DBFL Consulting Engineers

Proposed Boyne Greenway (Drogheda to Mornington) Project

Ecological Impact Assessment (EcIA) Report

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Inis

Quality Assurance

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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1. Introduction

Inís Environmental Consultants Ltd. was commissioned by DBFL Engineering Ltd. to complete an Ecological Impact Assessment (EcIA) report on behalf of Meath County Council, for the proposed 'Boyne Greenway: Drogheda to Mornington' project; specifically the development of a pedestrian and cycle access route which follows the River Boyne Estuary from east of Drogheda to the coast at Mornington. The proposal is presented in the context of the works required to deliver the project; evaluated in the context of baseline ecological survey data collected by Inís ecologists and desk study information. The potential impacts arising from the construction of the project, as well as during the operational phase are assessed with regard to key biodiversity receptors identified as likely to occur within the immediate footprint of the works and within the wider study area (i.e. the zone of influence (ZoI)). Where required, mitigation measures are proposed to avoid, reduce or remediate potential impacts in order to avoid significant impacts on sensitive ecological receptors.

This version of the EcIA 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 EcIA report is accompanied by updates to the Natura Impact Statement (NIS) report for the project (dated 17/02/2022).

Whilst it is necessary to refer to European designated sites for nature conservation (also referred to as 'Natura 2000 sites') within this EcIA report (specifically their locations, designated features of relevance to the project, and further surveys that include data pertaining to these sites), assessments with implications specifically relating to European sites (including bespoke surveys for these sites and mitigation and monitoring recommendations specifically to avoid impacts on these sites) are addressed within the NIS report (Inís, 2022).

1.1. Description of the Proposed Development

The proposed design comprises a pedestrian and cycle route along the Boyne Greenway: Drogheda to Mornington route corridor (a minimum of 4 metre (m) wide cycle and pedestrian path) which will provide a safe, traffic-free environment for tourists and local users to cycle or walk adjacent to the Boyne river, estuary and coast, extending from east of Drogheda (Ship Street, which is located adjacent to the railway viaduct Belfast - Dublin line) to Mornington, Co. Meath.

The proposed Boyne Greenway route generally follows the existing R150/R151 Regional Road, to ensure that open views to the Boyne Estuary are retained where possible and maximise the benefits of the greenway. A significant portion of the route falls within the boundary of the Boyne Estuary Special Protection Area (SPA) and Boyne Coast and Estuary Special Area of Conservation (SAC).

The proposed route for the Boyne Greenway is approximately 5.9 km in length, with approximately 4.1km of the route directly alongside the Regional Road, and 1.8km away from the Regional Road to ensure both a safe continuation of the route and the retention of the views across the Boyne Estuary (**Figure 1.1**).

There are a number of constraints and opportunities, both natural (i.e. existing natural environment) and physical (the built environment), which constrain route options for the proposed scheme within the defined study area. These include:

- River Boyne;
- Boyne Estuary SPA and the Boyne Coast and Estuary SAC;

- Existing and committed future development along the route;
- Existing monuments and protected structures along the route such as Mornington Bridge;
- Mature Trees and other natural features along the Marsh Road (R150) and Mornington Road (R151);
- Road alignment along the Marsh Road (R150) and Mornington Road (R151);
- The need to maintain traffic flow for access to local amenities;
- Land ownership; and
- Environmental impacts and engineering constraints such as steep topography, frequent watercourse crossings, and potential flooding.

Sections of the proposed Greenway route overlap or run adjacent to the boundaries of the Boyne Estuary Special Protection Area (SPA). The Boyne Estuary in general is the second most important estuary for wintering birds on the Louth-Meath coastline.

Sections of the proposed Greenway route also overlap or run adjacent to the boundaries of the Boyne Coast and Estuary Special Area of Conservation (SAC), a 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. The site is designated due to the presence of the following habitats: Estuaries, Tidal Mudflats and Sandflats, Annual vegetation of drift lines, Salicornia Mud, Atlantic Salt Meadows, Embryonic Shifting Dunes, Marram Dunes (White Dunes), Fixed Dunes (Grey Dunes).

The western portion of the proposed Greenway lies due south and within close proximity of the River Boyne and River Blackwater SAC. This designated site includes a number of habitats and species listed on Annex I/II of the EU Habitats Directive, including: alkaline fens, alluvial forests, river lamprey, Atlantic salmon and otter.

Further details regarding the effects of the proposed Greenway on European sites and their Qualifying Interests (QI) and Special Conservation Interests (SCI) are provided in the NIS report (Inís, 2022).

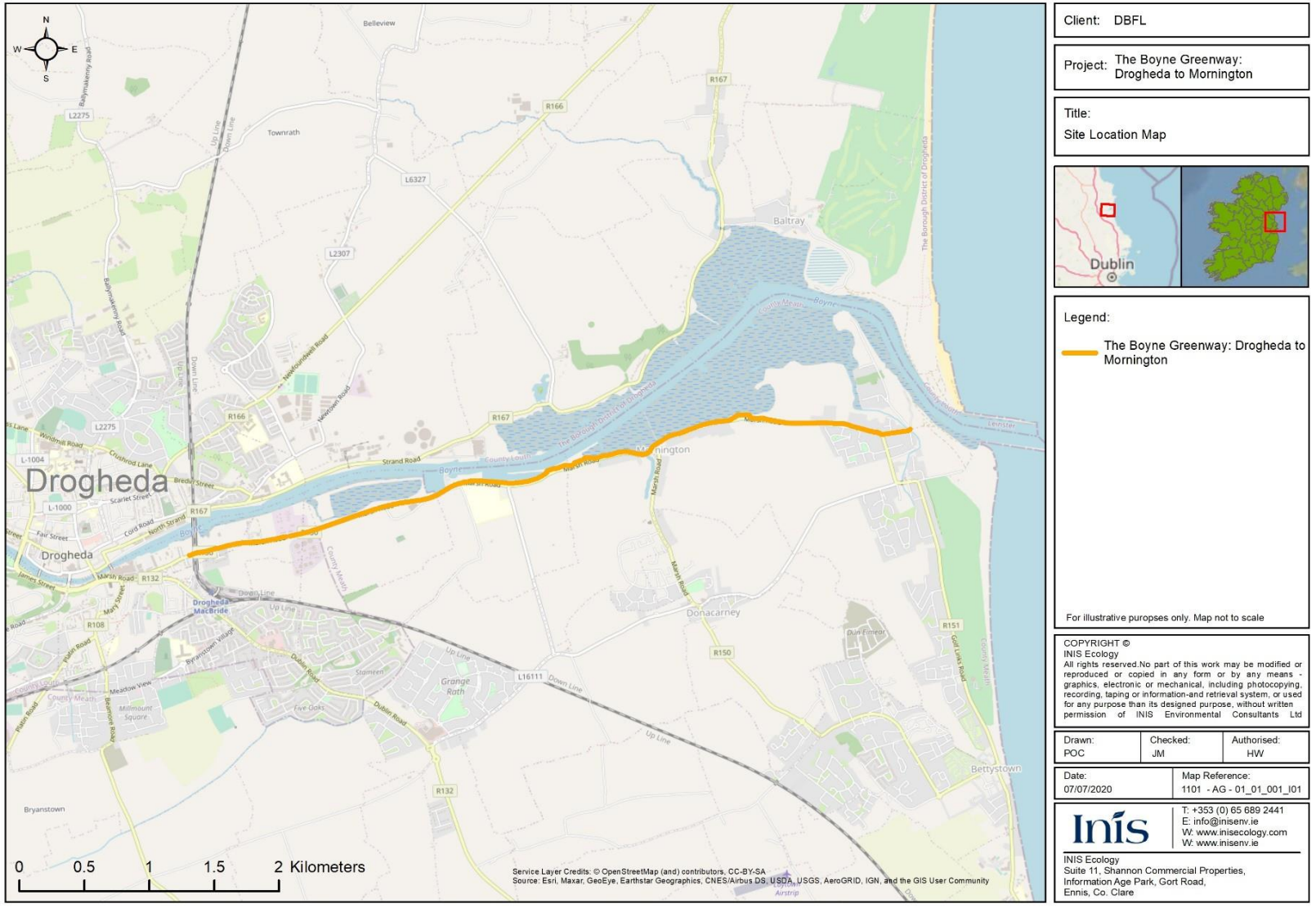

Figure 1.1: Location of the proposed Boyne Greenway Drogheda to Mornington route.

1.2. Proposed Works

1.2.1. Overview

The proposed Boyne Greenway will be constructed using two different methodologies, selected according to the sensitivities of the landscape and environment requirements encountered within the areas crossed by the route:

1. Construction directly alongside, or within very close proximity of, the regional road within an area of existing roadside verge; and

2. Construction significantly away from the roadside and/or within the intertidal zone/SPA/ SAC.

Each of the above requirements is discussed below, providing an overview of the proposals and measures intrinsic to project design which aim to minimise significant impacts on ecological receptors.

1.2.2. Greenway Construction Alongside Road

Approximately 4.1km of the proposed Greenway route will be constructed alongside the road or very close to the road edge. Given the location, access and low maintenance requirements, robust construction forms are preferred. Therefore, bituminous construction in accordance with the recommendations of the TII Design Manual for Roads and Bridges (TII DMRB) (TII, 2013) is considered the most appropriate method. With this proposed form of construction, verge vegetation would be cleared with limited additional excavation. The pavement will be formed by placing imported granular sub-base material on a geotextile separator and finished with approximately 100mm of bituminous surfacing in accordance with the TII DMRB (TII, 2013). The width of the Greenway will be limited to 4m and restrained on each side with a kerb. Some similar greenway examples are provided in **Figure 1.2** for illustration.

Figure 1.2: Examples of greenway alongside road (Holland and Ireland).

As part of the proposed construction methodology, the following proposed measures will be employed to ensure minimal impact during construction of the Greenway:

a. Works will be restricted to outside the period of October to-March at all sensitive sites where disturbance is an issue (i.e within the SAC/SPA or immediately adjacent). This timing restriction will not apply to public road sections;

b. Construction works will be limited to daylight hours to minimise effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowled away from sensitive habitats, with no light spillage, in line with best practice for bats. Only existing municipal compound areas will be utilised, and security lighting will be sensor-based at these locations;

c. If, on the advice of the onsite ecologist, further protection is required, a suitable camouflage barrier netting will be utilised. Camouflage netting will be utilised on all roadside works outside the period March to September to minimise noise transfer and visual intrusion, as a matter of course;

d. Regular monitoring of the works will be provided by a suitably qualified Ecological Clerk of Works (ECoW) with authority to 'Stop the Works'. The representative will have knowledge of working on construction programmes within SAC and SPA areas where potentially sensitive features (e.g. significant bird populations) exist;

e. The following additional measures are proposed to limit the impact of the Greenway in operation (discussed further in Section 5 of this report):

    1. Landscape planting is incorporated into the development design alongside the proposed Greenway route, using locally sourced native plant species of known biodiversity value. This will minimise visual impacts from the development, reduce the level of disturbance of adjacent habitats and species, and provide biodiversity enhancements for a range of species;

    2. Operational lighting, where necessary for security and safety, will be LED based (to avoid emission of UV light) and will be cowled away from estuarine habitats with no light spillage 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, such as bollards and gates, shall have reflectorised strips in line with best practice guidance. No lighting will be provided where birds forage within 50m of the cycle path to avoid any disturbance. Detailed lighting design information is provided within the Outdoor Lighting Report (Sabre Electrical Services Ltd, 2022); and

    3. To minimise disturbance impacts (particularly from dogs) and avoid noise transfer to birds and other species which may occur, the boardwalk barrier will be screened to full height (~1400 mm) in particularly sensitive locations (further details are provided in the NIS report for the project). The screening will be provided by fixing boardwalk running boards to the fence posts.

1.2.3. Greenway Construction Intertidal Zones/SPA/SAC

There is approximately 2.4km of proposed Greenway within the SPA/SAC areas, approximately 610m of which is within the intertidal zone. In these areas it is proposed that the Greenway be elevated onto a boardwalk structure to minimise impacts, as agreed provisionally with the

ecological consultant. The boardwalk will be constructed at a minimum level defined within the flood risk assessment report (3.54m above ordnance datum). This is approximately 1.5m above the present day highest astronomical tide level and will mitigate the risk of flood throughout the design life of the boardwalk section of greenway. 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. Further details are provided below.

Proprietary Recycled Plastic Elements

A section of Phase 1 of the Boyne Greenway has already been constructed using this form (see **Figure 1.3**). It involves installing recycled plastic components much like forming a similar timber structure. Long column type elements, typically 100mm by 100mm square, are installed into the underlying ground at regular intervals, acting as mini piles. They are installed to a depth to suit the underlying geology and provide the required level of load capacity. The running surface is then created by bolting transverse and longitudinal beams together. Running boards are then fixed to the beams to provide the surface. As the boardwalk is elevated, a barrier will be necessary. This is fixed to the elevated structure and uses similar recycled plastic components.

The following measures will be employed to minimise impacts impact during construction of the Greenway in areas identified as being most ecologically sensitive:

a. The works will be scheduled to avoid the winter months between October and March when most of the particularly sensitive species likely to be affected will be present (notably wintering waterbirds). Therefore, with the exception to selected activities such as vegetation removal that would likely impact other protected species, such as nesting birds, all works will be undertaken between March and September;

b. The timing of the works and the measures intrinsic to the design, outlined above, will be sufficient to avoid significant effects. Nevertheless, if on the advice of the onsite ecologist further protection is required, then a suitable camouflage barrier netting will be utilised;

c. Construction works will be limited to daylight hours to minimise effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowled away from sensitive habitats, with no light spillage, in line with best practice for bats. Existing municipal compound areas will be utilised with sensor-based security lighting only;

d. Construction works will be limited to daylight hours to minimise effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowled away from sensitive habitats, with no light spillage, in line with best practice for bats. Existing municipal compound areas will be utilised with sensor-based security lighting only;

e. The mini piling will be installed using reduced noise equipment in accordance with best practice; and

f. Regular monitoring of the works will be provided by a suitably qualified ECoW with authority to 'Stop the Works'. The representative will have knowledge of working on construction programmes within SAC and SPA areas where significant bird populations exist.

Figure 1.3: Boyne Greenway upstream recycle plastic elements construction.

1.2.4. Greenway Construction Bridge Sections

Bridge sections will be required at two locations along the route of the Greenway to provide 20m clear spans. The bridging sections are over a stream (steel arch bridge - **Figure 1.4**) and surface water outfall (precast concrete beams - **Figure 1.4**).

The proposed steel arch bridge will be a prefabricated steel arch bridge placed on precast concrete cross beams on precast concrete piles (see **Figure 1.5**). This construction form was agreed through discussions with the architectural heritage department of Meath County Council to limit impact on the existing stone arch bridge structure and not detract from the bridge visually.

The proposed precast concrete beams bridge will be a simpler option, formed by providing a prestressed precast concrete beam resting on a precast concrete ground beam on precast concrete piles. The deck will be partially precast with in-situ finished surface (see **Figure 1.6**).

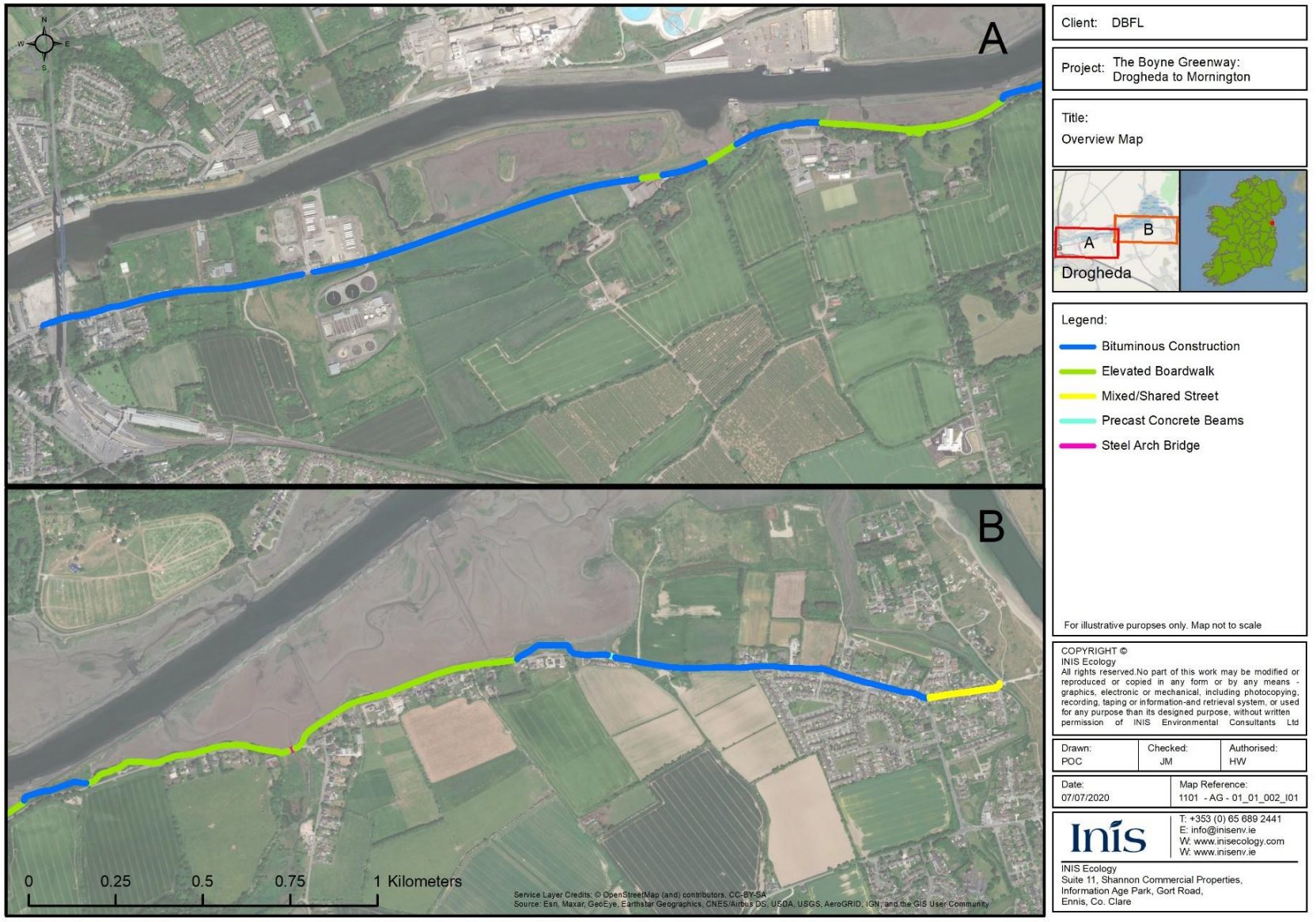

Figure 1.4: Construction methods for the proposed Boyne Greenway.

Figure 1.5: Typical prefabricated steel arch bridges.

Figure 1.6: Typical precast concrete bridges.

1.2.5. Monitoring Commitment

The effectiveness of the intrinsic design measures will be monitored during construction and post construction for three years. Monitoring during construction will be undertaken by a suitably qualified ECoW with a 'Stop Works' authority.

Monitoring in relation to the integrity of designated features for European sites is detailed within the NIS report for the project (Inis, 2022).

2. Approach

2.1. Legislative Context and Relevant Guidelines

National and European legislation and policy relevant to undertaking ecological assessment have been utilised in the development of this report. The basis of this report is to accompany a Planning application by DBFL engineering for the proposed Boyne Greenway: Drogheda to Mornington Project, Drogheda, Co. Meath, and as such the project proposal comprises a planning application under the Planning and Development (Amendment) Act (2000). In the compilation of this report, cognisance is taken of relevant and appropriate legislation and guidance as follows:

- Wildlife Act, 1976 and Wildlife (Amendment) Act (2000) including all amendments. In this document, the legislation is referred to collectively as the Wildlife Acts;
- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011; hereafter referred to as the Birds and Habitats Regulations);
- EC Birds Directive 2009/147/EEC;
- EC Habitats Directive 92/43/EEC;
- Convention on the conservation of European wildlife and natural habitats Bern Convention);
- European Union EIA Directive 2014/52/EU;
- European Union (Environmental Impact Assessment) (Planning and Development) Regulations 2014 (S.I. No. 543/2014);
- Flora (Protection) Order, 2015;
- Planning and Development Act (2000) including all amendments;
- Planning and Development (Amendment) Act 2010; and
- National Biodiversity Action Plan, 2017-2021.

The following guidelines were included in the evaluation of biodiversity receptors (flora and fauna) in relation to the proposed development works:

- Guidelines on The Information to be Contained in Environmental Impact Assessment Reports Draft) (EPA, 2017);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009);
- Best Practice Guidance for Habitat Survey and Mapping (Smith, O'Donoghue, et al., 2011); and
- A Guide to Habitats in Ireland (Fossitt, 2000).

In particular, reference was made to Objective 1 of the National Biodiversity Action Plan 2017-2021. This objective aims to tackle the issue of biodiversity loss in Ireland in order to conserve biodiversity.

2.2. Desk Study

The ecological desktop study evaluated the magnitude, scale and extent of the proposed project and delineated a buffer zone to comprise the zone of influence (ZoI) of the proposed works in the context of the immediate footprint and adjacent areas, as well as the wider landscape and biodiversity receptors. On this basis the ZoI for the project was determined to be variable, depending on the receptors identified within the study area and their ecological sensitivities in terms of direct and indirect disturbance to species and their supporting habitats. The desk study

incorporated a review of the following information sources available online and within the public domain:

- Records of rare and protected flora and fauna including those obtained from the NPWS website[1] presented in NPWS reporting, and the National Biodiversity Data Centre (NBDC) website[2];
- National Parks and Wildlife Service (NPWS) designated site mapping, site synopses (Natura 2000 data form) and conservation objectives for European Sites[3] with the identification of potential pathways from the proposed development
- Online mapping and aerial/satellite imagery (www.google.ie; www.bing.com/maps) in order to determine broad habitats that occur within the study area;
- Waterbird data (including data for SCI species for relevant European sites) from the Irish Wetland Bird Survey (I-WeBS);
- Water Framework Directive website[4] and EPA Envision database (https://gis.epa.ie/EPAMaps/); and
- Any other relevant ecological reports and literature (published scientific literature and 'grey' literature)[5].

2.3. Field Survey

2.3.1. Habitats and Volant Mammals

An ecological walkover survey of the proposed Greenway route was completed in April 2018. This was within the optimal mammal field survey season but outside the optimal botanical survey season. The survey was undertaken in accordance with Smith et al. (2011) and habitats within 50m of the route were classified according to Fossitt (2000). 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 Documents[6]. Determinations were made during the field survey with regard to saltmarsh communities aligning with Annex I habitats listed as QIs for the site 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, particularly in relation to bats.

2.3.2. Non-volant Mammals

[1] Available at www.npws.ie/. Accessed in May 2020.

[2] Available at https://maps.biodiversityireland.ie/Map. Accessed in May 2020.

[3] Available at https://www.npws.ie/protected-sites. Accessed in May 2020.

[4] Available at http://www.wfdireland.ie/wfd-more.html. Accessed in May 2020.

[5] I-WeBS data for Boyne Estuary SPA were also used when informing assessment relating to wintering birds, presented in the NIS report.

[6] Available at https://www.npws.ie/protected-sites/sac/001957. Accessed in May 2020.

A mammal survey was completed of the lands within 50m of the route, with specific searches for field signs indicating the presence of otter (slides, spraints, couches, prints and holts) and badger (pathways, hairs, latrines, snuffle holes, setts, and prints). If applicable (e.g. where evidence of badger activity was high) searches extended outside of this 50m buffer.

2.3.3. Birds

Initial scoping and consultation (including consultation with NPWS) highlighted the requirement for any route design and later evaluation to take cognisance of interaction with waterbird populations along the route; particularly regarding SPA designated waterbird populations for Boyne Estuary SPA and River Boyne and River Blackwater SPA. As such, available desk data were reviewed and bespoke field data were gathered by Inís Environmental Consultants between 2018 and 2021.

Full methods and results from these bird surveys are detailed within the NIS report for the project. In summary, these field surveys undertaken by Inís Environmental Consultants (for the areas indicated in **Figure 2.1**) comprised the following:

- Wintering waterbird surveys within/in close proximity to Boyne Estuary SPA in March 2018;
- Wintering waterbird surveys within/in close proximity to Boyne Estuary SPA in January to March and October to December 2021;
- Little tern surveys (focusing on breeding and foraging activity) within/in close proximity to Boyne Estuary SPA in April to September 2021; and,
- Kingfisher surveys (focusing on breeding activity) in close proximity to River Boyne and River Blackwater SPA in March to July 2021.

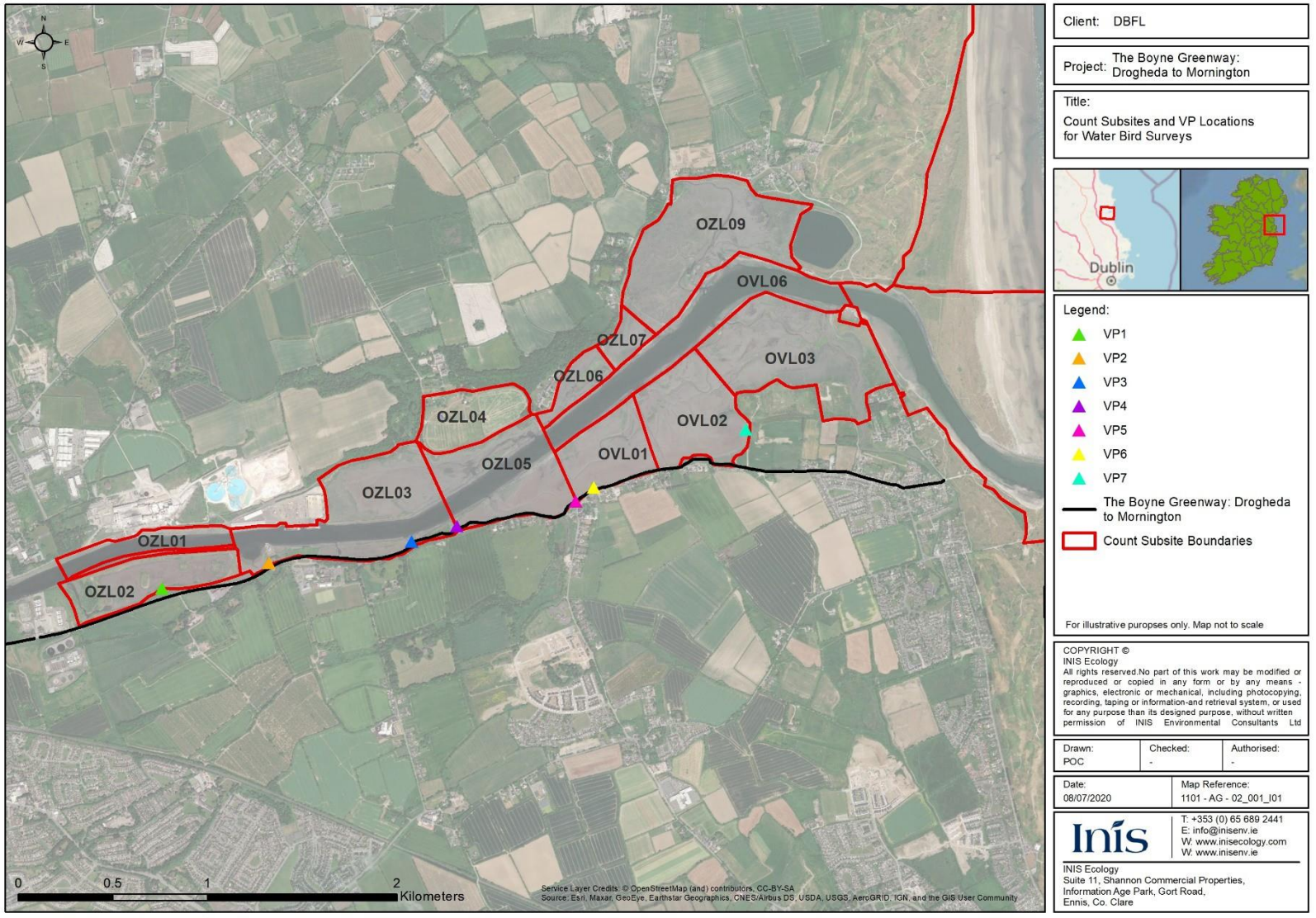

Figure 2.1: Sub-site and Vantage Point locations for waterbird surveys of Boyne Estuary SPA.

3. Results

3.1. Desk Study

3.1.1. Designated Sites

Given the scale and nature of the proposed works, a zone of influence of 15km has been identified for evaluation of potential impacts from this project on European Sites, based on standard guidance (DoEHLG, 2010). From a review of the NPWS protected sites data[7] there are six designated European sites for nature conservation within a 15km radius of the proposed works area:

- 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 Natura 2000 sites are indicated in **Figure 3.1.** Details on the designated features of these sites, potential impacts on these sites, and required mitigation and monitoring are provided in the NIS report for the project (Inis, 2022).

Regarding national statutory designated sites for nature conservation, it is noted that the Boyne Coast and Estuary SAC was previously designated as a proposed Natural Heritage Area (pNHA). However, the ecological sensitivities of this national designation have been subsumed into the SAC designation as a European site within the Natura 2000 network. On this basis, there are no additional nationally designated conservation areas within the study area. As such, all designations relating to ecological receptors are included within the European sites (SAC/SPA) listed above.

[7] Available at https://www.npws.ie/map s-and- data. Accessed in May 2020.

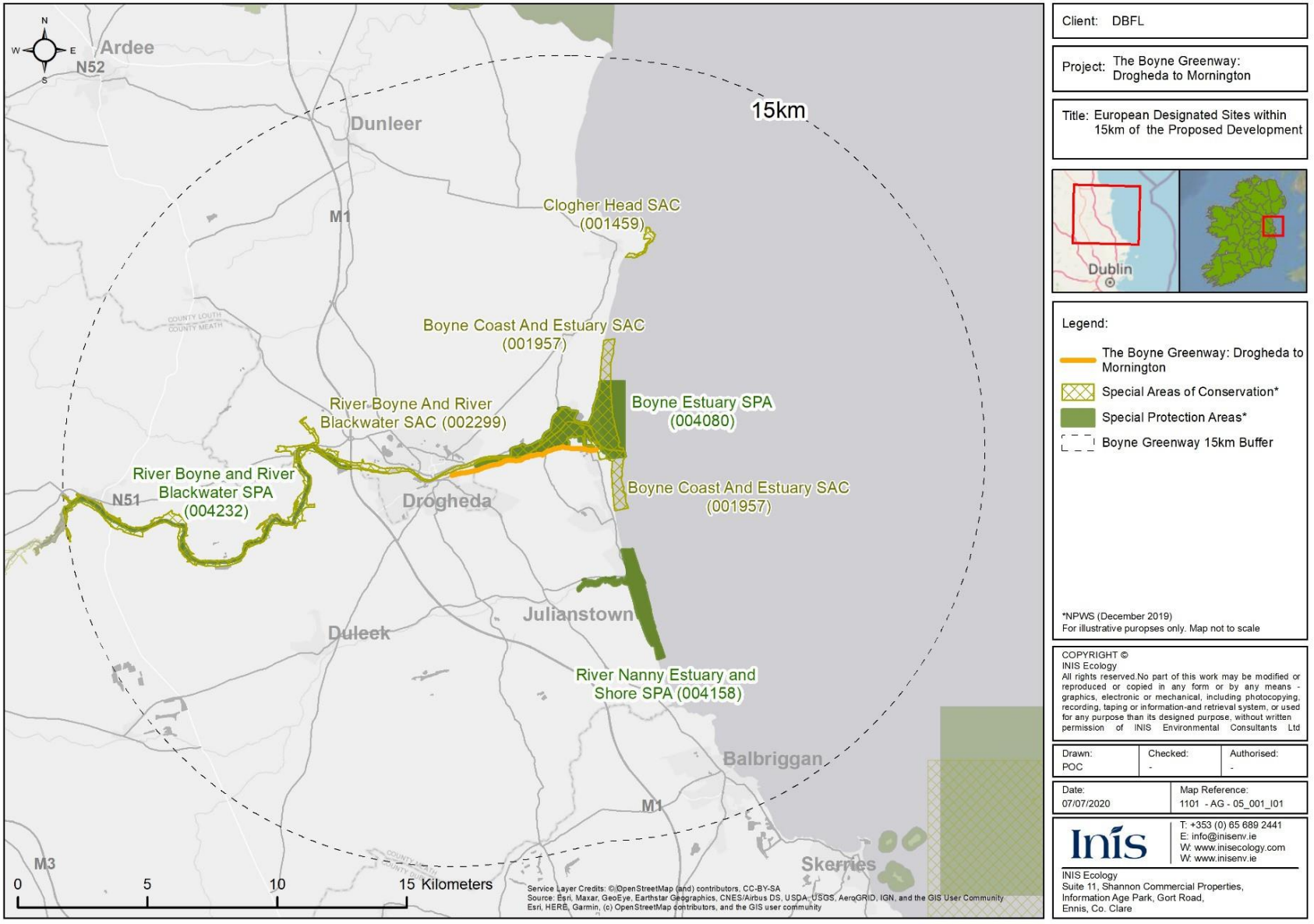

Figure 3.1: Natura 2000 sites within a 15km radius of the proposed Boyne Greenway.

3.1.2. Terrestrial Biodiversity

Habitats and Flora

An online search was undertaken of data contained in the National Biodiversity Data Centre (NBDC) records base[8]. Data from an area of 2km surrounding the proposed Greenway route were analysed for records of terrestrial flora and fauna. This radius was considered to incorporate the extent of local ecological interests potentially occurring within the ZoI of the project. Five 2km^2 grid squares were searched to cover the linear extent of the proposed Greenway route. This desk-based review included a wider study area than the field survey, which was focused on the footprint of the proposed works and potential indirect effects associated with the construction and operation of the project.

A single record of the endangered moss species Pointed Beard-moss (*Didymodon acutus*) was identified from the northern side of the estuary, approximately 1km from the proposed route. The near-threatened moss Side-fruited Crisp-moss (*Pleurochaete squarrosa*) has also been recorded within the 100m^2 grid squares that are located adjacent to the proposed Greenway route.

Invasive Species

Based on existing records, there are seven locations of Japanese Knotweed (*Reynoutria japonica*) to the west of the viaduct in Drogheda town, occurring mainly within housing estates in the Drogheda area, outside of the proposed route 50m buffer zone. Japanese knotweed is classed as a high impact invasive species and is listed on the Third Schedule of the Birds and Natural Habitats Regulations (2011) and is subject to control and management requirements.

There are single records of Common Cord-grass from 2014 (*Spartina anglica*), Giant Hogweed (*Heracleum mantegazzianum*) and *Rhododendron ponticum* within 2km of the proposed Greenway route. These species are high impact species and are subject to control under the Birds and Natural Habitats Regulations (2011). There is a single record of Sea-Buckthorn, which is a medium impact invasive species listed on the third schedule of the Birds and Natural Regulations (2011) and is therefore subject to control and management. There is one record of Butterfly-bush (*Buddleja davidii*), six records of Sycamore (*Acer pseudoplatanus*) and one record of Japanese Rose within 2km of the proposed Greenway route. These species are classed as medium impact invasive and are not listed on the third Schedule of the Birds and Natural Habitats Regulations (2011) and thus are not subject to control and management requirements. There is a record of Cherry Laurel (*Prunus laurocerasus*) within the study area from 2005. This species is classed as 'high impact'; however, it is not listed on the Birds and Natural Habitats Regulations (2011) and thus is not subject to control and management requirements.

Fauna

Mammals

The NBDC data records for the study area were evaluated for the grid squares overlapping the proposed route corridor. In total, observations within the study area numbered 13 for Daubenton's Bat (*Myotis daubentonii*), one for Brown Long-eared Bat (*Plecotus auritus*), three for

[8] Available at http://www.biodiversityireland.ie/. Accessed in May 2020.

Lesser Noctule (*Nyctalus leisleri*), five for Pipistrelle spp. and seven for Soprano Pipistrelle (*Pipistrellus pygmaeus*). All bat species in Ireland are protected under the Annex IV of the EU Habitats Directive (1992) and the Wildlife Act (2000).

There are eight records of Badger (*Meles meles*) and 20 records of Hedgehog (*Erinaceus europaeus*) within the study area; both species are protected under the Wildlife (Amendment) Act. There are 13 records of Otter (*Lutra lutra*); 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. There is a single record of Irish Hare (*Lepus timidus ssp. hibernicus*) within the study area from 2009; this species is also protected under the Wildlife Act (2000).

There are three records of Harbour Seal (*Phoca vitulina*) within the study area, this species is listed on Annex II and Annex V of the European Habitats Directive. Single records of Common Dolphin (*Delphinus delphis*) and Striped Dolphin (*Stenella coeruleoalba*) were identified on the northern side of the estuary. All marine cetacean species are designated for conservation under Annex IV of the EU Habitats Directive as well as the Wildlife Act.

There are ten records of Grey Squirrel (*Sciurus carolinensis*), which is a species listed as a high impact invasive and is subject to control and management requirements. There are six records of Rabbit (*Oryctolagus cuniculus*) within 2 km of the proposed Greenway route, which is a medium impact invasive species. There are two records of Brown Rat (*Rattus norvegicus*) with the study area, which is a species listed as a high impact invasive but is not subject to control and management on the mainland under the Birds and Natural Habitats Regulations (2011).

Birds

A search of bird records held by the NBDC within the 10km grid square within which the proposed Greenway route occurs was undertaken. Bird species recorded are presented in **Table 3.1** below. These species are typically associated with the coastal areas, woodland and agricultural land. All bird species in Ireland are protected under the Wildlife (Amendment) Act 2000, with additional conservation designation afforded for species listed on Annex I of the EC Birds Directive (2009), with further species listed on Annex II and Annex III of this Directive. In Ireland, Birdwatch Ireland and the Royal Society for the Protection of Birds (RSPB NI) publish the Birds of Conservation Concern in Ireland (BoCCI) list (Colhoun & Cummins, 2013) of priority bird species for conservation action on the island of Ireland. This categorises birds which breed and/or winter in Ireland as Red, Amber and Green, based on the conservation status of the bird species and hence conservation priority.

Table 3.1: Records of birds of conservation concern for the wider study area.

Species	Date of Record	Conservation Designation	
		Birds Directive	BoCCI
Arctic Tern (*Sterna paradisaea*)	31/12/2001	Annex I	Amber
Barn Owl (*Tyto alba*)	31/12/2011		Red
Barn Swallow (*Hirundo rustica*)	12/06/2017		Amber

Species	Date of Record	Conservation Designation	
		Birds Directive	BoCCI
Bar-tailed Godwit (*Limosa lapponica*)	31/12/2011	Annex I	Amber
Black-headed Gull (*Larus ridibundus*)	12/06/2017		Red
Black-legged Kittiwake (*Rissa tridactyla*)	31/12/2001		Amber
Black-tailed Godwit (*Limosa limosa*)	31/12/2011		Amber
Brent Goose (Branta bernicla)	04/12/2017	Annex II	Amber
Common Goldeneye (*Bucephala clangula*)	31/12/2011	Annex II	Red
Common Grasshopper Warbler (*Locustella naevia*)	31/07/1972		Amber
Common Greenshank (*Tringa nebularia*)	04/12/2017		Amber
Common Guillemot (*Uria aalge*)	05/08/1998		Amber
Common Gull (*Larus canus*)	31/12/2011		Amber
Common Kestrel (*Falco tinnunculus*)	31/12/2011		Amber
Common Kingfisher (*Alcedo atthis*)	05/09/2016	Annex I	Amber
Common Linnet (Linaria cannabina)	04/12/2017		Amber
Common Pochard (*Aythya ferina*)	31/12/2001	Annex II/III	Amber
Common Redshank (*Tringa totanus*)	31/12/2011		Red
Common Sandpiper (*Actitis hypoleucos*)	31/12/2001		Amber
Common Scoter (*Melanitta nigra*)	31/12/2011	Annex II/III	Red
Common Shelduck (*Tadorna tadorna*)	12/06/2017		Amber
Common Tern (*Sterna hirundo*)	31/12/2009	Annex I	Amber
Corn Crake (*Crex crex*)	31/07/1972	Annex I	Red
Dunlin (Calidris alpina)	31/12/2011	Annex I	Amber
Eurasian Curlew (*Numenius arquata*)	04/12/2017	Annex II	Red
Eurasian Oystercatcher (*Haematopus ostralegus*)	04/12/2017		Amber
Eurasian Teal (*Anas crecca*)	31/12/2011	Annex II/III	Amber

Species	Date of Record	Conservation Designation	
		Birds Directive	BoCCI
Eurasian Tree Sparrow (*Passer montanus*)	31/12/2011		Amber
Eurasian Wigeon (*Mareca penelope*)	04/12/2017	Annex II/III	Amber
Eurasian Woodcock *(Scolopax rusticola*)	31/12/2011	Annex II/III	Amber
European Golden Plover (*Pluvialis apricaria*)	31/12/2011	Annex II/III	Red
European Shag (Phalacrocorax aristotelis)	12/06/2017		Amber
Gadwall (Mareca strepera)	31/12/2011	Annex II	Amber
Goosander (Mergus merganser)	31/12/2011	Annex II	Amber
Great Black-backed Gull (*Larus marinus*)	12/06/2017		Amber
Great Cormorant (Phalacrocorax carbo)	12/06/2017		Amber
Great Crested Grebe (*Podiceps cristatus*)	31/12/2011		Amber
Great Northern Diver (*Gavia immer*)	31/12/2011	Annex I	Amber
Greater Scaup (*Aythya marila*)	31/12/2011	Annex II/III	Amber
Greater White-fronted Goose (*Anser albifrons*)	31/12/2001	Annex I/II/III	Amber
Grey Partridge (*Perdix perdix*)	31/07/1972	Annex II/III	Red
Grey Plover (Pluvialis squatarola)	31/12/2011		Amber
Greylag Goose (*Anser anser*)	31/12/2011	Annex II/III	Amber
Hen Harrier (*Circus cyaneus*)	31/12/2011	Annex I	Amber
Herring Gull (*Larus argentatus*)	12/06/2017		Red
House Martin (Delichon urbicum)	31/12/2011		Amber
House Sparrow (Passer domesticus)	31/12/2011		Amber
Jack Snipe (Lymnocryptes minimus)	31/12/2011	Annex II/III	Amber
Lesser Black-backed Gull (*Larus fuscus*)	31/12/2011		Amber
Lesser Whitethroat (*Sylvia curruca*)	31/12/2011		Amber
Little Egret (Egretta garzetta)	12/06/2017	Annex I	Green
Little Grebe (Tachybaptus ruficollis)	31/12/2011		Amber

Species	Date of Record	Conservation Designation	
		Birds Directive	BoCCI
Little Tern (Sternula albifrons)	31/12/2011	Annex I	Amber
Manx Shearwater (*Puffinus puffinus*)	05/08/1998		Amber
Mediterranean Gull (*Larus melanocephalus*)	31/12/2001	Annex I	Amber
Merlin (Falco columbarius)	31/07/1991	Annex I	Amber
Mute Swan (*Cygnus olor*)	12/06/2017		Amber
Northern Gannet (*Morus bassanus*)	31/12/2011		Amber
Northern Lapwing (*Vanellus vanellus*)	04/12/2017	Annex II	Red
Northern Pintail (*Anas acuta*)	31/12/2011	Annex II/III	Red
Northern Shoveler (*Spatula clypeata*)	31/12/2011	Annex II/III	Red
Northern Wheatear (*Oenanthe oenanthe*)	06/09/2017		Amber
Red Knot (Calidris canutus)	31/12/2011		Red
Red-throated Diver (*Gavia stellata*)	31/12/2011	Annex I	Amber
Ringed Plover (Charadrius hiaticula)	12/06/2017		Amber
Ruff (Philomachus pugnax)	31/12/2001	Annex I	Amber
Sand Martin (Riparia riparia)	05/04/2016		Amber
Sandwich Tern (Sterna sandvicensis)	11/07/2016	Annex I	Amber
Short-eared Owl (*Asio flammeus*)	31/12/2011	Annex I	Amber
Sky Lark (Alauda arvensis)	31/12/2011		Amber
Spotted Flycatcher (*Muscicapa striata*)	31/12/2011		Amber
Stock Pigeon (*Columba oenas*)	31/12/2011		Amber
Tufted Duck (Aythya fuligula)	31/12/2011	Annex II/III	Amber
Water Rail (Rallus aquaticus)	31/12/2011		Amber
Whinchat (Saxicola rubetra)	31/07/1991		Amber
Whooper Swan (*Cygnus cygnus*)	31/12/2011	Annex I	Amber
Yellowhammer (Emberiza citrinella)	31/12/2011		Red

Reptiles and Amphibians

With the 2km grid square to the west of the viaduct in Drogheda, there is a single record each for Common Frog (*Rana temporaria*) and Smooth Newt (*Lissotriton vulgaris*); both species are protected under the Wildlife (Amendment) Act (2000), while the Common Frog is also listed on Annex V of the EU Habitats Directive. There are three records of Common Lizard within the study area; this is expected in areas where dry, south-facing coastal dunes and suburbs provide suitable habitat for this species.

Invertebrates

There are four records of the Red Data List *near-threatened* beetle species *Ochthebius (Ochthebius) marinus* within the study area. There is a record of the near threatened butterfly, Small Heath (*Coenonympha pamphilus*), to the north of the sand dune system at Mornington. No records of Small Heath occur within 50m of the proposed Greenway route. The following near-threatened species were also recorded within the study area; Two records of *Andrena (Leucandrena) barbilabris* from 2010, two records of *Colletes (Colletes) similis*, two records of Large Red-Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius*), four records of Moss Carder-bee (*Bombus (Thoracombus) muscorum*) and two records of Osmia *(Helicosmia aurulenta*). A total of four records of Northern Colletes (*Colletes (Colletes) floralis*); this species is classified as vulnerable.

3.1.3. Fisheries and Aquatic Biodiversity

The study area for the proposed Greenway route follows the southern margin of the Boyne Estuary, Hydrometric Area 07, from due east of Drogheda town to its mouth on the east coast at Mornington. The lands crossed by the proposed Greenway route drain in a northerly direction into the Boyne Estuary.

In general, the site has been modified somewhat by human activity, such as on-going dredging for shipping. A number of factories are also present along the river, upstream of the estuary. The Boyne River channel, which is navigable and dredged, is defined by training walls that are breached in some places. Intertidal flats occur on the sides of the river channel. The sediments vary from fine muds in the sheltered areas to sandy muds or sands towards the river mouth (J. Kelly et al., 2008).

The EU Water Framework Directive (WFD) status (2013-2018) for the Boyne estuary (IE_EA_010_0100) is characterised as 'Moderate', with specific regard to phytoplankton, macroalgae, nutrient conditions and poor hydromorphological conditions[9]. However, fish and invertebrate status are classed as 'Good'. The Boyne Estuary discharges to the Boyne Estuary Plume Zone waterbody (IE_EA_010_0000), characterised as at 'Moderate' status, including high biological status and nutrient conditions, but 'Moderate' status for phytoplankton, supporting chemistry conditions and oxygenation[10].

The Boyne Estuary was surveyed by Inland Fisheries Ireland as part of the WFD Fish programme in 2009 (Fiona Kelly et al., 2009). A total of 23 fish species (sea trout are included as a separate

[9] Available at https://www.catchments.ie/data/#/waterbody/IE_EA_010_0100?_k=vzq3oe. Accessed in May 2020.

[10] Available at https://www.catchments.ie/data/#/waterbody/IE_EA_010_0000?_k=liwvvl. Accessed in May 2020.

'variety' of trout) were recorded in the Boyne Estuary. Juveniles of a number of commercially important species were present, including cod, plaice and herring, as well as other species of angling importance, including flounder, sea trout and thick-lipped grey mullet. The diversity of species present reflects the salinity gradient and variety of habitat in the Boyne Estuary from more freshwater/brackish conditions in its upper reaches to more saline conditions closer to the sea. Additional monitoring surveys were completed as part of the same programme in 2012 (F. Kelly et al., 2013) which also identified 23 species of fish; however, in 2012, fifteen-spined stickleback, stone loach and two-spotted goby were recorded, while herring, thick-lipped grey mullet and whiting were recorded in the 2009 surveys but not in 2012.

3.2. Field Survey

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 Saltmarsh, Lower Saltmarsh, Mudflats 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. The invasive species Japanese Knotweed, which is listed on the Third Schedule of the Birds and Natural Habitats Regulations (2011), was identified within the study area during the site visit (**Figure 3.7**).

Hedgerows and trees within proximity to the proposed development have potential for foraging and commuting bats; however, no suitable features comprising bat roost potential were identified within the route corridor. Similarly, 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.

3.2.1. Habitats and Flora

Habitat Description along Proposed Route

The proposed Greenway route 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 3.2**). This section the route will be constructed from bituminous pavement.

Figure 3.2: Regional road R150 with grass verge and wall in the foreground and mudflats in the background.

Just east of 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 (**Figure 3.8**).

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 3.2**), 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 3.8**). The majority of trees within this habitat have low bat roost suitability and may need to be removed to allow access from the road corridor. On the southern side of the road, within the grounds of Drogheda Grammar School, there are a number of mature trees with low bat roosting potential. These trees are within the grounds of the school and will not be affected by the proposed route (**Figure 3.3**).

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.

Figure 3.3: Example of amenity grassland (GA2) and treelines (WL2) recorded outside Drogheda Grammar School.

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 (**Figure 3.9**). 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*). Trees occurring within these habitats have low bat roost suitability.

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 (**Figure 3.9**).

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. 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.

From this point, the route crosses a small section of upper saltmarsh (CM2) and borders lower saltmarsh habitat (CM1) to the north (see an illustrative example in **Figure 3.5**), which is intersected further east, approximately at the location where the route crosses again the SAC and SPA's boundaries for a short length (**Figure 3.9**). The route continues east, re-entering the SAC and SPA, intersecting lower saltmarsh (CM1) and mostly scrub habitat (WS1).

Figure 3.4: Example of lower saltmarsh and mudflats habitat recorded within the study area.

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 (**Figure 3.10**).

Figure 3.5: Example of upper saltmarsh in the right of the photo and lower saltmarsh (CM1) in the middle with mudflats to the left.

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 saltmarsh (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 saltmarsh 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. Non-native species such as Butterfly-bush (*Buddleja davidii*), Montbretia (*Crocosmia* x *crocosmiiflora*), Fuschia (*Fuchsia magellanica*) and Wall Cotoneaster (*Cotoneaster horizontalis*) were commonly recorded in domestic gardens and in some hedgerows adjacent to houses.

The route then continues east, leaving the R151 Road and extending through the suburban area of Mornington (**Figure 3.11**). 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. The route re-enters the Boyne Coast and Estuary SAC for the 18m of this Section, within Buildings and artificial surfaces (BL3) and Flower beds and borders (BC4) habitats.

Invasive/Non-native Species

One species listed on the Third Schedule of the Birds and Natural Habitats Regulations (2011) was recorded from the study area in close proximity to the proposed development, although subject to control and management. Japanese Knotweed was recorded in one location (**Figure 3.7**) adjacent to the R150 and within <5m of the proposed route corridor. It was observed that this stand was previously treated with herbicide as only three dried canes remained.

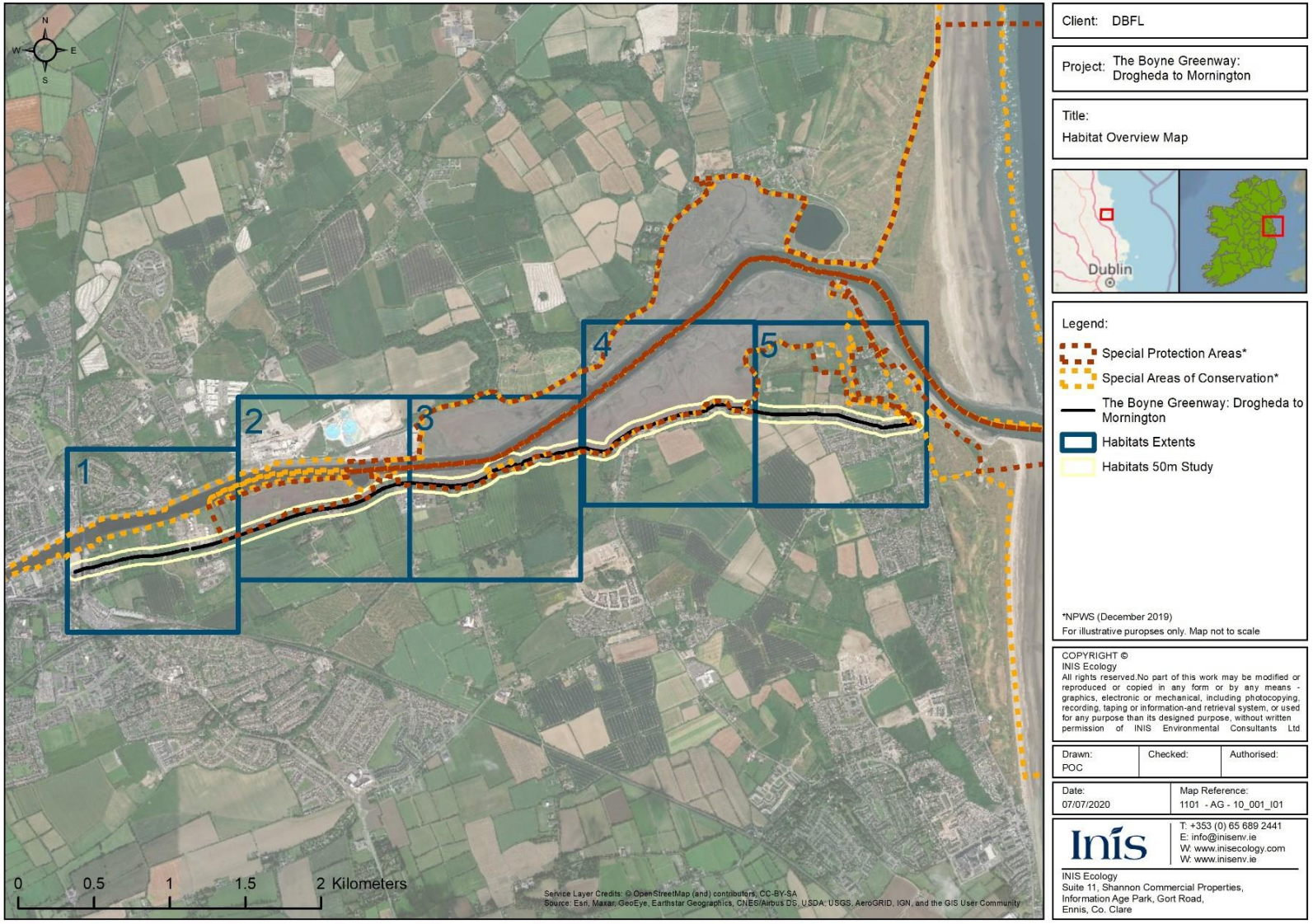

Figure 3.6: Overview location of habitat maps 1 – 5, showing Boyne Greenway route and study area.

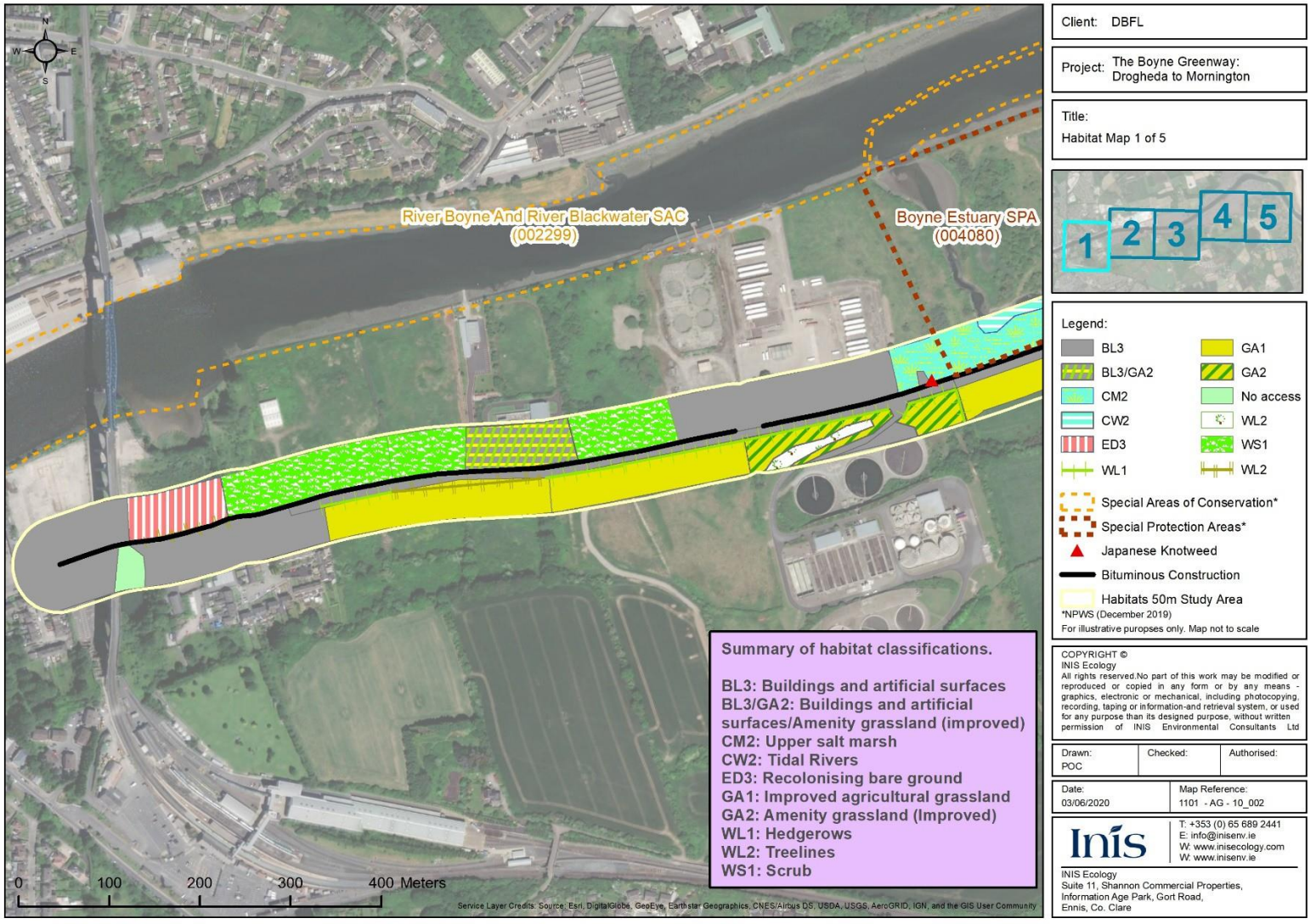

Figure 3.7: Habitats within a 50m buffer of the proposed Greenway route (Map 1/5).

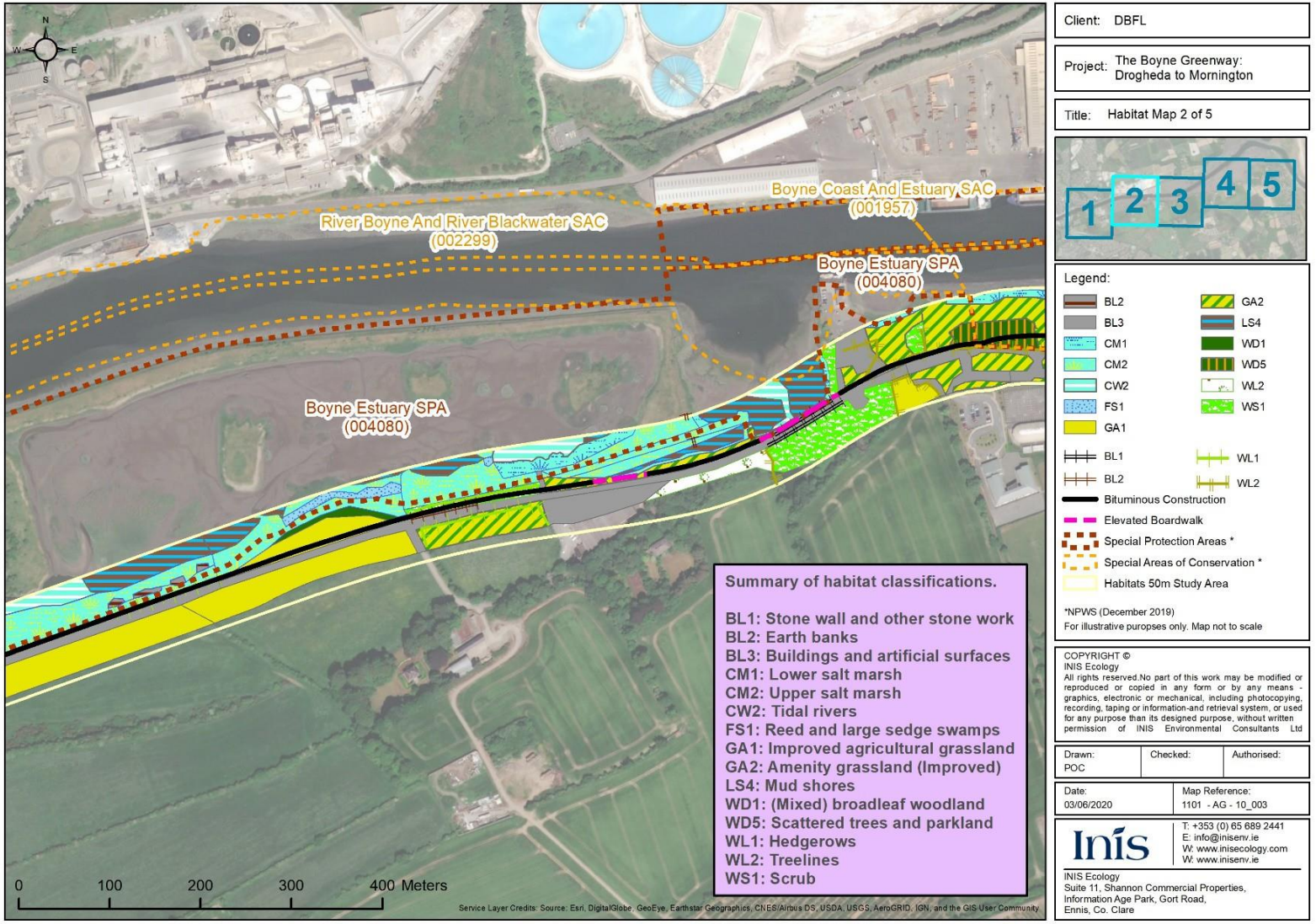

Figure 3.8: Habitats within a 50m buffer of the proposed Greenway route (Map 2/5).

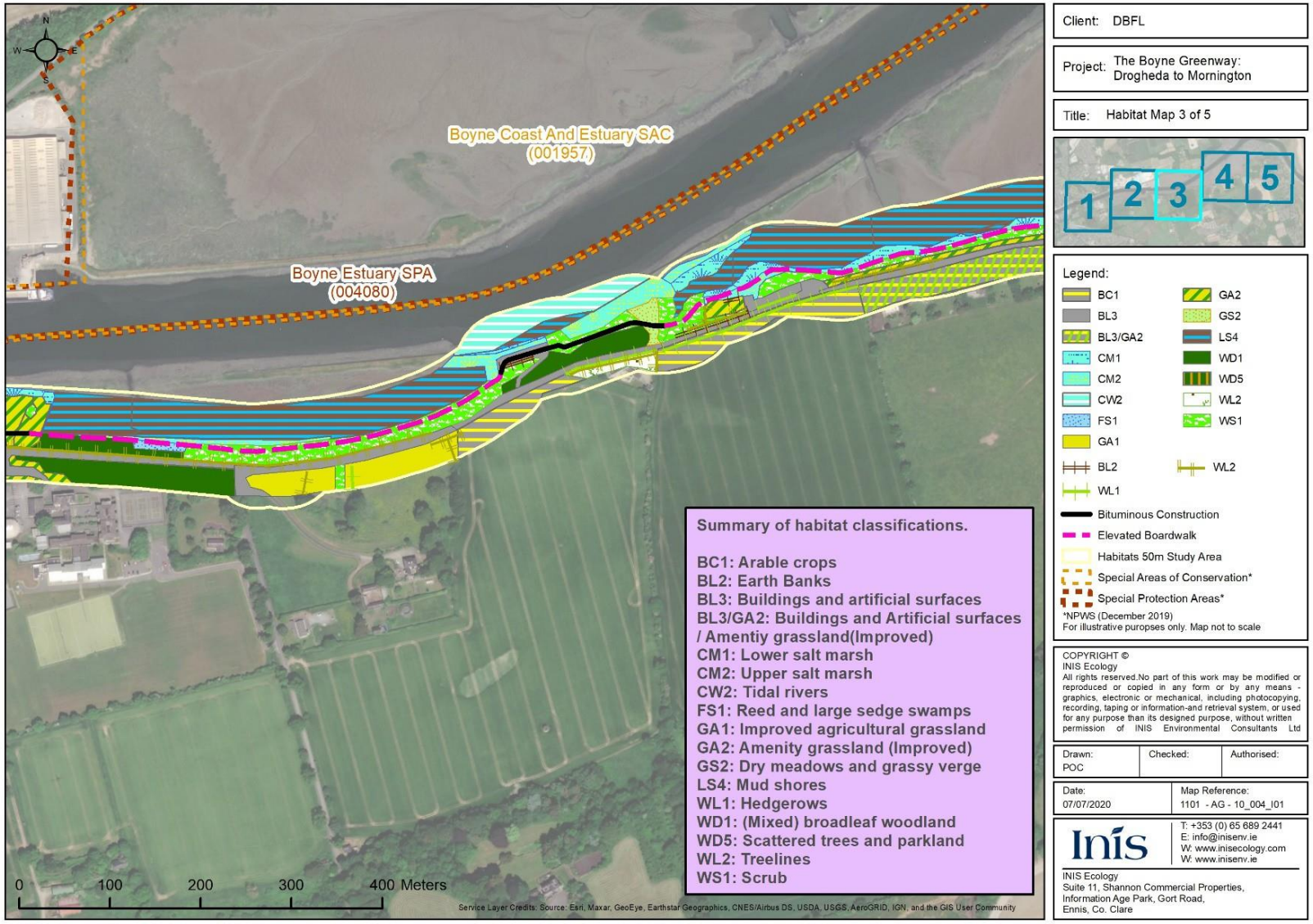

Figure 3.9: Habitats within a 50m buffer of the proposed Greenway route (Map 3/5).

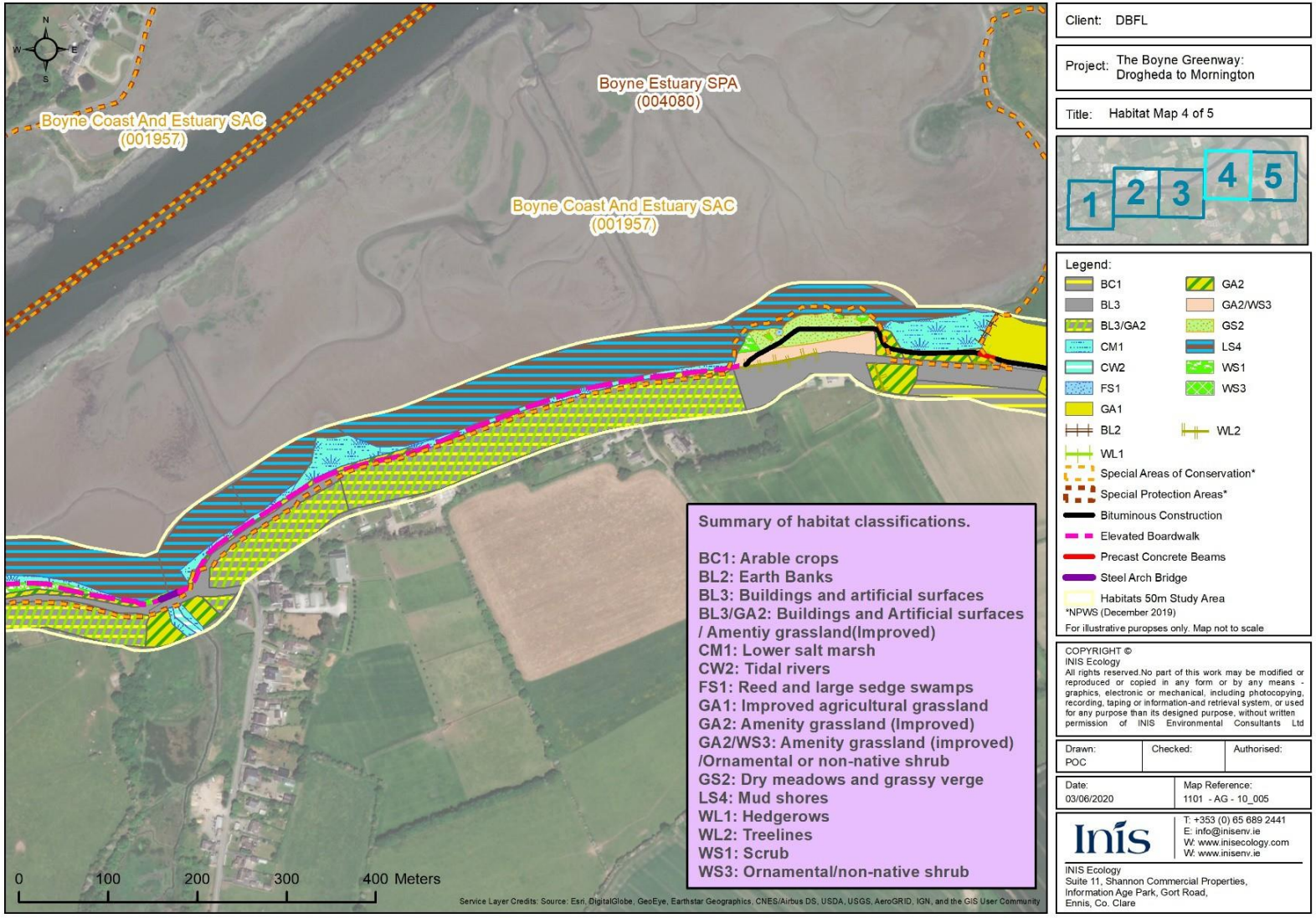

Figure 3.10: Habitats within a 50m buffer of the proposed Greenway route (Map 4/5).

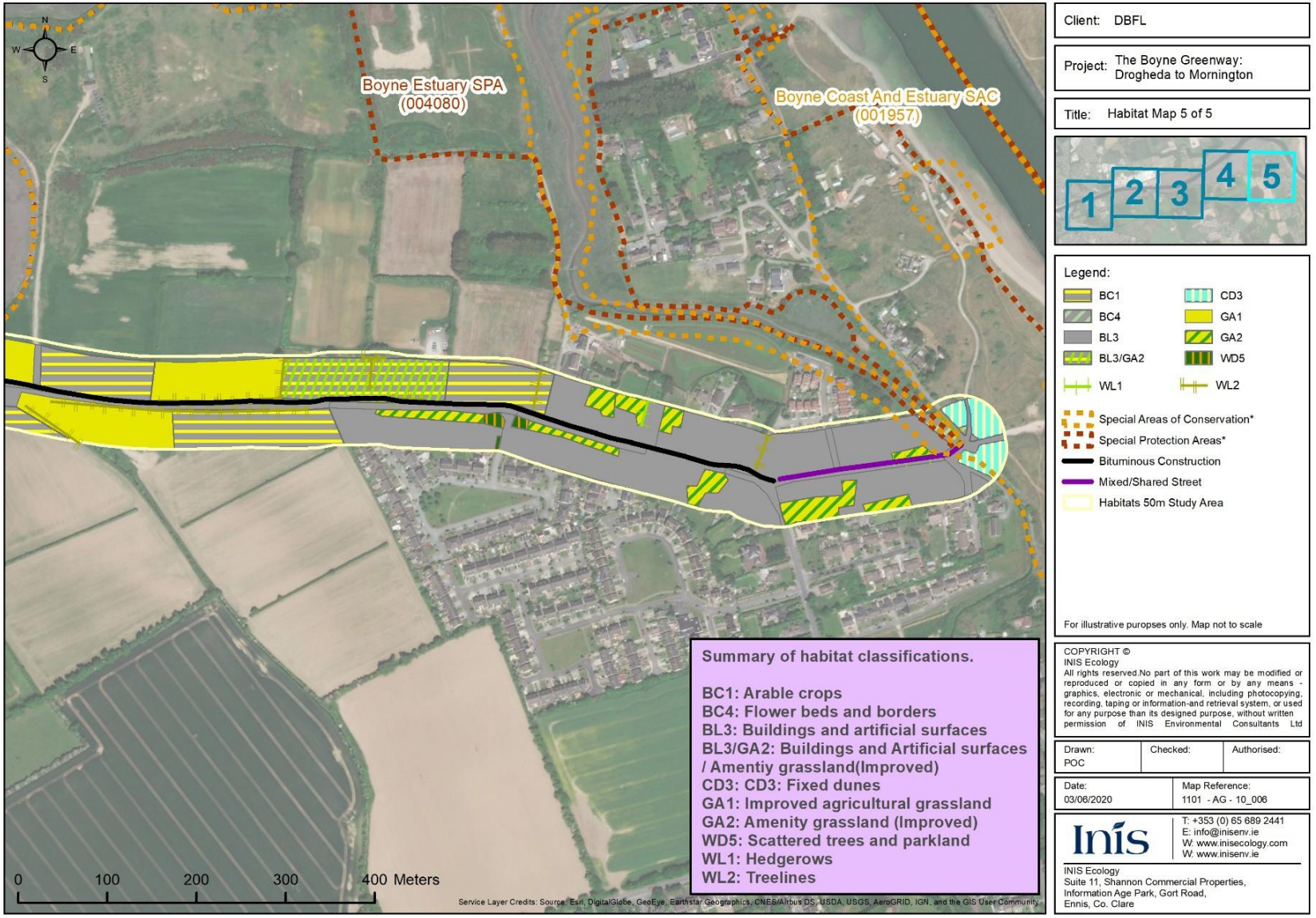

Figure 3.11: Habitats within a 50m buffer of the proposed Greenway route (Map 5/5).

3.2.2. Terrestrial Fauna

Mammals

Bats

A visual assessment of the suitability of bat habitat was completed along the proposed route corridor and included the lands immediately surrounding the proposed works. The majority of trees within the survey area were evaluated as being of negligible bat roost potential. There are a number of individual mature trees with low bat roost potential within the vicinity of Drogheda Grammar School, occurring along the road alignment. No buildings were identified as potential roost features (PRF) within the survey area. The majority of treelines recorded along the route were evaluated as having low-medium potential as foraging and commuting habitat for bats. There is a good degree of connectivity between the roadside hedgerows and treelines and to those of the adjoining field boundaries, predominantly to the south of the R150. Based on the habitats recorded, foraging and commuting bats are evaluated as likely using the habitats within the route alignment and also connected to the wider landscape.

Otter

An old Otter spraint was recorded along the upper saltmarsh within the eastern section of the study area. No other evidence of Otter such as holts, prints, feeding remains or couches was 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.

Badger

No evidence of Badger was recorded during the field survey. No Badger setts were identified along the proposed route. The presence of the existing roadway is likely to be a significant constraint to Badgers utilising the Greenway Route corridor from surrounding areas.

Birds

Field surveys completed in April 2018 (during the breeding bird season) did not record breeding activity by bird species of conservation interest.

Dedicated bird surveys were undertaken in relation to potential impacts on designated bird populations for European sites; namely Boyne Estuary SPA and River Boyne and River Blackwater SPA. These surveys were as follows:

- Wintering waterbird surveys within/in close proximity to Boyne Estuary SPA in March 2018;
- Wintering waterbird surveys within/in close proximity to Boyne Estuary SPA in January to March and October to December 2021;
- Little tern surveys (focusing on breeding and foraging activity) within/in close proximity to Boyne Estuary SPA in April to September 2021; and,

- Kingfisher surveys (focusing on breeding activity) in close proximity to River Boyne and River Blackwater SPA in March to July 2021.

Full survey results are detailed in the NIS report for the project (Inis, 2022).

Other fauna

No records of other protected faunal species or species identified as rare or sensitive were identified during the field surveys completed along the proposed Greenway route in April 2018, or the additional surveys for waterbirds undertaken in 2021.

3.2.3. 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 waterbody (IE_EA_07S320550), specifically at the Stagrennan stream (EPA Code: 07S32) crossed by the proposed Greenway 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 mudflats and lower saltmarsh. 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 waterbody 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.

3.3. Identification of Key Biodiversity Receptors

Following guidelines for ecological impact assessment ((CIEEM, 2018; EPA, 2017), biodiversity receptors of Local Importance (higher value) or greater within the ZoI of the project are evaluated for the potential for significant impacts. Where potential for impacts on biodiversity receptors are identified, appropriate mitigation measures are presented in this EcIA report.

On this basis, the key biodiversity receptors identified within the works area of the proposed Boyne Greenway: Drogheda to Mornington, and wider ZoI, are presented in **Table 3.4**.

Detailed description and discussion of key biodiversity receptors concerning Natura 2000 sites is provided within the NIS report for the project.

Table 3.2: Key biodiversity receptors identified within the zone of influence of the proposed Boyne Greenway: Drogheda to Mornington route.

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Within construction ZoI	Within operation ZoI	Requiring further assessment
Designated European sites: Boyne Coast and Estuary SAC, Boyne Estuary SPA, River Boyne and River Blackwater SAC	See NIS report					
River Boyne Estuary (CW2/MW4)	National	Annex I EU Habitats Directive	N	Y: Construction required in proximity and overlapping this habitat in short sections, crossing portions below the high-water mark. Boardwalk and Bridge sections to be raised above this habitat.	Y: The operation/ utilisation of the Greenway is directly proximate but outside of the Boyne estuary.	Y (during construction and operation)
Tidal Mudflats and Sandflats (LS4)	National	Annex I EU Habitats Directive	Y	Y: Construction required in proximity to and overlapping this habitat in short sections, crossing portions below the high-water mark. Boardwalk and Bridge sections to be raised above this habitat.	Y: The operation/utilisation of the Greenway is directly proximate to this habitat.	Y (during construction and operation)
Invasive species: Japanese Knotweed	N/A	Birds and Habitats Regulations (2015) Annex III	N	Y: This species does not occur within the route corridor, but has been recorded within	Y: This species will persist in proximity to the	Y (during construction

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Within construction ZoI	Within operation ZoI	Requiring further assessment
				proximity to, and may potentially interact with, construction activities.	Greenway during the operation phase.	and operation)
Otter	National	Wildlife Act (2000); Annex II and IV, EU Habitats Directive	N	Y: Otter occur within the Boyne estuary and its tributaries, adjacent to the	Y: Otter activity will continue within the Boyne estuary and its tributaries adjacent to the Greenway.	Y (during construction and operation)
Bats	County	Wildlife Act (2000); Annex II EU Habitats Directive	N	Y: Trees with low bat roost suitability adjacent to route corridor.	Y: Operation/utilisation of the Greenway will occur proximate to trees with low bat roost suitability	Y (during construction and operation)
Badger	County	Wildlife Act (2000); Annex II EU Habitats Directive	N	N: Badger occur within the wider study area of the proposed Greenway. However, this species does not occur within or proximate to the construction corridor	. N: Absence of badger activity along the route corridor indicates no interaction during the operation / utilisation of the Greenway.	N: no interaction within the ZoI
Marine mammals: Harbour Seal, Common Dolphin, Striped Dolphin	County	Wildlife Act (2000); Annex II EU Habitats Directive	N	N: Marine mammals occur incidentally within the wider study area of the proposed Greenway. However, this species does not occur within or proximate to the construction corridor.	N: Absence of records for marine mammals in proximity to the route corridor indicates no interaction during the operation / utilisation of the Greenway.	N: no interaction within the ZoI

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Within construction ZoI	Within operation ZoI	Requiring further assessment
Waterbirds (primarily wintering waterfowl and waders, also breeding little tern)	See NIS report					
Breeding Birds	Local (higher value)	Wildlife Act (2000)	Y	Y: Breeding bird habitat occurs within and proximate to the construction corridor.	Y: Breeding birds and their habitats occur proximate to the operational Greenway corridor.	Y (during construction and operation)
Kingfisher	See NIS report					
Reptiles and amphibians: Common Lizard, Smooth Newt	County	Wildlife Act (2000)	N	Y: Potential for lizard to occur within the eastern portion of the route corridor in coastal dune habitats.	Y: Potential for lizard to occur within the eastern portion of the route corridor in coastal dune habitats.	Y (during construction and operation)
Fish/fisheries: such as Salmon, Lamprey sp.	See NIS report					

4. Potential Impacts Arising from the Proposed Development

4.1. Construction Phase Impacts

4.1.1. Designated Sites

The magnitude, scale and significance of any construction impacts potentially affecting designated sites is limited within the project ZoI to effects on Natura 2000 Sites. Construction phase impacts on these sites are discussed in the NIS report for the project.

In summary, potential construction phase impacts were identified in relation to River Boyne and River Blackwater SAC, Boyne Coast and Estuary SAC, and Boyne Estuary SPA. Potential construction impacts comprise direct land-take (i.e. habitat loss), pollutant run-off and disturbance of designated features (e.g. waterbird bird populations).

4.1.2. Terrestrial Biodiversity

Habitats and Flora

The proposed Greenway route corridor is principally aligned along existing road corridors, amenity areas and existing trackways and disturbed ground, following the southern margin of the River Boyne estuary. The construction stage of the project will require a temporary works area along the route corridor for machinery access, in addition to the permanent land cover change within the footprint. The habitats identified within the route corridor have been evaluated with respect to the required habitat loss arising from the permanent footprint of the development. The linear habitat lengths within the footprint of project construction, described by construction method are presented in **Table 4.1**. The total habitat areas within the footprint of the project are presented in **Table 4.2**.

Table 4.1: Linear habitats within the footprint of the proposed Greenway route.

Habitat Type	Habitat Code	Total Length (m)
Hard surface (Bitumen, bridge works and wooden track)		
Hedgerow	WL1	160
Treeline	WL2	291
Elevated boardwalk (recycled plastic)		
Earth banks	BL2	5

Table 4.2: Habitat areas within the footprint of the proposed Greenway route.

Habitat Type	Habitat Code	Total Area (m^2)
Hard surface (Bitumen, bridge works and wooden track)		
Arable crops	BC1	855
Flower beds and borders	BC4	32

Habitat Type	Habitat Code	Total Area (m^2)
Buildings and artificial surfaces	BL3	4,316
Buildings and artificial surfaces/Amenity grassland	BL3/GA2	1,081
Lower saltmarsh	CM1	248
Upper saltmarsh	CM2	1,108
Recolonising bare ground	ED3	404
Improved agricultural grassland	GA1	1,612
Amenity grassland	GA2	1,614
Amenity grassland/Ornamental/non-native shrub	GA2/WS3	98
Dry meadows and grassy verges	GS2	643
Muddy shore	LS4	45
Mixed (broadleaved) woodland	WD1	67
Scattered trees/parkland	WD5	378
Scrub	WS1	2,641
Elevated boardwalk (recycled plastic)		
Buildings and artificial surfaces	BL3	137
Buildings and artificial surfaces/Amenity grassland	BL3/GA2	38
Lower saltmarsh	CM1	3,120
Upper saltmarsh	CM2	830
Reeds and large sedge swamps	FS1	39
Amenity grassland	GA2	2
Amenity grassland/ornamental shrub	GA2/WS3	779
Dry meadow and grassy verges	GS2	45
Muddy shore	LS4	1,230
Mixed (broadleaved) woodland	WD1	12
Scrub	WS1	1,823

The areas of the different habitat types affected by the proposed Boyne Greenway for all habitats encountered within the route corridor are presented in **Table 4.1** and **Table 4.2** above. Of these, the habitat types and associated impact footprint habitat loss calculations evaluated as being potentially significant in the context of the local environment and wider ZoI are presented in **Table 4.3**. Further details of trees and hedgerows to be removed are provided in the Arboricultural Impact and Tree Protection Strategy Report (CMK Horticulture and Arboriculture Ltd., 2021).

Table 4.3: Impact evaluation for habitats identified as biodiversity receptors within the footprint of the works area.

Habitat Type	Habitat Code	Impact Evaluation
Hard surface (Bitumen, bridge works and wooden track)		
Hedgerow	WL1	Clearance within footprint of the works will potentially result in the reduction of this habitat in the local context. Specifically, ten private hedges are to be removed (further details provided within the Arboricultural Assessment). Mitigation is required.
Treeline	WL2	Clearance within footprint of the works will potentially result in the reduction of this habitat in the local context. The construction works are temporary; however, due to the nature of this habitat, the effects would be long-term. Specifically, 147 trees (plus two trees near the proposed Greenway route deemed to be unsafe and therefore requiring felling) are to be removed (further details provided within the Arboricultural Assessment), equating to 54.6% of wooded vegetation in proximity to works; however, these are generally trees assessed as being of low value. The majority of moderate and high value trees will be retained. Mitigation is required.
Upper saltmarsh	CM2	The botanical community along the corridor identifies that this habitat is characterised by species requiring dry ground, on embankment lands which are subject to periodic inundation by elevated flood flows and low saline contributions. Mitigation is required.
Muddy shore	LS4	The limited extent of habitat loss occurs where the Greenway requires crossing at existing bridge locations and works directly adjacent to the Boyne Estuary. This is a highly dynamic habitat and any temporary impacts resulting from the proposed works will be remediated following the tidal inundation. No mitigation is required.
Mixed (broadleav	WD1	Loss of this habitat type will occur during site clearance works along the route corridor. The construction works are temporary.

Habitat Type	Habitat Code	Impact Evaluation
ed) woodland		However, due to the nature of this habitat, the effects will be long-term. Mitigation is required.
Scrub	WS1	Loss of this habitat type will occur during site clearance works along the route corridor. The construction works are temporary and due to the nature of this habitat, the effects will be short-term. Mitigation is required.
Elevated boardwalk (recycled plastic)		
Lower saltmarsh	CM1	The boardwalk section crosses lower saltmarsh along the Boyne Estuary. However, the temporary works will require the installation of support piles for the suspended boardwalk, rather than habitat clearance. Impacts are, therefore, temporary within the calculated landcover change. Mitigation is required.
Upper saltmarsh	CM2	The botanical community along the corridor identifies that this habitat is characterised by species requiring dry ground, on embankment lands which are subject to periodic inundation by elevated flood flows and low saline contributions. The temporary works will require the installation of support piles for the suspended boardwalk, rather than habitat clearance. Impacts are therefore temporary within the calculated landcover change. Mitigation is required.
Reeds and large sedge swamps	FS1	The boardwalk section crosses reeds and large sedge swamps for a limited area. Nevertheless, the temporary works will require the installation of support piles for the suspended boardwalk, rather than habitat clearance. Impacts are therefore temporary and of limited scale within the calculated landcover change, which habitats expected to re-establish naturally. Mitigation is not required.
Muddy shore	LS4	The boardwalk section crosses lower saltmarsh along the Boyne Estuary; however, the temporary works will require the installation of support piles for the suspended boardwalk, rather than habitat clearance. Impacts are therefore temporary within the calculated landcover change. Mitigation is required.

Habitat Type	Habitat Code	Impact Evaluation
Scrub	WS1	Loss of this habitat type will occur during site clearance works along the route corridor. The construction works are temporary and due to the nature of this habitat, the effects will be short-term. Mitigation is required.

Invasive Species

The construction works along the proposed route corridor will require machinery access along the public road and extending within amenity grassland, waste ground and intertidal areas of the Boyne Estuary. The occurrence of Japanese Knotweed directly adjacent to the route gives rise to the potential for the spread of this species from construction machinery or movement of excavated material along the construction corridor. Construction machinery arriving on site from other contaminated sites may also potentially result in the introduction of Japanese Knotweed, or other high-risk invasive species, to additional sections along the corridor. This potential impact is evaluated as being long-term due to the difficulty of the required management regime and potentially significant in magnitude and scale due to the potential for spread outside of the works corridor and taking account of the biodiversity receptors within the ZoI. Mitigation measures will be required to avoid significant impacts.

Mammals

Otter

No mammal species of local importance (higher value) were recorded during the field surveys undertaken along the route corridor. There is the potential for Otter to occur along the entire length of the River Boyne Estuary, utilising the intertidal habitats and riparian margins for foraging and commuting. This species is designated within the River Boyne and River Blackwater SAC, the boundary of which adjoins the western portion of the Greenway route. The proposed construction works are temporary and do not result in the loss of permanent habitat utilised by Otter for breeding. The works will require machinery access and construction over the period April to September and will be temporary in nature. Disturbance will be limited to daytime hours which will be in line with the existing baseline, in the context of amenity usage and ongoing traffic within the study area. There are no construction impacts identified during the hours of darkness which could overlap with the preferred foraging and commuting times for this species. The potential for significant impacts is therefore limited to temporary, short-term, impacts on Otter arising from disturbance during construction.

Bats

Existing records for bats indicate a diversity of species in the local study area. The construction stage of the project does not require the removal of, or works in direct proximity, to any known bat roosts. No buildings or trees identified as having high roost potential were identified along the Greenway corridor. Therefore, potential impacts affecting bat species are limited to the removal of habitats which are integral to the continuity of commuting and foraging corridors along the route. Although hedgerow and treeline habitats require removal along the route, the width of the construction footprint will not comprise a significant gap precluding the continuation of foraging

and commuting for bat species in the ZoI. Works will be restricted to daylight hours and therefore no disturbance is identified during active periods for bats. Mitigation measures are required to avoid long term effects of habitat loss within commuting corridors.

Birds

Potential construction impacts relating to SPA-designated waterbird populations are assessed in the NIS report for the project.

Based on recommendations relating to wintering waterbirds, the project construction proposal is specified as limited to the non-winter season in areas where disturbance of wintering waterbirds is an issue. Therefore, the main effects likely to arise will be from disturbance along the proposed route due to construction machinery and equipment during installation. There is the potential for disturbance and displacement of breeding birds utilising the suburban and estuarine habitats crossed by the route, including (in the absence of mitigation) the potential for destruction of active bird nests.

Other Fauna

Common Lizard has been recorded within the study area and is likely to occur within dune and coastal habitats at the eastern portion of the route corridor. This species is mobile and is likely to avoid construction activity within the route corridor itself. However, the works may affect existing habitat used for foraging and sheltering. Impacts are therefore evaluated as temporary, direct and potentially significant in the absence of mitigation.

4.1.3. Fisheries and Aquatic Biodiversity

The construction works to deliver the Greenway route 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. There are records of Harbour Seal within the Boyne Estuary complex, construction works may potentially give rise to disturbance or noise infiltrating the aquatic environment which could temporarily result in avoidance behaviours for this species in the locality of individual works elements along the intertidal zone. We note however the adherence to best practice measures in the prevention of noise.

The tidal reaches of the Boyne Estuary are characterised by a high turbidity loading, with background nutrient inputs from the entire Boyne catchment and Drogheda town upstream. On this basis the location and scale of the proposed construction works, taking account of their temporary nature, may potentially give rise to water quality impacts in the local context of the works footprint, these indirect impacts will likely be assimilated into the background context within each tidal cycle.

Mitigation measures are required to avoid and reduce the significance of any disturbance or indirect water quality impacts affecting aquatic biodiversity receptors during the construction stage.

Table 4.4: Summary of the potential construction impacts on key biodiversity receptors from the proposed Greenway Project.

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Evaluation of construction phase impacts	Significance	Requiring mitigation
Designated European sites: Boyne Coast and Estuary SAC, Boyne Estuary SPA, River Boyne and River Blackwater SAC	See NIS report					
River Boyne Estuary (CW2/MW4)	National	Annex I EU Habitats Directive	N	Construction works for the proposed Greenway are located in proximity and overlaying this habitat in short sections, crossing portions below the highwater mark. There is therefore the potential for direct and indirect impacts on this habitat arising from machinery access, disturbance and waste/emissions.	The proposed works are short-term, limited in extent to the route corridor and require limited machinery access within the estuarine habitat. The potential impacts are evaluated as slight to moderate (in line with ongoing baseline trends) and may be significant in the absence of mitigation.	Y
Invasive species: Japanese Knotweed	N/A	Birds and Habitats Regulations (2015) Annex III	N	These species do not occur within the route corridor, but have been recorded within proximity to, and may potentially interact with,	Although the proposed construction works are short-term and limited in extent, any potential introduction or spread of	Y

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Evaluation of construction phase impacts	Significance	Requiring mitigation
				construction activities. In the absence of mitigation, there is the potential for the spread of these species through inadvertent contact or interaction with contaminated material either introduced to the site, or disposed of outside of the site boundary.	invasive species would likely have a long-term effect. This is evaluated as potentially moderate and significant in the absence of mitigation.	
Otter	National	Wildlife Act (2000); Annex II and IV, EU Habitats Directive	N	Otter occur within the Boyne estuary and its tributaries, adjacent to the construction works. Potential impacts directly affecting otter are unlikely, however, indirect and in-combination effects may include disturbance to habitat, displacement and habitat deterioration through waste/emissions.	The proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential impacts are evaluated as imperceptible to slight, and not significant; taking account of the mobility of these species and the habitat availability in the local context.	N
Bats	County	Wildlife Act (2000); Annex II EU Habitats Directive	N	Trees with low bat roost suitability occur adjacent to the route corridor. There are no direct impacts to bat suitability features; however, indirect	The proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert	Y (regarding disturbance and lighting)

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Evaluation of construction phase impacts	Significance	Requiring mitigation
				impacts may include noise and lighting disturbance during construction.	materials. Potential impacts are evaluated as imperceptible to slight and may be significant in the absence of mitigation.	
Waders and Waterbirds (wintering): Shelduck, Oystercatcher, Golden Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone, Little Tern, Ringed Plover, Herring Gull	See NIS report					
Breeding Birds	Local (higher value)	Wildlife Act (2000)	Y	Breeding bird habitat occurs within and proximate to the construction corridor, potential direct and indirect impacts include habitat removal, disturbance and displacement in	The proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential impacts are evaluated as slight to moderate, and	Y

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Evaluation of construction phase impacts	Significance	Requiring mitigation
				the local context of the corridor itself.	may be significant in the absence of mitigation.	
Reptiles and amphibians: Common Lizard, Smooth Newt	County	Wildlife Act (2000)	N	There is the potential for lizard to occur within the eastern portion of the route corridor in coastal dune habitats. Construction works may give rise to indirect disturbance in the local context.	The proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential impacts are evaluated as imperceptible to slight, and unlikely to be significant.	N
Fish/fisheries: such as Salmon, Lamprey sp.	National	Wildlife Act (2000); Annex II EU Habitats Directive	N	There is no fisheries habitat directly within the footprint of the route corridor; however, there is the potential for indirect impacts arising due to disturbance and waste/emissions during construction.	The proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential impacts are evaluated as slight to moderate and the proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential	Y

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Evaluation of construction phase impacts	Significance	Requiring mitigation
					impacts are evaluated as slight to moderate and may be significant in the absence of mitigation.	

4.2. Operational Phase Impacts

4.2.1. Designated Sites

The magnitude, scale and significance of any operational impacts potentially affecting designated sites during the utilisation of the Greenway is limited within the project ZoI to effects on European sites. On this basis, the impact assessment and evaluation of significant effects on European sites has been addressed in full in the NIS report for the project.

In summary, potential operational phase impacts were identified in relation to River Boyne and River Blackwater SAC, Boyne Coast and Estuary SAC, and Boyne Estuary SPA. Potential operational impacts comprise indirect habitat loss/degradation and disturbance of designated features (notably waterbird populations).

4.2.2. Terrestrial Biodiversity

Habitats and Flora

There are no pathways for operational impacts identified which could potentially affect the terrestrial habitats occurring directly adjacent to, or in proximity to the proposed Boyne Greenway: Drogheda to Mornington Project. The project design has taken account of the environmental processes prevailing upon the sensitive habitats in proximity to the Boyne Greenway route. The utilisation of a suspended boardwalk structure, elevated on piles will continue to allow tidal inundation and flushing within the marginal habitats of the Boyne Estuary, including intertidal muds and saltmarsh habitats. Impacts on designated habitats within overlapping and adjacent European sites (notably Boyne Coast and Estuary SAC) are discussed in the NIS report for the project.

Invasive Species

The operation of the Boyne Greenway, limited to amenity, cycle traffic and pedestrian access does not have the potential to give rise to pathways for the spread of non-native invasive species. The spread of such species by users of the Greenway is not considered to be a likely significant effect. However, ongoing management of Japanese knotweed by Meath Co. Co., in line with existing legislative obligations, is required as mitigation at locations where this already occurs adjacent to the route.

Mammals

There are no pathways for potential impacts affecting terrestrial mammals during the operational phase of the project. Although otter utilise the margins of the Boyne Estuary and its tributaries within the study area, there are no impact sources arising from the operation or utilisation of the Greenway which could result in direct or indirect impacts on this species within the footprint or immediate environs of the route corridor. Therefore, the potential for impacts is evaluated as being imperceptible in the local context.

Birds

During operation, the main effects likely to arise on birds will be from disturbance (e.g. visual, noise) along the proposed Greenway from cyclists and pedestrians. The influence of such disturbance (i.e. the distance at which disturbance sources disrupt bird behaviour or activities) will be based upon a number of influencing factors, including species, weather and tide conditions and the exact nature

of the disturbance event. Detailed assessment of impacts on designated bird populations of European sites during the operation of the proposed development is provided within the NIS report for the project.

Regarding non-designated bird populations, operational disturbance impacts are considered to be relatively minor. The measures described in relation to designated bird populations (including embedded measures within the Greenway design) are considered to be sufficient to minimise operational impacts on non-designated bird populations.

4.2.3. Fisheries and Aquatic Biodiversity

There are no potential direct or indirect operational impacts arising from the proposed development which may affect fish and aquatic biodiversity receptors occurring adjacent to, or within the wider study area of the proposed Boyne Greenway corridor. Potential operational impacts are therefore evaluated as being imperceptible in the local context and will not be considered significant.

Table 4.5: Summary of the potential operational impacts on key biodiversity receptors from the proposed Greenway Project.

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Evaluation of operation phase impacts	Significance	Requiring mitigation
Designated European sites: Boyne Coast and Estuary SAC, Boyne Estuary SPA, River Boyne and River Blackwater SAC	See NIS report					
River Boyne Estuary (CW2/MW4)	National	Annex I EU Habitats Directive	N	The operation/utilisation of the Greenway will not give rise to direct impacts on the estuarine habitat. Although the Boyne estuary is directly adjacent to the Greenway corridor, the potential for indirect impacts is limited by the nature of the operational stage. Potential impact sources are limited in scale and extent, taking account of the pedestrian and cycling traffic predicted. Secondary and in-combination impacts on the estuarine habitat are also evaluated as being imperceptible.	The operational phase will be long-term, but limited in extent to the corridor itself, potential impacts are evaluated as being imperceptible and not significant.	N

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Evaluation of operation phase impacts	Significance	Requiring mitigation
Tidal Mudflats and Sandflats (LS4)	National	Annex I EU Habitats Directive	Y	The operation/utilisation of the Greenway will not give rise to direct impacts on intertidal mudflat/sandflat habitat. Although the Boyne estuary and its intertidal habitat is directly adjacent to the Greenway corridor, the potential for indirect impacts is limited by the nature of the operational stage. Potential impact sources are limited in scale and extent, taking account of the pedestrian and cycling traffic predicted. Secondary and in-combination impacts on these intertidal habitats are also evaluated as being imperceptible.	The operational phase will be long-term, but limited in extent to the corridor itself, potential impacts are evaluated as being imperceptible and not significant.	N
Invasive species: Japanese Knotweed	N/A	Birds and Habitats Regulations (2015) Annex III	N	There are no direct, indirect or in-combination impacts arising during the operational phase with regard to invasive species. The nature of the utilisation of this amenity space infers that operational impacts will be imperceptible.	The operational phase will be long-term, but limited in extent to the corridor. Potential impacts are imperceptible and not significant.	N - no project-specific mitigation required at operation stage. Statutory obligations apply for

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Evaluation of operation phase impacts	Significance	Requiring mitigation
						ongoing management.
Otter	National	Wildlife Act (2000); Annex II and IV, EU Habitats Directive	N	There are no direct, indirect or in-combination impacts arising during the operational phase with regard to Otter. The nature of the utilisation of this amenity space infers that operational impacts will be imperceptible.	The operational phase will be long-term, but limited in extent to the corridor. Potential impacts are imperceptible and not significant.	N
Bats	County	Wildlife Act (2000); Annex II EU Habitats Directive	N	The operational phase of the project will not give rise to any direct effects on bats or bat habitat. Indirect and in-combination Impacts are limited to the potential for lighting provision to affect foraging and commuting potential along linear features. Taking account of the suitability and value of the landscape within the study area, operational impacts are evaluated as imperceptible to slight.	The operational phase will be long-term, but limited in extent to the corridor. Potential impacts are imperceptible to slight, and potentially significant in the absence of mitigation.	Y (lighting design to be implemented during operation)
Waders and Waterbirds (wintering): Shelduck,	See NIS report.					

Biodiversity Receptor	Level of importance	Sensitivity/protected status	Within footprint of works area	Evaluation of operation phase impacts	Significance	Requiring mitigation
Oystercatcher, Golden Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone, Little Tern, Ringed Plover, Herring Gull						
Breeding Birds	Local (higher value)	Wildlife Act (2000)	Y	There are no direct, indirect or in-combination impacts arising during the operational phase with regard to breeding bird species. The nature of the utilisation of this amenity space infers that operational impacts will be imperceptible.	The operational phase will be long-term, but limited in extent to the corridor. Potential impacts are imperceptible and not significant.	N
Reptiles and amphibians: Common Lizard, Smooth Newt	County	Wildlife Act (2000)	N	There are no direct, indirect or in-combination impacts arising during the operational phase with regard to reptile and amphibian species. The nature of the utilisation of this amenity space infers that operational impacts will be imperceptible.	The operational phase will be long-term, but limited in extent to the corridor. Potential impacts are imperceptible and not significant.	N

5. Mitigation Measures

5.1. Construction Phase Mitigation

5.1.1. Designated Sites

The magnitude, scale and significance of any construction impacts potentially affecting designated sites is limited within the project ZoI to effects on SAC and SPAs, designated as European sites. On this basis, all mitigation measures required to avoid significant adverse effects on European Sites are described in the NIS report for the project.

In summary, potential construction phase impacts were identified in relation to River Boyne and River Blackwater SAC, Boyne Coast and Estuary SAC, and Boyne Estuary SPA; specifically direct land-take (i.e. habitat loss), pollutant run-off and disturbance of designated features (e.g. waterbird bird populations). Appropriate Assessment of these potential construction impacts on European sites concluded that, based on the project design and embedded mitigation measures, significant adverse effects on the integrity of any of these European sites due to construction impacts are highly unlikely.

5.1.2. Terrestrial Biodiversity

The proposed design has incorporated intrinsic avoidance measures aimed at lessening the impact of the proposed cycle and pedestrian infrastructure on the key biodiversity receptors within the study area, including the ecological sensitivities of the Boyne Estuary SPA and the Boyne Coast and Estuary SAC (discussed further in the NIS report). Design measures have accounted for both construction and long-term operational stages. The efficacy of the intrinsic design measures will be monitored during construction and post construction for 3 years by a suitably qualified Ecologist. Monitoring during construction will be completed by a suitably qualified Ecological Clerk of Works, (ECoW) with a 'Stop Works' authority. This Ecologist/ECoW will have previous experience and extensive knowledge of working on construction programmes (including experience relating to SAC and SPA constraints where necessary). The construction works will be compliant with the following:

1. The construction work will be restricted to outside the period of October – March at all sensitive sites where disturbance is an issue, i.e. within the intertidal habitats of the SAC/SPA or immediately adjacent. Therefore, all works will be undertaken between March and September, when all wintering birds are absent. The timing restriction will not apply to public road sections;

2. Construction works will be limited to daylight hours to avoid effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowled away from sensitive habitats, with no light spillage, in line with best practice for bats. Only existing municipal compound areas will be utilised and security lighting will be sensor based only at these locations.

3. The timing of the works and the measures intrinsic to the design, outlined above, will be sufficient to avoid significant effects. Camouflage netting will be utilised on all roadside works outside the period March to September to minimise noise transfer, as a matter of course.

4. Regular monitoring of the works will be provided by a suitably qualified ECoW with authority to 'Stop the Works'. The representative will have knowledge of working on construction programmes within SAC and SPA areas where significant bird populations exist. The EcOW will undertake pre-works checks of locations where protected species may pose a constraint (e.g. for new active bird nest locations, otter dens etc.).

Strategic Timing of Works to Protect Breeding and Wintering Birds

The removal of hedgerows and trees, should it be required, will be outside of the bird breeding season (i.e. 1st of March to 31st of August) to reduce impact on breeding birds. The majority of construction work within certain work sections will be restricted to outside the period of October – March at all sensitive sites where disturbance is an issue, 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 birds (i.e. the Special Conservation Interests of the SPA) are absent. The timing restriction will not apply to public road sections where disturbance is constant.

Specific Measures for the Avoidance of Transfer of Invasive Species to the Site

One invasive species listed on Third Schedule of the Birds and Natural Habitats Regulations (2011) was found during the survey of the site of the proposed development (Japanese knotweed). Furthermore, construction works are a potential vector for the transfer of invasive species from other areas into the site. A site-specific Invasive Species Management Plan will be delivered by the appointed contractor, as a requirement in the Contract Documents. This plan will be adopted for the protection of habitats and the prevention of spread of invasive species and will be managed by a suitably qualified Ecologist with experience in dealing with Third Schedule invasive species.

Appointment of a Suitably Qualified Ecological Clerk of Works

A suitably qualified ECoW will be appointed to oversee environmental protection measures during the construction phase of the proposed road upgrade works. This appointment will be a contractual obligation to ensure compliance to environmental protection measures.

Visual Inspection of Mature Trees for Roosting Bats within Footprint of Development

Prior to the commencement of works, a survey of existing trees proposed to be removed or trimmed back within the construction area will be carried out by a suitably qualified ecologist. Consideration will be given to the loss of commuting and foraging bat habitat and mitigation measures explored (e.g. reinstating treelines at the edges of new embankments to compensate for this loss of habitat).

Landscape Design

Where possible, habitats subject to loss or alteration during the construction of the proposed development will be allowed to re-establish naturally. Retained trees will be subject to a Tree Protection Strategy to ensure they are not adversely affected during construction (see the Arboricultural Assessment Report for further details). In order to compensate for permanent loss of habitat arising from the proposed Greenway (as summarised in **Table 4.3**, and to provide an overall increase in habitat extent and biodiversity value (as required by Objective 1 of the National Biodiversity Action Plan 2017-2021), replacement landscape planting is specified within the Landscape Design Document for the proposed development. This includes a detailed planting schedule document which specifies the species to be planted (including their initial heights and composition relative to other planted species). This document

also specifies management measures and schedules for the establishment and long-term success of landscape planting. Species selected for landscape planting are native species of known biodiversity value. Proposed planting types are as follows (note that habitat length/area measurements are approximate):

- Native tree planting: 365m in length;
- Native hedgerow planting including native trees: 2,180m in length;
- Native hedgerow planting: 770m in length;
- Native woodland planting: 12,250m^2 in area;
- Native low-medium shrub and ornamental shrub planting: 12,790m^2 in area; and
- Formal hedge planting: 335m in length.

Landscape planting will predominantly be along the northern edge of the proposed Greenway route. This will further minimise the potential for disturbance impacts on adjacent features of ecological value (notably waterbird populations).

5.1.3. Fisheries and Aquatic Biodiversity

Mitigation measures put in place for protection of aquatic biodiversity downstream of the proposed development

The study area is located in the Boyne River catchment. Considering the hydrological connectivity of the study area to the River Boyne and River Blackwater SAC, a site designated for a number of aquatic species (e.g. River Lamprey and Atlantic Salmon), and the Boyne Coast and Estuary SAC, designated for a number of habitats (e.g. mudflats and sandflats), it would be prudent to apply safeguards to prevent siltation and other contamination of surface and groundwaters. There are a number of river crossings along the proposed route, particular care should be taken at these locations. All mitigation measures will be in line with industry Best Practice, such as CIRIA Guidance (Murnane et al., 2006) and will be reviewed by the appointed ECoW.

5.2. Operational Phase Mitigation

5.2.1. Designated Sites

The magnitude, scale and significance of any operation impacts potentially affecting designated sites is limited within the project ZoI to effects on European sites. On this basis, all mitigation measures required to avoid significant adverse effects on European sites are addressed in the NIS report for the project.

In summary, potential operational phase impacts were identified in relation to River Boyne and River Blackwater SAC, Boyne Coast and Estuary SAC, and Boyne Estuary SPA; specifically indirect habitat loss/degradation and disturbance of designated features (notably waterbird populations). Appropriate Assessment of these potential operational impacts on European sites concluded that, based on the project design and embedded mitigation measures, significant adverse effects on the integrity of River Boyne and River Blackwater SAC are highly unlikely. However, additional mitigation measures and monitoring are required to avoid adverse effects on the integrity of dune habitats of Boyne Coast and Estuary SAC and waterbird populations of Boyne Estuary SPA. These measures include screening alongside the Greenway route at sections within/adjacent to important habitat for designated wintering waterbird populations, information signage and post-construction monitoring. Detailed information is provided within the NIS report.

5.2.2. Terrestrial Biodiversity

Design measures to minimise operational impacts on sensitive habitats and species are described below. Further details are provided in Section 1.2 of this report.

Lighting Design

The lighting design for the proposed development is detailed in the Outdoor Lighting Report (Sabre Electrical Services Ltd, 2022). At locations where additional operational lighting is required for security and safety, it is proposed to install LED lights to avoid emission of UV light, with cowlings directed away from sensitive features and habitats. Lighting design will specify no light spillage outside of the boardwalk corridor, in line with best practice for bats and birds. Low energy LED luminaires incorporating a solar power source and motion detectors will be specified. Furthermore, to minimisethe requirement for lighting all access features, such as 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 Boyne Greenway to avoid any disturbance. However, the use of lighting will be subject to health and safety requirements. Bird sensitive lighting design will be required where the Boyne Greenway route passes over, adjacent or within 50m of mudflat habitat.

Screening

Landscape planting alongside the Greenway will reduce the potential for disturbance impacts on adjacent habitats and species. In addition, in locations unsuitable for landscape planting and/or where particularly sensitive ecological features are present (e.g. wintering waterbirds), screening barriers will be constructed (e.g. alongside boardwalks) to minimise visual and noise disturbance. The screening will be provided by fixing boardwalk running boards to the fence posts. Boardwalk screening can either be 'half-height' (c.600mm) or 'full height' (c.1400mm). Detailed of screening specifications and locations are provided in the NIS report for the project.

Information Signage

Signage will be provided along the Greenway route in order to educate users on the potential for disturbance impacts on sensitive ecological features, and to encourage a positive code of conduct; particularly with regard to avoiding straying from the Greenway into sensitive habitats and keeping dogs on leads. There is precedent for this on other Greenway projects. Further details are provided regarding designated features of European sites in the NIS report for the project.

5.2.3. Fisheries and Aquatic Biodiversity

No operational mitigation is required for fisheries and aquatic biodiversity receptors as there are no identified pathways for operational impacts, with regard to key receptors. There areno direct or indirect emissions or inputs arising from the proposal which require avoidance, reduction or remediation.

6. Residual Impacts

The proposed Boyne Greenway: Drogheda to Mornington route corridor has been selected as the preferred route through an 18-month iterative design process, in direct consultation with both the Development Applications Unit and NPWS. The construction phase of the project incorporates intrinsic design features which effectively minimise the potential for specific negative impacts on sensitive receptors. Implementation of the proposed intrinsic design submitted in the planning application as contractual obligations, in addition to the implementation in full of the proposed measures set out in **Section 5** above, is anticipated to effectively avoid and, where appropriate, reduce the potential for any significant impacts on the ecological interests identified as key biodiversity receptors within the ZoI of the proposed development. Detailed landscape planting is specified within the design of the proposed development in order to avoid a reduction in habitat extent and biodiversity value (in line with Objective 1 of the National Biodiversity Action Plan 2017-2021). Therefore, there are no significant residual impacts anticipated at the construction stage with regard to biodiversity. This evaluation is summarised in **Table 6.1** below.

The Greenway design includes various measures to minimise operational impacts on ecological receptors. Operational impacts and associated mitigation and monitoring is described in detail in the NIS report for the project. Such measures include sensitive route planning and lighting design, installation of screening and landscape planting, and information signage. Taking account of the sensitive design, and with the implementation in full of the proposed measures set out in **Section 5** above, there are no significant residual impacts identified at operation stage with regard to biodiversity. This evaluation is summarised in **Table 6.1** below.

Table 6.1: Summary of the potential residual impacts on key biodiversity receptors from the proposed Greenway Project.

Biodiversity Receptor	Level of importance	Sensitivity/ protected status	Within footprint of works area	Evaluation of residual impacts	Significance Requiring mitigation
Designated European sites: Boyne Coast and Estuary SAC, Boyne Estuary SPA, River Boyne and River Blackwater SAC	See NIS report				
River Boyne Estuary (CW2/MW4)	National	Annex I EU Habitats Directive	N	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context. Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on this habitat.	Residual impacts are not significant.
Tidal Mudflats and Sandflats (LS4)	National	Annex I EU Habitats Directive	Y	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context. Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on this habitat.	Residual impacts are not significant.
Invasive species: Japanese Knotweed	N/A	Birds and Habitats Regulations	N	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible, limited to the local context.	Residual impacts are not significant.

Biodiversity Receptor	Level of importance	Sensitivity/ protected status	Within footprint of works area	Evaluation of residual impacts	Significance Requiring mitigation
		(2015) Annex III		Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.	
Otter	National	Wildlife Act (2000); Annex II and IV, EU Habitats Directive	N	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context. Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.	Residual impacts are not significant.
Bats	County	Wildlife Act (2000); Annex II EU Habitats Directive	N	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible, limited to the local context. Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.	Residual impacts are not significant.
Waders and Waterbirds (wintering): Shelduck, Oystercatcher, Golden Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone, Little	See NIS report.				

Biodiversity Receptor	Level of importance	Sensitivity/ protected status	Within footprint of works area	Evaluation of residual impacts	Significance Requiring mitigation
Tern, Ringed Plover, Herring Gull					
Breeding Birds	Local (higher value)	Wildlife Act (2000)	Y	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context. Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.	Residual impacts are not significant.
Reptiles and amphibians: Common Lizard, Smooth Newt	County	Wildlife Act (2000)	N	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context. Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.	Residual impacts are not significant.
Fish/fisheries: such as Salmon, Lamprey sp.	National	Wildlife Act (2000); Annex II EU Habitats Directive	N	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context. Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.	Residual impacts are not significant.

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Appendix A: Consultation

Minutes of Meeting in Knocksink Wood Education Centre 27/9/18 between Inís 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), Inís 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 Inís Consultants following their appointment, have modified the original route extensively following scoping and a comprehensive constraints evaluation by Inís 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 Inís 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 Inís 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.

<u>Route design and final layout</u>

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 EcIA 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 – Inís Environmental Consultants
Chris Cullen	CC	Ecologist – Inís 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:

1. **Welcome and Introductions:** GC welcomed all attending and introductions followed.
2. **Project Overview:** Inís 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.
3. **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 his 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.