturbance event. A literature review conducted to inform route design and the current evaluation indicated that there are studies where human recreational activities have disturbed wintering waterbirds (Liley et al., 2011). However, the critical factor in evaluating potential disturbance events on wintering waterbirds, particularly in relation to a site designated for their conservation (such as the Boyne Estuary SPA in this case) is to determine first the scale and extent of bird usage (if present) and then if disturbance sources have the potential for significant effects on the conservation status of priority species which occur. Lighting within the proposed development is to be designed sensitively (Section 6.1.2), in which lighting will be using LED sources and cowled away from potentially sensitive habitats. Current lighting design details regarding the precise location and specification of lighting is available within the Outdoor Lighting Report (Sabre Electrical Services Ltd, 2022), with indicative lighting locations agreed in consultation with the project Ecologist. The project Ecologist will continue to be consulted regarding any changes to final lighting locations to ensure adverse effects on site integrity are avoided.</p> <p>Gill et al. (2001) sought to evaluate the impacts of such disturbance on an individual species (Black-tailed Godwit) to determine if disturbance was having a population effect at a study site in the UK. The authors concluded that human disturbance adjacent to foraging areas did not influence habitat use or the distribution of birds in their study area, providing that a large extent of suitable foraging habitat distant from disturbance was available. Another study, this time at the Exe Estuary (in relation to a proposed cycle path), determined that Redshank within 25m of the cycle path were largely habituated (i.e. no longer took flight) to disturbance arising from the use of the cycle path after 10 days and had completely habituated after 20 days (Gross-Custard, 2008). These and other similar reviews indicate that waterbirds can habituate to human disturbance, and that adverse effects may not necessarily occur (especially if large expanses of foraging habitat are available, as is the case for Boyne Estuary SPA).</p> <p>To further determine if disturbance effects are likely, the literature review looked at the individual tolerances of bird species to disturbance. Flight Initiation Distances (FID) are considered to be one of the most effective metrics to determine disturbance effects upon birds (Stankowich & Blumstein, 2005). However, birds may respond to disturbance events by other, non-flight, behaviours such as increased vigilance (Fernández-Juricic et al., 2005). Minimum Approach Distances (MADs), which are a function of FIDs, are therefore a more widely used approach for establishing set-back distances (or</p>				

Boyne Estuary SPA Species of Conservation Interest (SCI)	Proposed Project Stage	Potential Source(s) of Impacts to the European Site	Possible Impact Pathway(s) to European Site	Potential Effect(s) on the European Site
<p>buffers) to limit disturbance effects around areas where birds occur and are thus considered the best available scientific technique. Livezey et al. (2016) reviewed a substantial number of studies between 2009 and 2015 where FIDs had been calculated for the species groups of interest which also occur in the Boyne Estuary SPA, including non-breeding Anseriformes (wildfowl, including Shelduck and Charadriiformes – waders including Oystercatcher, Lapwing, Golden Plover, Black-tailed Godwit and Redshank). As it offers the most comprehensive and best scientific knowledge currently available, the MADs presented in Livezey et al. (2016) were considered an appropriate reference material in evaluating potential disturbance effects.</p> <p>For context, MADs utilised in relation to impacts from pedestrians were 71.0m for Anseriformes and 42.2m in Charadriiformes. As there may be site-specific effects in relation to these distances, and as these average MADs are not solely based on the species relevant to the proposed development (but rather on a selection of species from different geographical areas), a precautionary application was used in the analysis below, with extended MADs of 100m for Shelduck and 50m for waders.</p> <p>The bespoke field data collected in 2018 and 2021 to inform this assessment found that five sub-sites within/in close proximity to the proposed Greenway route (OVL01, OVL02, OZL05, OZL02 and OZL03) contained significant proportions of the SPA populations for seven of the ten SCI waterbird species: specifically Shelduck, Golden Plover, Grey Plover, Lapwing, Black-tailed Godwit, Redshank and Turnstone. Whilst the majority of land in these sub-sites (within which these populations were recorded) is far in excess of the guideline MADs described above, additional measures (including mitigation and monitoring) would be required to ensure operational disturbance of these populations is not present at a level that risks adverse effects on these populations, and therefore adverse effects on the integrity of Boyne Estuary SPA.</p> <p>Based on the two observations of Little Tern fishing approximately 250m from the proposed Greenway route (with no active nests recorded), and the distribution of Little Tern habitat in relation to the proposed Greenway route, adverse impacts on Little Tern populations due to operational disturbance are considered highly unlikely. Mitigation measures recommended in relation to disturbance of other SCI bird species (regarding implementation of screening) would further minimise the risk of disturbance impacts on Little Tern.</p>				
<p>Appropriate Assessment Findings: Effects on the integrity of the European site can reasonably be excluded, with the exception of potential operational impacts on wintering waterbird populations. This is subject to further assessment in Stage 3 (see Section 7 of this report).</p>				

7. Stage 3: Alternative Solutions and Mitigation

The Appropriate Assessment presented in Section 6.4 of this report found that, based on the current development design (including embedded mitigation measures), adverse effects on the integrity of two European sites are still possible as a result of the proposed development, specifically:

- Boyne Coast and Estuary SAC (site code: 001957):
 - Indirect habitat loss or degradation of embryonic shifting dunes.
- Boyne Estuary SPA (site code: 004080):
 - Indirect operational disturbance of wintering waterbirds.

As such, in accordance with the methods described in Section 2.1 of this report, it is necessary to proceed to Natura Impact Assessment Stage 3. This involves identifying alternative solutions to avoid adverse effects, or if alternative solutions that would avoid such adverse effects cannot be devised, the recommendation of additional mitigation measures.

7.1 Avoidance of Impacts on Designated Habitats within Boyne Coast and Estuary SAC

As assessed in **Table 6.3**, the location of the eastern terminus of the proposed Greenway route adjacent to QI dune habitat for Boyne Coast and Estuary raises the potential for adverse impacts on the integrity of the European site. The presence of the terminus adjacent to this habitat is likely to result in increased use of this habitat by the public (e.g. for walking, picnics, dog-walking etc.). This increased use (particularly when viewed in the long-term) could potentially result in habitat degradation through sources such as trampling/erosion and dog-fouling, as well as impacts on non-designated features of nature conservation importance such as disturbance impacts on nesting birds.

In combination with the construction of Greenway terminus (to be undertaken using best practice methods as stated within the embedded mitigation for the project (see Section 6.1.2)), information signage would be erected to inform members of the public (including Greenway users) of the nature conservation value and sensitivity of these habitats, and to discourage access to areas identified by the project Ecologist as being particularly sensitive to degradation. Where signage permits users to enter this habitat, it would include instruction to keep dogs on leads to minimise potential nutrient enrichment and disturbance impacts.

In providing a designated walking route, recreational use within ecologically sensitive areas (with regard to QI habitats and SCI species) would likely be reduced, as pedestrians, cyclists and dogs (including users already frequenting these areas prior to the construction of the proposed development) may be more likely to remain within the Greenway route than stray into wider sensitive areas within these European sites. Similarly, when viewed in combination with information signage identifying the value of biodiversity features and the need for users to avoid sensitive areas, the Greenway route may discourage members of the public from straying into more sensitive areas.

In order to determine the effectiveness of these measures, and to identify if any adverse impacts are occurring, it is proposed that QI dune habitat adjacent to the terminus is subject to ongoing monitoring; specifically annual monitoring for the first three years after construction. During this monitoring a suitably experienced Ecologist would record the condition of dune habitat.

Consideration should be given to any emerging patterns in habitat condition relative to proximity to the Greenway terminus, or if there are any areas within dune habitat that are evidently being subject to more use/disturbance by the general public than prior to the construction of the Greenway route. Any particular issues (e.g. erosion, reduction in habitat extent, changes in vegetative structure towards less desirable species) would be recorded.

Based on the findings of these monitoring surveys, should it be identified that existing mitigation measures (i.e. signage) are proving insufficient in avoiding adverse impacts, additional mitigation in the form of screen planting (to provide a physical barrier to access) or fencing may be provided to minimise public access to these areas of QI habitat. These measures would be agreed with the project Ecologist and relevant statutory stakeholders including NPWS.

7.2 Avoidance of Impacts on Wintering Waterbird Populations within Boyne Estuary SPA

As assessed in **Table 6.4**, the operation of the proposed Greenway route where it passes through and in close proximity to suitable habitat within the Boyne Estuary SPA raises the potential for adverse impacts on the integrity of the European site. Appropriate Assessment was unable to reasonably conclude that significant disturbance impacts due to the increased presence of pedestrians (notably dog-walkers) and cyclists on SCI wintering waterbird species will not occur. Within the context of both short and long-term national declines in Ireland (Burke et al. 2018) for the majority of these species, and in view of the significance of the populations recorded adjacent to the proposed Greenway route relative to baseline SPA populations, adverse effects on these populations (and thus the integrity of the European site) must be avoided.

Embedded mitigation measures for the project (as described in Section 6.1.2) include provisions to minimise operational disturbance of sensitive species including birds. These include landscape planting along the northern edge of the Greenway. In addition, the boardwalk barrier is to be screened within sensitive areas to counteract visual disturbance (especially from dogs) and reduce noise transfer. Boardwalk screening would be 'full height' (c.1400mm), where there would be an absence of natural screening from tree and hedgerow planting between the Greenway and those intertidal habitats that are of particular importance to birds. The screening will be provided by fixing boardwalk running boards to the fence posts (further details are provided in the EclA report for the project). The bespoke field surveys for wintering birds undertaken in 2018 and 2021 recorded significant proportions of SPA baseline populations using all five sub-sites (as indicated in **Figure 2.1**) within (OVL01, OVL02 and OZL05) and adjacent to (OZL02 and OZL03) the proposed Greenway route. Particularly significant SCI waterbird populations were recorded using sub-sites OVL02 and OZL05. Based on these findings, half-height (c.600mm) screening to minimise operational disturbance is proposed within Zone 4 (Chainage 1810-2000), to supplement proposed hedgerow planting that would be situated to the north of the boardwalk, between it and the intertidal habitats. Full-height (c.1400mm) screening is proposed within Zone 4 (Chainage 2000-2104) and Zones 5-8 (Chainage 2270-4735) where landscape screening from tree and hedgerow planting is not proposed.

Note that, in order to avoid shading of landscape planting (which would reduce the effectiveness of planting), additional screening is not proposed in other areas where landscape planting is proposed between the Greenway and suitable bird habitat. Whilst this landscape planting will help to minimise operational disturbance, to most effectively avoid visual disturbance impacts on waterbirds, half and full height screening will be installed in the most sensitive areas (as described above).

In addition, signage outlining the conservation value of this habitat to waterbirds would be installed along boardwalk within and adjacent to these five sub-sites in order to increase public awareness. In particular, signage will specify the accepted 'code of conduct' for dogs, in line with best practice for similar greenway projects; this is especially important given that effects from off-leash dogs have been shown to be the single highest source of disturbance in similar scenarios (Liley et al., 2011).

As mentioned in Section 6.1.2 of this report, frequent post-construction monitoring would be undertaken to identify any potential adverse effects on SCI waterbird populations, and to inform any requirement for additional mitigation. This monitoring would be undertaken annually for the first three years after construction, with a minimum of six visits undertaken per winter season (i.e. between late-October and early-March inclusive, covering all five sub-sites of the SPA that are in close proximity to the proposed Greenway route (OVL01, OVL02, OZL02, OZL03 and OZL05)). The methods for these surveys should replicate those for the field surveys undertaken in 2021. During these surveys the level of disturbance from users of the Greenway would also be recorded and (if required) used to inform any additional mitigation, such as installation of additional screening, in relation to any ongoing sources of disturbance. Disturbance monitoring should take into account the possibility that birds may initially (i.e. during the early stages of operation) exhibit relatively high disturbance responses but may gradually become more habituated to disturbance sources associated with the Greenway and thus not be significantly affected in the long-term.

8. Conclusions

This Natura Impact Statement report has been prepared to in order to identify and address potential adverse impacts on the integrity of any European sites (also referred to as Natura 2000 sites) as a result of the proposed Boyne Greenway (Drogheda to Mornington) project, alone and in combination with other developments.

Of the six European sites within the potential Zone of Interest of the proposed development, Likely Significant Effects on three of these sites could not be 'screened out' during Stage 1 of the assessment process due to the presence of potential impact sources and pathways: Boyne Coast and Estuary SAC, River Boyne and River Blackwater SAC and Boyne Estuary SPA.

As such, these three sites were subject to Appropriate Assessment of potential adverse effects on site integrity, taking into account supporting information (notably bespoke field survey data for birds), embedded measures within the design of the proposed development and the specific conservation objectives for the designated features (i.e. QIs and SCIs) of these European sites. This included assessment of direct and indirect impacts during the construction and operation of the Greenway. Whilst a conclusion of no potential for significant adverse effects on integrity was reached for River Boyne and River Blackwater SAC, adverse effects on integrity could not reasonably be ruled out for Boyne Coast and Estuary SAC (in relation to indirect operational degradation of designated dune habitat) and Boyne Estuary SPA (in relation to operational disturbance of wintering waterbirds).

Based on the Appropriate Assessment described above, alternative solutions and mitigation measures are proposed for the avoidance of adverse effects on the integrity of these European sites. These include the provision of signage to highlight to users of the proposed Greenway the importance and sensitivity of the SAC habitats, particularly the dune habitat beyond the Greenway terminus at Mornington. The provision of screening along the Greenway is also proposed to minimize any potential disturbance to wintering birds using the intertidal habitats. A provision for frequent monitoring over an extended period in order to assess the effectiveness of these measures and inform any additional mitigation requirement is also proposed.

According to the process of Natura Impact Assessment described above, it is concluded that adverse effects on the integrity of European sites can reasonably be avoided providing that the embedded and additional mitigation measures outlined within this report are adhered to.

It should also be noted that in providing a designated walking route, recreational use within ecologically sensitive areas (with regard to QI habitats and SCI species) would likely be reduced, as pedestrians, cyclists and dogs (including users already frequenting these areas prior to the construction of the proposed development) may be more likely to remain within the Greenway route than stray into wider sensitive areas within these European sites. Similarly, when viewed in combination with information signage identifying the value of biodiversity features and the need for users to avoid sensitive areas, the Greenway route may discourage members of the public from straying into more sensitive areas. This could therefore result in a reduction in potential adverse effects that the European sites are already subjected to.

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Appendix A: Supporting Figures

Appendix B: Consultation Chronology and Meeting Minute

Minutes of Meeting in Knocksink Wood Education Centre 27/9/18 between Inis Consultants, Meath County Council and NPWS to discuss the Boyne Greenway

Attendees: Cormac Ross (CR), Meath County Council (MCC)
Howard Williams (HW) and Chris Cullen (CC), Inis Environmental Consultants
Linda Patton (LP), NPWS, Dept. Culture, Heritage and the Gaeltacht

Background to project

The background to the project was discussed by Howard Williams, Chris Cullen and Cormac Ross. CR outlined the current project being put forward by MCC as comprising the Boyne Greenway from just before the viaduct in Drogheda out to Mornington. The very first section of the route is in Co. Louth, however CR outlined that an agreement will be in place between Louth Co. and MCC to allow MCC to progress the project through the planning process and construction phase.

The Boyneside Trails Group/MCC had previously commenced work on a route but this was designed with no cognisance of the special conservation interests or qualifying features of Natura sites.

Meath County Council, as advised by Inis Consultants following their appointment, have modified the original route extensively following scoping and a comprehensive constraints evaluation by Inis based on Best Practice surveys to be ecologically 'fit for purpose'. CC also noted a review had been undertaken of the precedent set in other European Sites on similar projects and referred to providing examples later.

By way of background CR/CC outlined some data from a greenway/cycleway in Co. Waterford, where a peak daily figure of 5000 cyclists/pedestrians was recorded (2017), with a daily average of approximately 1100.

Ecologists input – intrinsic design

This was presented by Chris Cullen and Howard Williams.

CC/HW outlined the iterative approach undertaken from the initial scoping visit carried out by Inis in February 2018 through to the present date.

Key knowledge gaps identified in informing the optimum route iteration from an Ecological perspective were bird distribution during the winter months within adjacent estuarine areas, and the scale and nature of sensitive habitats along the route corridor.

The requirement to apply intrinsic design was also identified at an early stage in the project as the most robust approach in ensuring the avoidance of effects on Biodiversity.

As a route had already been chosen, ecological constraints were examined and the route was amended where necessary through multiple iterations in conjunction with MCC's appointed Engineering Design company (DBFL). The original route impacted on bird roosts and saltmarsh and proposed a bridge across the area known as 'the gut'. This was deemed unacceptable by Inis Environmental Consultants at an early stage and these locations are now wholly avoided.

Bird surveys to inform route selection followed the survey areas as per the conservation objectives sections for compatibility of data. Count sectors referred to were those available

from NPWS low tide counts previously conducted and which form part of the online supporting documentation to Conservation Objectives (Tierney et al. 2012), CC provided a map illustrating the count sectors.

CC noted this approach was intentional to allow for robust side by side comparison upon which to inform route selection options. CC explained that the methodology was the same in principle as the Low Tide survey programme however rather than single counts within a 2- hour window either side of the LT point, hourly counts across a 6-hour period of the tidal cycle (HT to LT, LT to HT, mid-ebb to mid-flood etc) were completed from fixed vantage points (VP's). All locations and activities of feeding roosting birds etc. was recorded in line with the Low Tide methodology. All roosts were identified and mapped on the hourly count coinciding with High Tide. Bird flocks/activity and roosts were georeferenced at 50 metre intervals extending from the Greenway. Bird surveys comprised 12 days in total.

CC provided some information on survey results such as a total of 28 species being recorded, with maximum densities of species such as Golden Plover (max 2600). Roosts were recorded intertidally, supra-tidally and terrestrially- many of these were ephemeral roosts of e.g. single birds. CC provided a sample map of results from one survey.

No significant bird populations are using the area adjacent to the greenway route however there are roosts within the distance bands out to 200m from it. CC noted that whilst obviously the more expansive count sectors where the estuary widens hold higher numbers of birds, the size of the uncovered intertidal areas at these points means birds may be at distances of >200m from the Greenway.

Mammals were surveyed using NRA and Highways Agency Best Practice methodology within a 50m buffer of the proposed greenway.

Trees were examined for bat suitability in line with Best Practice. Some trees are suitable at Drogheda Grammar School however these will be unaffected. CC noted the adherence to Best Practice in lighting etc to fully avoid effects on Bats and referred to later to be discussed intrinsic design.

No otter holts were found although otters are present throughout the estuary. CC pointed out on the map a location where some runs were found (near Flogas Ireland).

Vegetation was mapped using Fossitt classification and indicating annexed habitats. Invasive species included one plant of knotweed which was not on the route and there is sea buckthorn in the dunes. HW indicated that MCC have agreed that an Invasives Species Management Plan will be completed for the submission.

Route design and final layout

CC and HW then proceeded to run through an A1 map overview of the proposed route which outlined by colour, the differing construction methods proposed and the inherent design elements applicable to Biodiversity.

There will be no lighting during operation of sensitive sections adjacent to intertidal birds. Away from sensitive intertidal areas, lighting if required during operation will be motion sensor activated, and LED in nature (to avoid effects on Bats and Birds). Increased reflective barriers at entry and egress points will be a matter of course.

No compounds are required; only existing municipal compounds will be used during construction.

There will be an ECoW with the power to stop the works employed for the full duration of the construction period. The ECoW will be experienced in assessing bird behaviour and will monitor the construction to ensure that all intrinsic design features are applied correctly.

Construction will be during daylight hours only and will have camouflage hoarding during the wintering bird season where necessary. No works will be carried out at the inlet or any sensitive intertidal areas during the wintering bird season (October to March inclusive).

Educational information will also be part of the project to tell of the importance of the site. Most of the route will be beside the road and will be a tarmac surface and will be screened by a waist high hedge of native species to enhance Biodiversity.

In Mornington Dunes the route will be on the existing track and will have wooden boardwalk maps. Signage will indicate restricted access. The boardwalk here will be cut to match the exact size of the existing track.

Other off-road parts will have a recycled plastic boardwalk. Boardwalk will have a waist high screening board made of the same material (minimum height 600mm) to avoid noise transfer from e.g. dogs and disturbance pathways to birds.

Some research was also done of greenways in similar locations, within Natura sites in other countries. CC ran through some examples such as on Schierlonnikoog Island within the Waddenzee SPA, Terschelling Island within the Waddenzee SPA, Het Zwin SPA in the Netherlands and the River Po delta SPA where in all instance's greenways run through or immediately adjacent to designated areas for wildfowl. LP commented on the availability of data on the effects, if any, of these greenways. CC noted this.

In one part, where there is proximity to an inlet, there is no room to have the route beside the road so it will go the other side of the wall. It will be a boardwalk on stilts within the mudflats (this will also apply to any other similar location where the adjacent grass verge is non-existent and/or the boardwalk is required to go on the outer side of the roadside wall). Linda Patton was of the view this was the part most likely to result in the project screening in for AA, it will result in a potential impact on a small part of the wetlands habitat used by birds however it was explained that large aggregations of birds do not use this part of the estuary, in close proximity. She advised looking at the issue of a boardwalk, shading and birds in the S 2 S EIS and accompanying documents that was submitted to ABP. The possibility of removing infill to allow for the creation of more wetlands was also discussed as an intrinsic design measure to offset any potential loss of mudflat habitat. This offset should be greater than the potential habitat loss to affect a net gain on the SPA. HW acknowledged this, as did CR.

There was a discussion about court judgements and mitigation (i.e. Recent case law such as *People over Wind*) and whether effective loss of habitat was deemed significant. Habituation was brought up by HW and discussed briefly.

CC noted that the rationale for stilts was to allow light penetration thus not excluding birds from potential foraging areas. Disturbance effects are considered to be brief if at all given the existing source of disturbance from on-road traffic. CC also noted some of the existing disturbance sources recorded during surveys such as water vessels on the river.

There was also a discussion about a proposal to have some marram planting at habitat damaged areas at Mornington beach which Meath County Council are happy to progress as part of the project. This is an added measure to provide habitat over and above any effects from the development.

The need for an outline construction management plan to allow for a complete assessment was also discussed. This was acknowledged by CR/CC as a matter of course.

It was agreed that Linda Patton would send a standard scoping response to EclA following the meeting.

'During' and 'Post Construction' monitoring

There will be three years post construction monitoring to ensure measure the efficacy of all measures employed. A report of the findings will be submitted to NPWS at the end of this term.

CC outlined that there is a precedent for this project in the Irish context from e.g. a Greenway/Cycleway project in Wexford. This will be an important element in supporting the efficacy of the intrinsic design of the project in avoiding effects on any European Sites.

Proposed reporting

Reporting was discussed during the early portion of the meeting when the likely Part 8 application was brought up. In response to CC outlining the consideration of the iterative process that had gone into a final intrinsic design, LP queried whether Appropriate Assessment Screening would be the level of Appropriate Assessment reporting undertaken. CC acknowledged that this was currently under consideration given the intrinsic design.

During the discussion on case law CC outlined a recent case in the UK (R (Langton) v Secretary of State for Environment) wherein the judge found that integral features within a scheme can be considered at Screening (i.e. Stage 1) of the Appropriate Assessment process.

Final Minutes: Meeting on the Proposed Boyne Greenway

Location: Department of Culture, Heritage and the Gaeltacht (DCHG), 90 North King Street, Smithfield, Dublin 7, D07 N7CV. Room 2.26

Date and Time: 18 December 2019, 2.00pm – 3.30pm

Attendees:

Name:	Initials:	Role/Organisation:
Gerry Clabby	GC	Head of Ecological Assessment – NPWS
Annette Lynch	AL	Divisional Ecologist – NPWS
Kelly Muldoon	KM	Ecological Assessment Unit – NPWS
Nicholas Whyatt	NW	Senior Engineer – Meath County Council
Cormac Ross	CR	Resident Engineer – Meath County Council
Howard Williams	HW	Ecologist – Inis Environmental Consultants
Chris Cullen	CC	Ecologist – Inis Environmental Consultants
Frank Magee	FM	Senior Executive Engineer – Louth County Council
Brendan McSherry	BMCS	Heritage Officer – Louth County Council
Bill Bates	BB	Director – DBFL Consulting Engineers

Minutes:

- Welcome and Introductions:** GC welcomed all attending and introductions followed.
- Project Overview:** Inis Environmental Consultants briefly outlined the proposed scheme. Meath County Council has recently conducted a non-statutory consultation on the proposed route to invite comments from the public prior to submitting a planning application to An Bord Pleanála (ABP). GC explained that NPWS had requested an opportunity to review the scheme as part of this consultation process as representations had been made to the Department concerning the scheme. GC thanked Meath County Council for their co-operation in this matter and for attending the meeting on foot of the concerns highlighted in the Department's observations dated 13 December 2019. NPWS highlighted its support for the provision of greenways but pointed out that the Department has a duty, as a statutory consultee in the planning code and the lead Department with regard to nature conservation, to highlight nature conservation concerns when they arise. In addition, all public authorities have a duty to ensure in carrying out their functions that the objectives of the Habitats and Birds Directives are met as set out in Regulation 27 of the EC (Birds and Natural Habitats) Regulations, 2011.
- DCHG observations in relation to the proposal:** GC highlighted that the Department is solely concerned with nature conservation issues which may arise from the proposed greenway, in the context of its role as a statutory consultee in the planning code. The Department's observations are aimed at ensuring that the project is delivered in a way which minimises impacts to nature conservation interests. GC mentioned potential impacts at construction and operational phases, including the potential impacts of bringing more people to habitats

of conservation concern which are already under pressure. In addition the potential for further future development through expansion of the route, with consequent potential for impacts to designated sites needed to be considered. The consent authority for the proposed greenway is An Bord Pleanála.

On this basis GC and AL highlighted a number of issues:

- a. The Route Options Assessment Main Report provides a detailed appraisal of Section 2 of the route including Multi-Criteria Analysis (MCA), which is required under the Public Spending Code for projects between €5 million and €20 million. Sections 1 and 3 have been omitted from MCA in the detailed appraisal stage. The Department recommends that these sections are included in the MCA as set out in the observations issued by the Department because of their potential to impact European sites.

It was queried if alternative routes outside of European sites had been considered for Sections 1 and 3 of the proposed route. In preparing an EIAR reasonable alternatives need to be considered and it was suggested that the applicants should consider looking at alternative routes which avoid potential impacts to European sites as part of the EIA alternatives process. GC noted that whilst European Sites are not excluded from development, there is a need in any appropriate assessment to demonstrate that the proposal will not adversely affect the integrity of a European site or sites. This is so when there is no reasonable scientific doubt as to the absence of such effects.

There was a general discussion in relation to Section 1 of the proposed route and the proposed boardwalk structure. AL clarified a number of points of detail. GC queried if the posts for raised boardwalks would be inserted into the mudflats. CC clarified that they would be placed in the grass verge where possible but some would need to be placed in the mudflats. The structure would be 1 m above the high tide mark to allow light through to the habitat underneath. GC raised concerns about the proposal in relation to land take due to the placement of piles in the ground, the potential impact of the boardwalk on habitats due to light reduction, and the potential impact of increased footfall on birds. GC highlighted the need to ensure any appropriate assessment can conclude that the proposal would not adversely impact the integrity of a European site. GC also mentioned pertinent case law such as the Galway bypass case. CC provided a brief overview of the surveys undertaken on wintering birds to inform the iterative route selection process i.e. in line with Best Practice surveys such as the Low Tide Project. He also referred to a comment in the Department's observations on the occurrence of Annex 1 level saltmarsh along the proposed route, and queried whether this statement was based on more recent surveys than the date of the available information on the NPWS website, in SAC supporting documents.

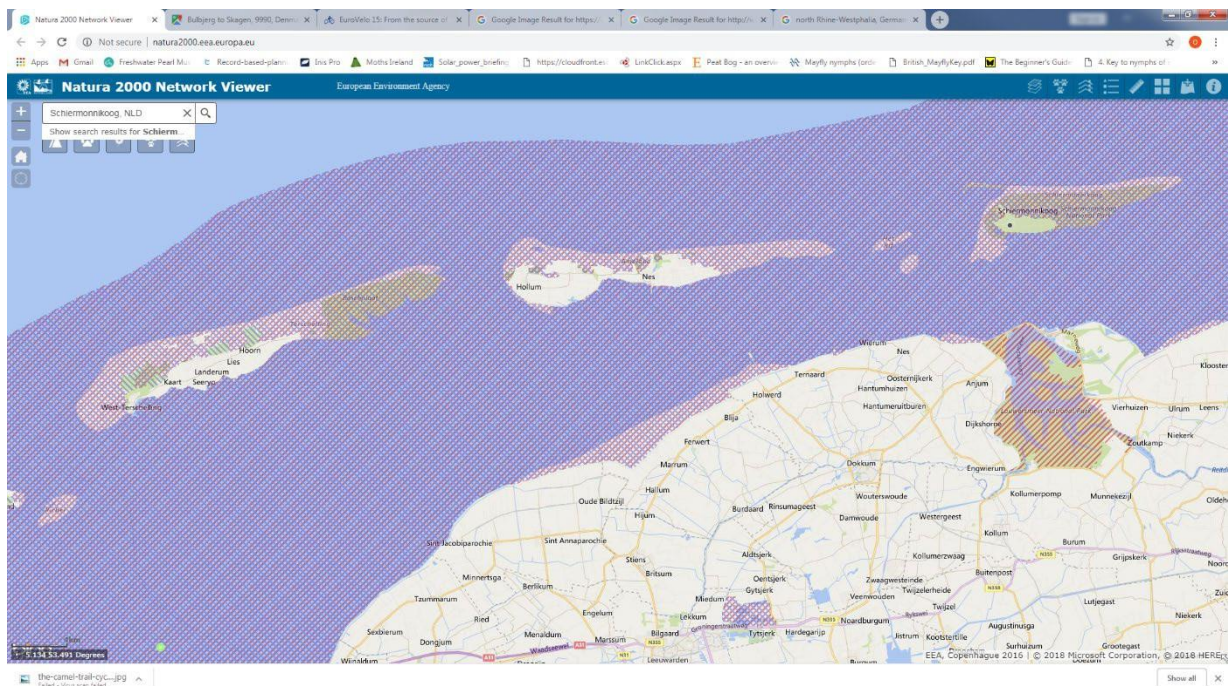
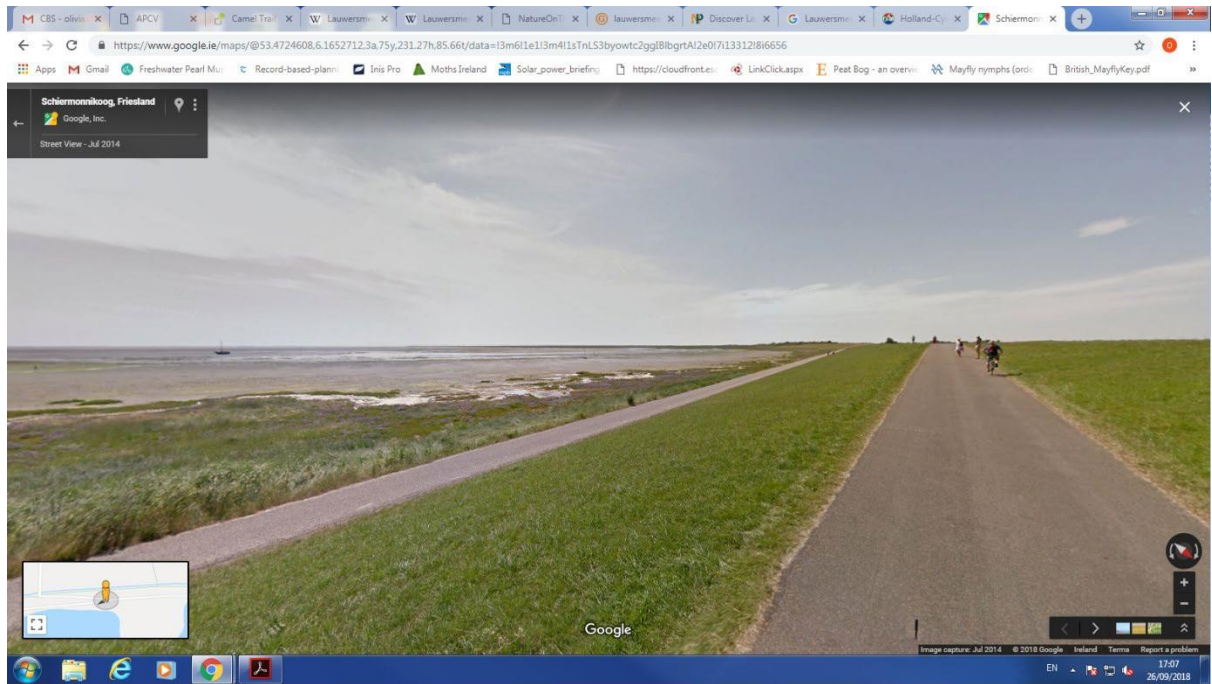
- b. GC queried the proposal to locate Section 3 of the route within a European site, given its potential negative impacts on the site including impacts to priority habitats. AL queried the end location of the greenway (Section 3 of the proposed route) in an unofficial carpark and whether there would be land take here to upgrade the carpark. CR clarified that there was no proposal no proposal to upgrade the carpark as part of this project. There was discussion in relation to potential impacts due to an increase in people coming to this area leading to increased trampling, dune walking, recreational activities etc. which could lead to habitat loss. HW suggested that this is occurring already and needed to be managed. GC acknowledged that the site needed management but suggested that the current greenway proposal may not be the best way to manage the site and could exacerbate the current situation. CC noted that the test as set out in case law suggests that habitat loss may have to be irreparable to constitute adverse effects on site integrity – and queried whether the

use of a boardwalk within sand dunes at Mornington would meet this criterion. GC queried if the proposed greenway was part of a bigger plan, to extend proposed greenway further into the European site beyond what was currently proposed, as any cumulative impact would then need to be considered. NW clarified that this was a standalone project at present but more projects could be proposed as part of the national strategy.

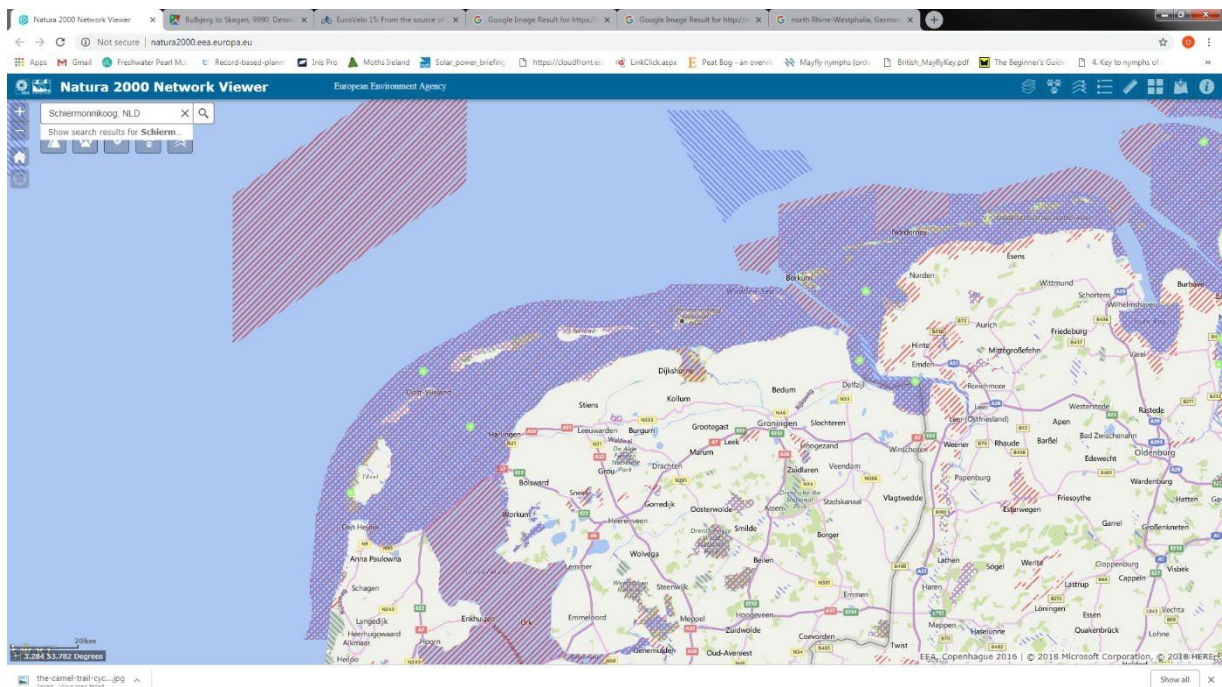
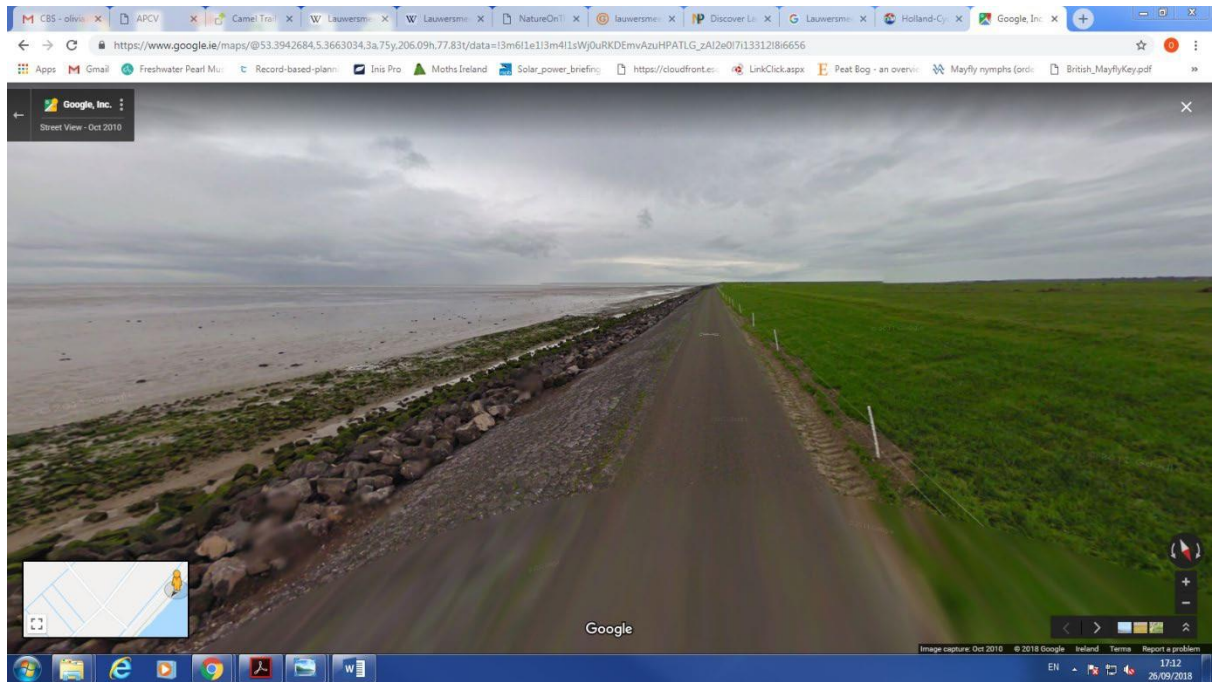
- c. FMcG, in stressing the socio economic benefits of the project, discussed the need for the area to be an amenity to draw tourism as well as a commuter corridor between Drogheda and Mornington. With particular reference to the section in Louth FMcG queried whether the section could be just within the SAC/SPA to achieve amenity value as a greenway rather than along the roadside. GC reiterated that while it was agreed that the Councils needed to pursue these objectives, NPWS highlighted the need to ensure that European sites, and biodiversity generally, were protected as part of any proposals.
 - d. GC discussed a recent ABP finding that Greenways or Cycleways constitute public roads from a project classification standpoint. (see <http://www.pleanala.ie/casenum/303499.htm>).
4. Before the meeting closed, CC queried whether there was more up to date data on Annex 1 quality salt marsh habitat along the proposed route available from NPWS. He was advised to submit a data request form through the NPWS website and all relevant information would be made available on request. The meeting then closed. CC thanked everyone for their time.

Appendix C: Examples of Greenway Projects in Europe

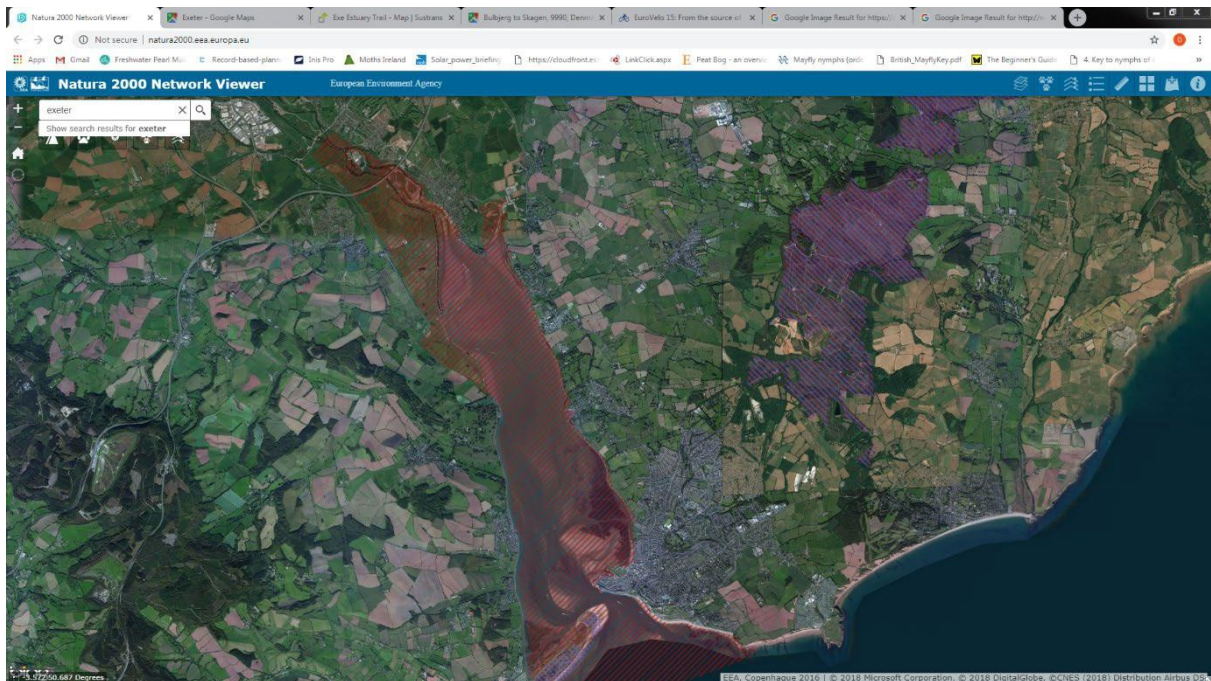
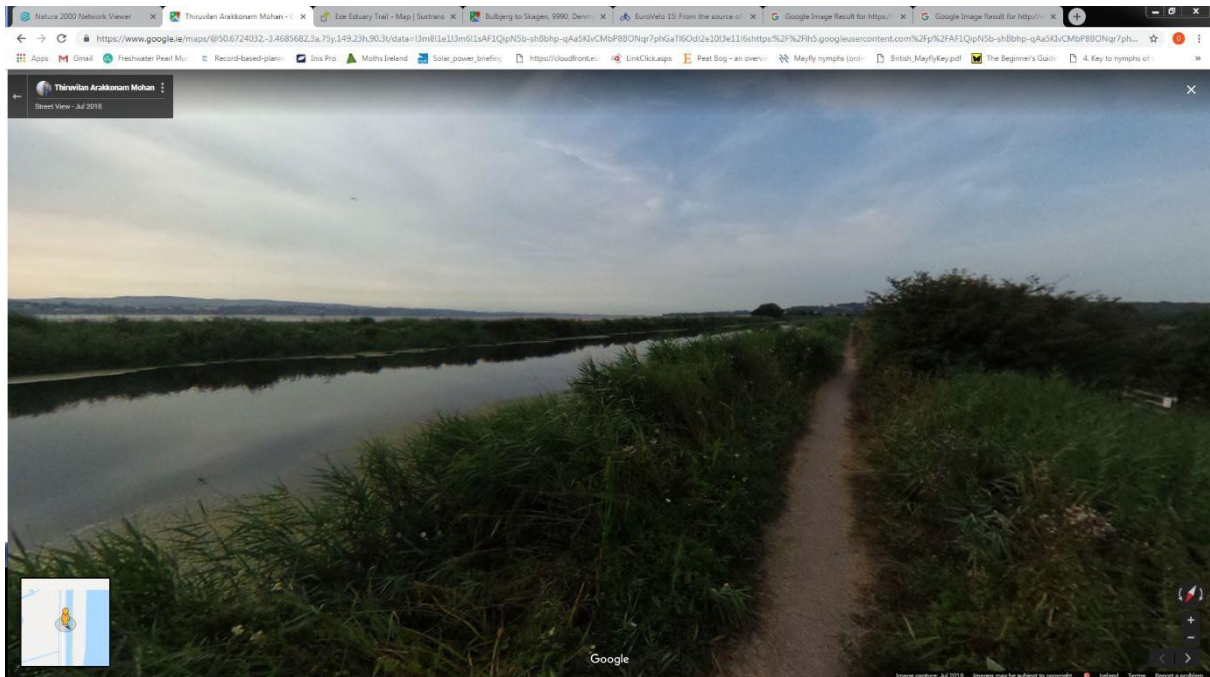
Netherlands – Schiermonnikoog Island - Waddenzee SPA/SAC



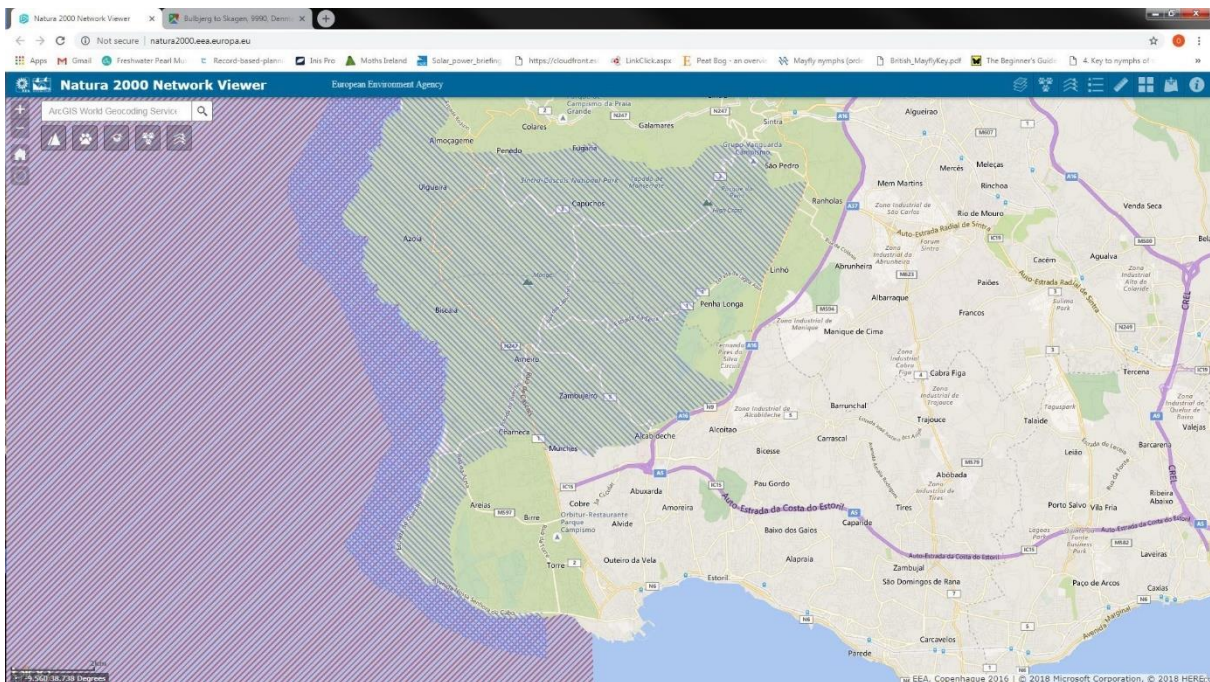
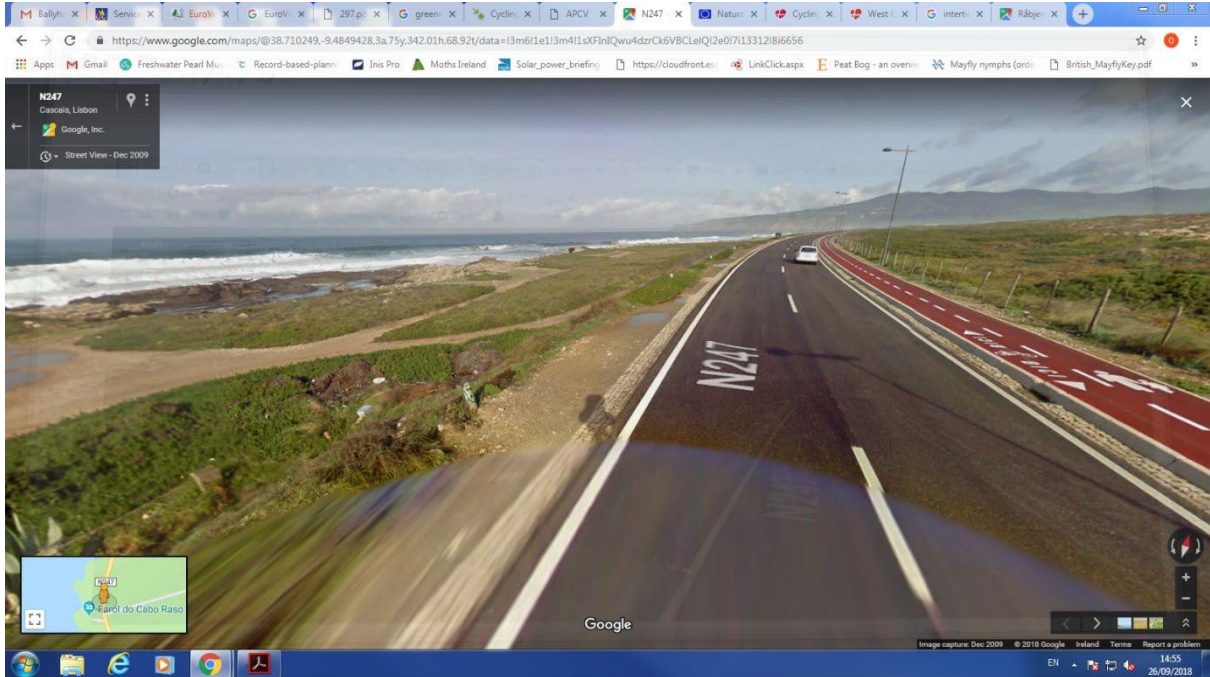
Netherlands – Terschelling Island – Waddenzee SPA; Duinen Terschelling SAC



Exeter – River Exe SPA



Portugal – Sintra/Cascais SAC



Portugal – Costa Sudoeste SAC/SPA

