

Chapter 12
Biodiversity

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12. Biodiversity

12.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) presents the output of the biodiversity assessment and contains information regarding, *inter alia*, the biodiversity baseline scenario, the potential impacts on biodiversity, the mitigation measures and the predicted residual effects of the Tallaght / Clondalkin to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

The likely significant effects of the Proposed Scheme on biodiversity during both the Construction Phase and Operational Phase (including routine maintenance) have been assessed. The potential Construction Phase impacts assessed include those on air, water quality, habitats, and on flora and fauna from construction activities such as utility diversions, road resurfacing, road realignments and the provision of new/ replacement structures. The assessment undertaken for the Proposed Scheme identified numerous key ecological receptors (KERs) within the study area that could potentially be impacted by the Proposed Scheme. These KERs are examined in detail in this Chapter.

The methodologies used to collate information on the baseline biodiversity environment and assess the likely significant impacts of the Proposed Scheme are detailed in the following sections.

The aim of the Proposed Scheme, when in operation, is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the Proposed Scheme are described in Chapter 1 (Introduction). The Proposed Scheme, which is described in Chapter 4 (Proposed Scheme Description), has been designed to meet these objectives.

The design of the Proposed Scheme has evolved through comprehensive design iteration process with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process have been incorporated, where appropriate.

12.2 Methodology

In accordance with the requirements of Directive 2014 / 52 / EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011 / 92 / EU on the assessment of the effects of certain public and private projects on the environment (hereafter referred to as “the EIA Directive”), this Chapter of the EIAR identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Scheme on biodiversity, with particular attention to species and habitats protected under both European Union (EU) and Irish law.

The EIA Directive does not provide a definition of biodiversity. However, as noted in the European Commission, “Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment” (European Commission 2013), Article 2 of the Convention on Biological Diversity, gives the following formal definition of biodiversity:

‘biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems’ (CBD 2006).

Alongside the term ‘*biodiversity*’ the terms ‘*ecology*’ and ‘*ecological*’ are also used throughout this Chapter as broader terms to consider the relationships of biodiversity receptors with one another and with the wider environment.

This Chapter also refers to the Appropriate Assessment Screening Report (hereafter referred to as the AA Screening Report) and the Natura Impact Statement (hereafter referred to as the NIS) which have also been prepared on behalf of the NTA and submitted with the application for approval, so as to enable the Board, as

competent authority, to carry out the assessments required pursuant to Article 6(3) of Council Directive 92 / 43 / EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as “the Habitats Directive”).

A review of the Proposed Scheme was undertaken which identified numerous KERs within the study area that could potentially be impacted by the Proposed Scheme. These KERs are examined in detail in this Chapter.

The methodologies used to collate information on the baseline biodiversity environment and assess the likely significant effects of the Proposed Scheme are detailed in the following sections.

12.2.1 Ecological Survey Study Area

The Proposed Scheme extents are illustrated in the General Arrangement Drawings (BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-9001) in Volume 3 of this EIAR. Ecological surveys were carried out for each of the biodiversity receptors listed in Table 12.1 within a specific study area (as illustrated in Figures 12.1.1 to Figure 12.1.2 in Volume 3 of this EIAR) and focused on assessing potential impacts within the Zone of Influence (Zoi) of the Proposed Scheme. The Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (hereafter referred to as the CIEEM Guidelines) (CIEEM 2018) define the Zoi for a development as the area over which ecological features may be subject to significant impacts as a result of the Proposed Scheme and associated activities (see Section 12.3.1 for more detail on the Zoi as it relates to the Proposed Scheme and the various ecological receptors).

The ecological surveys were designed based upon the characteristics of the Proposed Scheme and its likely significant impacts on the baseline environment during construction and / or operation. The study areas are described in Table 12.1.

Table 12.1: Ecological Survey Study Areas for Each Ecological Receptor

Ecological Receptor	Study Area Description
Habitats	The area within or immediately adjacent to the Proposed Scheme footprint where habitats could be directly or indirectly affected during construction/operation. The extent of the study area for habitats is illustrated in Figure 12.5 in Volume 3 of this EIAR.
Rare and / or Protected Flora	The area within or immediately adjacent to the Proposed Scheme footprint where rare and/or protected flora could be directly or indirectly affected during construction / operation. The extent of the study area for rare and/or protected flora is illustrated in Figure 12.5 in Volume 3 of this EIAR.
Fauna species other than those listed below (includes badger, otter, other protected mammal species, amphibians and reptiles)	The area within or immediately adjacent to the Proposed Scheme footprint where fauna species could be directly or indirectly affected during construction / operation. The extent of the study area for fauna species (other than bats and breeding birds) is illustrated in Figure 12.5 Volume 3 of this EIAR. The extent of otter survey is illustrated in Figure 12.1.3.
Bats	The area suitable for roosting, foraging and / or commuting bats (e.g., bridges, hedgerows, treelines, woodland and watercourses) within or immediately adjacent to the Proposed Scheme footprint where bats could be directly or indirectly affected during construction / operation. The extent of the study area for bats is illustrated in Figure 12.1.1 in Volume 3 of this EIAR.
Wintering Birds	The area suitable for wintering birds within or immediately adjacent to the Proposed Scheme footprint where wintering birds could be directly affected during construction / operation. The extent of the study area for wintering birds is illustrated in Figure 12.1.2 in Volume 3 of this EIAR.
Nesting kingfisher suitability	The area suitable for kingfisher within or immediately adjacent to the Proposed Scheme footprint where breeding birds could be directly affected during construction. The extent of the study area for kingfisher suitability is illustrated in Figure 12.1.3 in Volume 3 of this EIAR.
Aquatic Ecology	Watercourses crossed by the Proposed Scheme footprint where the aquatic ecology could be directly affected during construction/operation. The extent of the study area for aquatic ecology is illustrated in Figure 12.1.3 in Volume 3 of this EIAR.

12.2.2 Relevant Guidelines, Policy and Legislation

The assessment supporting this Chapter has been undertaken in accordance with the following guidance documents:

- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017);
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022a);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (hereafter referred to as the CIEEM Guidelines) (CIEEM 2018);
- National Road Authority (NRA) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority (NRA 2005a);
- Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes. National Roads Authority (NRA 2005b);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. National Roads Authority (NRA 2006a);
- Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (NRA, 2006b);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA 2008a);
- Environmental Impact Assessment of National Road Schemes – A Practical Guide. (NRA 2008b);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009);
- The Management of Invasive Alien Plant Species on National Roads - Technical Guidance (TII 2020a);
- The Management of Invasive Alien Plant Species on National Roads – Standard (TII 2020b);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition (Collins, J. (ed.) 2016);
- The Bat Workers' Manual (Mitchell-Jones and McLeish 1999);
- Bat Mitigation Guidelines for Ireland V2. Irish Wildlife Manuals No. 134 (Marnell *et al.*, 2022);
- The Irish Bat Monitoring Programme 2015 - 2017. Irish Wildlife Manuals 103. (Aughney *et al.* 2018);
- United Kingdom Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) (UKHA 2001a; UKHA 2001b; UKHA 2005);
- National Parks and Wildlife Service (NPWS) Circular NPW 1 / 10 & PSSP 2 / 10 Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities (NPWS 2010);
- Circular Letter NPWS 2 / 07 Guidance on compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species / applications for derogation licences (NPWS 2007a);
- Circular Letter PD 2/07 and NPWS 1 / 07 Compliance Conditions in respect of Developments requiring (1) Environmental Impact Assessment (EIA); or (2) having potential impacts on Natura 2000 sites (NPWS 2007b); and
- All-Ireland Pollinator Plan 2021-2025, National Biodiversity Data Centre Series No. 25, Waterford. March 2021(NBDC 2021).

It should be noted that in some instances standard survey methodology described in some of the guidance documents listed above was modified for practical reasons. Owing to the nature of the Proposed Scheme, being largely within an urban transport corridor, a practical approach was adopted to capture likely presence of protected species and or likely impacts arising as a result of the construction and operation of the Proposed Scheme. Thus, in respect of badger, the NRA 2005b guidance recommends surveys up to 150m beyond corridor boundaries in respect of badger, the NRA 2005b guidance recommends surveys up to 150m beyond corridor boundaries in respect of badger. This is not feasible for much of the existing urban corridor. Similarly, the guidance in respect of bat surveys (NRA 2006b) advocates surveys up to 1km from the route corridor. For similar reasons this is not considered practical and the focus of the multidisciplinary and follow-on surveys has been on areas that could, based on evidence from the desktop study, contain suitable habitat and professional judgement, support the protected species. In respect of otters, accessible riparian areas along at least 150m up and downstream of any proposed watercourse crossing were searched.

Policy and Planning Documents:

- Department of Culture, Heritage and the Gaeltacht (DCHG) National Biodiversity Plan 2017 - 2021 (DCHG 2017);
- Dublin City Council (DCC) Dublin City Development Plan 2022 - 2028 (DCC 2022);
- Dublin City Biodiversity Action Plan 2021 - 2025 (DCC 2021);
- The Heritage Ireland 2030 (Plan) (Government of Ireland 2022);
- South Dublin County Council (SDCC) South Dublin County Development Plan (2022-2028) (SDCC 2022);
- South Dublin County Heritage Plan 2010-2015 (SDCC 2010); and
- Connecting with Nature Biodiversity Action Plan for South Dublin County 2020-2026 (Draft) (SDCC 2020 Draft).

Legislation:

- The Habitats Directive;
- The Birds Directive;
- Directive 2000 / 60 / EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD));
- S.I. No. 477 / 2011 - European Communities (Birds and Natural Habitats) Regulations 2011, as amended (hereafter referred to as the Birds and Habitats Regulations);
- The EIA Directive;
- Planning and Development Acts 2000 to 2022;
- Wildlife Acts 1976 to 2022;
- S.I. No. 235 / 2022- Flora (Protection) Order, 2022 (hereafter referred to as the Flora Protection Order); and
- Inland Fisheries Acts 1959 to 2019.

12.2.3 Data Collection and Collation

12.2.3.1 Desk Study

A desk study involved collection and review of relevant published and unpublished sources of data, collation of existing information on the ecological environment and consultation with relevant statutory bodies.

The following sources were consulted during the desk study to inform the scope of the ecological surveys:

- Online data available on European sites and on Natural Heritage Areas (NHAs) or proposed Natural Heritage Areas (pNHAs) as held by the NPWS (NPWS 2022);
- Online data records available on National Biodiversity Data Centre Database (NBDC Online Database 2022);
- Ordnance Survey Ireland (OSI) orthophotography (from 1995 to 2012) for the Proposed Scheme study area;
- Bus Connects Drone Imagery, surveyed 2020 (NTA 2020);
- Records of rare and / or protected species for the 10km (kilometre) grid squares O02, O03, O13 and O13, held by the NPWS;
- Habitat and species GIS datasets provided by the NPWS, including Article 12 and Article 17 data;
- Records from the Botanical Society of Britain and Ireland (BSBI 2022);
- Information contained within the Flora of County Dublin (Doogue *et al.* 1998);
- Environmental information / data for the area available from the EPA website (EPA 2022b);
- Information on the status of European Union (EU) protected habitats and species in Ireland (NPWS 2019a, NPWS 2019b and NPWS 2019c); and

- Information on light-bellied Brent goose *Branta bernicla hrota* inland feeding sites (Scott Cawley Ltd. 2017).

A desk study was carried out to identify suitable bat foraging and / or commuting habitat (e.g. woodland and mature treelines) that may be affected by the Proposed Scheme (e.g. areas where vegetation will, or is likely to be, directly affected by works associated with the Proposed Scheme). Following this, transect routes for bat activity surveys were designed within these areas to encompass a representative sample of the habitats present within the Proposed Scheme area.

A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for wintering birds located within or directly adjacent to the Proposed Scheme. This included a review of recent aerial photography and known inland feeding sites for the Special Conservation Interest (SCI) bird species light-bellied Brent goose *Branta bernicla hrota* (Scott Cawley Ltd. 2017). The desk study identified sites in which significant suitable foraging and/or roosting habitat which would be directly lost as a consequence of the Proposed Scheme, for further wintering bird surveys.

A desk study was carried out to identify all hydrological crossing points within the footprint of the Proposed Scheme. Aquatic surveys, suitability assessments for nesting birds and dedicated otter surveys were undertaken at the proposed crossing points at which in-stream works, modifications to banks or significant disturbance (i.e. piling / rock breaking techniques) are proposed.

12.2.3.2 Ecological Surveys

This Section describes the various ecological survey methodologies used to collate baseline ecological information in the preparation of this Chapter. The ecological surveys carried out are summarised in Table 12.1.

Table 12.1: Ecological Surveys and Survey Dates Between 2018 and 2022

Survey	Survey Date(s)	Surveyor Reference
Habitat survey	June to August 2018 August 2020 December 2022, January 2023 – (areas where design changes occurred)	Scott Cawley Ltd.
Mammal surveys (excluding bats)	June to August 2018 August 2020 October 2020 December 2022, January 2023 – (areas where design changes occurred)	Scott Cawley Ltd.
Bat surveys	<u>Walked transect activity surveys</u> June to August 2018 September and October 2019 May 2020 July 2020 <u>Identification of potential roost features (PRFs)</u> June to August 2018 August 2020 March 2022 December 2022, January 2023 – (areas where design changes occurred)	Scott Cawley Ltd.
Nesting kingfisher suitability	October 2020	
Wintering bird survey	February to March 2020 October 2020 to March 2021 October 2021 to March 2022 December 2022, January 2023 – (areas where design changes occurred)	Scott Cawley Ltd.
Amphibian habitat suitability assessment	June to August 2018	Scott Cawley Ltd.

Survey	Survey Date(s)	Surveyor Reference
	August 2020	
Reptile habitat suitability assessment	June to August 2018 August 2020	Scott Cawley Ltd.
Fisheries / aquatic surveys	July 2022	Triturus Environmental Ltd.

12.2.3.3 Habitat Survey

Habitat surveys were carried out by Scott Cawley Ltd., between June and August 2018, and in August 2020 to capture design changes to the Proposed Scheme. Where further iterative changes were proposed, typically associated with the relocation of proposed Construction Compounds, confirmatory walkover surveys were undertaken on 22 December 2022 and 5 January 2023. All habitats located within or immediately adjacent to the Proposed Scheme footprint were surveyed and mapped to level three of the Heritage Council's A Guide to Habitats in Ireland habitat codes, after Fossitt (Fossitt 2000) and in accordance with Best Practice Guidance for Habitat Survey and Mapping (Smith *et al.* 2011). The level of field data quality (as per Smith *et al.*, 2011) was also recorded. Plant species present that were either representative of a habitat or considered to be of conservation interest (i.e., those listed on the Flora Protection Order or listed in the 'Threatened' category or higher on the Ireland Red List No. 10 Vascular Plants (Wyse Jackson *et al.* 2016) and the Ireland Red List No. 8 Bryophytes (Lockhart *et al.* 2012)) were recorded, along with their relative abundances. Non-native invasive plant species listed on the Third Schedule of the (Birds and Natural Habitats) Regulations were also recorded. The habitat's extent was mapped onto an aerial photograph, with Global Positioning System (GPS) points taken where a habitat's extent could not be clearly identified from the aerial photograph. Vascular plant nomenclature follows that of the New Flora of the British Isles Fourth Edition (Stace 2019).

12.2.3.4 Mammals (Excluding Bats)

The footprint of the Proposed Scheme was surveyed for badger *Meles meles* and otter *Lutra lutra* activity as part of the multidisciplinary walkover survey, undertaken between June and August 2018, in August 2020 and October 2020. Where further iterative changes were proposed, typically associated with the relocation of proposed Construction Compounds, confirmatory walkover surveys were undertaken on 22 December 2022 and 5 January 2023. The presence / absence of these species was surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings as well as by direct observation. In addition, the study area was surveyed for the presence of badger sett and otter holts. Where present, any evidence of use was recorded.

No species-specific surveys were considered necessary for other protected mammal species for which field signs are less frequent and / or less reliable than other larger mammals, such as pine marten *Martes martes*, Irish stoat *Mustela erminea hibernica* and Irish hare *Lepus timidus hibernicus*. Nevertheless, during all surveys, attention was paid to activity signs such as searching soft muds for tracks, and to look for droppings. Potential presence of these species in suitable habitat was determined based on the habitat preferences described in Exploring Irish Mammals (Hayden and Harrington 2000).

12.2.3.5 Bats

The following sections describe the methodologies employed to carry out the various bat surveys undertaken in 2018, 2019, 2020, 2021 and 2022 to inform the EIAR. The bat surveys were carried out under the following licences, issued by the NPWS:

- DER / BAT 2019-02 (amended) – Derogation licence to disturb bat roosts throughout the State;
- DER / BAT 2020-67 (amended) – Derogation licence to disturb bat roosts throughout the State;
- DER / BAT 2021-01 (amended) – Derogation licence to disturb bat roosts throughout the State; and
- DER / BAT 2022-02 (amended) – Derogation licence to disturb bat roosts throughout the State.

12.2.3.5.1 Bats - Walked Transect Surveys

Walked bat activity transect surveys were conducted along preselected transect routes at four locations along the Proposed Scheme. Transect routes were located along the R134 New Nangor Road between Oak Road and

Willow Road, referred to as CBC0809BT001, along Greenhills Road between Greenhills Motor Spares and Chadwicks Home Improvement Store, referred to as CBC0809BT002, along Greenhills Road between Tymon Park and Calmount Avenue, referred to as CBC0809BT003 and along Blessington Road, Main Street and Old Greenhills Road in Tallaght as far as Astro Park Tallaght, referred to as CBC0809BT004. The walked transect routes are shown on Figure 12.1.1 in Volume 3 of this EIAR.

Walked transect surveys comprised of four visits to each transect route across the three seasons of autumn, spring and summer as guided by Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins 2016) (see Table 12.1. for specific dates). Surveys were conducted in June to August 2018, September and October 2019, and May and July 2020. Surveys commenced approximately 30 minutes after sunset to ensure that bats had emerged from their roosts. Surveys involved the surveyor walking each transect route at a slow pace using with a handheld ultrasound bat detector (Elekon Batlogger M) to record any bat species present.

All bat calls were analysed using Elekon BatExplorer software. Calls were manually identified against species descriptions provided within British Bat Calls - A Guide to Species Identification (Russ 2012).

12.2.3.5.2 Bats - Tree Surveys

Trees located within the footprint of the Proposed Scheme were assessed for their potential to support roosting bats (i.e., to contain Potential Roost Features (PRFs)) as part of the multidisciplinary walkover survey carried out between June and August 2018, August 2020 and March 2022. Where further iterative changes were proposed, typically associated with the relocation of proposed Construction Compounds, walkover surveys confirming presence absence of PRFs were undertaken on 22 December 2022 and 5 January 2023.

A number of trees located along the Proposed Scheme were examined from ground level for the potential to support roosting bats. They were assessed based on the presence of features commonly used by bats. Examples of such features include:

- Natural holes;
- Cracks / splits in major limbs;
- Loose bark; and
- Hollows / cavities.

12.2.3.6 Wintering Birds

A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for wintering birds located within or directly adjacent to the Proposed Scheme. This included a review of recent aerial photography and known inland feeding sites for the SCI bird species light-bellied Brent goose (Scott Cawley Ltd. 2017).

The desk study identified five suitable wintering bird sites, located adjacent to the Proposed Scheme, which would be subject to habitat loss, or disturbance at the very least by the Proposed Scheme. These were located along amenity grassland sections along Greenhills Road to the west of the M50, referred to as CBC0809WB001; at grassland area adjacent to Templewoods residential area off Greenhills Road, referred to as CBC0809WB002; Tymon Park along Greenhills Road, referred to as CBC0809WB003; at amenity grassland along Calmount Road, referred to as CBC0809WB004; and amenity grassland at Bunting Park, referred to as CBC0809WB005 (refer to Figure 12.1.2 in Volume 3 of the EIAR for site locations). These sites were surveyed over seven consecutive weeks across February and March 2020 and additionally twice a month, between the months October 2020 and March 2021¹, and again between October 2021 and March 2022 during the 2021-2022 season. The results of the desk study and field surveys have informed the assessment of potential impacts on wintering bird species arising from the Proposed Scheme. Where further iterative changes were proposed, typically associated with the relocation of proposed Construction Compounds, a walkover of the site confirming potential use of open territory by wintering bird species were undertaken on 22 December 2022 and 5 January 2023.

The approach for wintering bird surveys was a 'look-see' methodology (based on Gilbert *et al.*, 1998). All birds present within a site were identified with reference to Collins Bird Guide (Svensson 2009) to confirm identification

¹ A scheduled visit in early January 2021 was postponed owing to government COVID-19 restrictions having been revised around that time.

(where necessary) and were recorded using the British Trust for Ornithology (BTO) species codes. The total flock size of birds present, their general location within the site and any activity exhibited were also recorded. Bird droppings were recorded along walked transect lines.

12.2.3.7 Reptiles

The suitability of habitats, located within and immediately adjacent to the Proposed Scheme, were assessed for breeding and / or hibernating reptile species common lizard *Zootoca vivipara*, as part of the multidisciplinary walkover surveys undertaken between June and August 2018 and in August 2020.

12.2.3.8 Amphibians

An assessment of the suitability of surface water features, such as watercourses, drainage ditches and ponds for amphibian species (common frog *Rana temporaria* and smooth newt *Lissotriton vulgaris*) along the footprint of the Proposed Scheme, and suitable lands immediately adjacent, was carried out as part of the multidisciplinary walkover surveys undertaken between June and August 2018 and in August 2020.

12.2.3.9 Aquatic Surveys

A desk study was carried out to identify all hydrological crossing points within the footprint of the Proposed Scheme. Three proposed crossing points where water bodies may be subject to significant disturbance as a consequence of the Proposed Scheme were identified. Aquatic habitat surveys and fisheries assessment were undertaken (Triturus Environmental Ltd 2022) at a number of locations, namely the River Camac at Yellowmeadows (CBC0809AR001), at the R134 New Nangor Road (CBC0809AR002) and the River Poddle at Bancroft Park, Tallaght (CBC0809AR003).

Fisheries habitat assessments were undertaken in 2020 and again in 2022 to establish the fisheries importance of each site for all fish species of conservation value. The assessments were carried out utilising elements of the approaches in the River Habitat Survey Methodology (Environment Agency 2003) and Fishery Assessment Methodology (O'Grady 2006) to broadly characterise the river sites (i.e., channel profiles, substrata, etc.). Surveys were carried out for salmonids using the Life Cycle Unit method (Kennedy 1984; O'Connor and Kennedy 2002) by assigning quality scores to each type of habitat. Higher scores in the Life Cycle Unit method of fisheries quantification are representative of poorer value, with lower scores being more optimal (despite this appearing counter intuitive). Lamprey habitat was assessed using the novel Lamprey Habitat Quality Index (LHQI) scoring system as devised by Triturus Environmental Ltd, which loosely follows the same rationale as the Life Cycle Unit score for salmonids above (Kennedy 1984; O'Connor and Kennedy 2002). Larval lamprey habitat quality as well as the suitability of adult spawning habitat was assessed based on the information provided in Maitland (2003). Water quality assessments were undertaken using the Macroinvertebrate Q-sampling methodology (Toner *et al.*, 2005).

Further limited surveys, following the same approach as described above, were carried out in 2022 at the same locations. The areas surveyed in 2020, were resurveyed in 2022 and are shown on Figure 12.1.3 in Volume 3 of this EIAR.

12.2.4 Appraisal Method for the Assessment of Impacts

The biodiversity and ecological impacts of the Proposed Scheme have been assessed using the following guidelines:

- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017);
- The EPA Guidelines (EPA 2022a);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013);
- CIEEM Guidelines (CIEEM 2018); and
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009).

12.2.4.1 Valuing the Ecological Receptors

Biodiversity receptors (including identified sites of biodiversity importance) have been valued with regard to the ecological valuation examples set out in the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009). These include International Importance, National Importance, County Importance, and Local Importance.

Habitat areas within Special Areas of Conservation (SACs) and Special Areas of Conservation (SPAs) are considered in the context of assessing impacts on the conservation objectives and site integrity of a given European site with regard to the Appropriate Assessment (AA) tests set out in Article 6(3) of the Habitats Directive. An AA Screening Report and Natura Impact Statements have been submitted with the application for approval as to enable the Board to carry out the requisite assessments for the purposes of Article 6(3) of the Habitats Directive. For the purposes of the appraisal of likely significant effects on biodiversity arising from the Proposed Scheme, as part of this chapter of the EIAR, all European sites are valued as internationally important.

In accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009), biodiversity features within the Zol of the Proposed Scheme which are *'both of sufficient value to be material in decision making and likely to be affected significantly'* are deemed to be KERs. These are the biodiversity receptors which may be subject to likely significant impacts from the Proposed Scheme, either directly or indirectly. KERs are those biodiversity receptors with an ecological value of Local Importance (Higher Value) or greater.

12.2.4.2 Characterising and Describing the Impacts

The parameters considered in characterising and describing the magnitude or scale of the likely significant effects of the Proposed Scheme are outlined in Table 12.2.

Table 12.2: Parameters used to Characterise and Describe the Magnitude or Scale of Potential Impacts

Parameter	Categories
Type of impact	Positive / Neutral / Negative May also include Cumulative Effects, 'Do Nothing Effects', 'Do Minimum Effects', Indeterminable Effects, Irreversible Effects, Residual Effects, Synergistic Effects, Indirect Effects and / or Secondary Effects.
Extent	The size of the affected area / habitat and / or the proportion of a population affected by the effect.
Duration	The period of time over which the effect will occur*.
Frequency and Timing	How often the effect will occur; particularly in the context of relevant life-stages or seasons.
Reversibility	Permanent/Temporary Will an impact reverse; either spontaneously or as a result of a specific action.

Note: *The above terms / definitions for describing the duration of impacts are provided in the EPA Guidelines (EPA 2022a): Momentary Effects - effects lasting from seconds to minutes; Brief Effects - effects lasting less than a day; Temporary Effects - effects lasting less than a year; Short-term Effects - effects lasting one to seven years; Medium-term Effects - effects lasting seven to 15 years; Long-term Effects - effects lasting 15 to 60 years; Permanent Effects - effects lasting over 60 years.

The likelihood of an impact occurring, and the predicted effects, are also an important consideration in characterising impacts. The likelihood of an impact occurring is assessed as being certain, likely or unlikely and in some cases, it may be possible to definitively conclude that an impact will not occur.

Professional judgement is used in considering the contribution of all relevant criteria in determining the overall magnitude of an impact.

12.2.4.3 Impact Significance

In determining impact significance, the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009) and the CIEEM Guidelines (CIEEM 2018) were followed, which requires examination of the following two key elements:

- Impact on the integrity of the ecological feature; and
- Impact on its conservation status within a given geographical area.

12.2.4.3.1 Integrity

The term 'integrity' should be regarded as the coherence of ecological structure and function, across the entirety of a site that enables it to sustain all of the biodiversity or ecological resources for which it has been valued (NRA 2009).

The term 'integrity' is most often used when determining impact significance in relation to designated areas for nature conservation (e.g., Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or proposed Natural Heritage Areas (pNHAs) / Natural Heritage Areas (NHAs) but can often be the most appropriate method to use for non-designated areas of biodiversity value where the component habitats and / or species exist with a defined ecosystem at a given geographic scale.

An impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favourable condition: removing or changing the processes that support the sites' habitats and / or species; affect the nature, extent, structure and functioning of component habitats; and / or, affect the population size and viability of component species.

12.2.4.3.2 Conservation Status

The definitions for conservation status given in the Habitats Directive, in relation to habitats and species, are also used in the CIEEM Guidelines (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009):

- For natural habitats, conservation status means the sum of the influences acting on the natural habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species, at the appropriate geographical scale; and
- For species, conservation status means the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations, at the appropriate geographical scale.

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status.

After the definitions provided in the Habitats Directive, the conservation status of a habitat is favourable when:

- Its natural range and areas it covers within that range are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable as defined below under species.

And, the conservation status of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

According to the CIEEM Guidelines (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Schemes methodology (NRA 2009), if it is determined that the integrity and / or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e., local, county, national, international). In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a species which is considered to be internationally important. However, an impact may occur at a local level on this internationally important species. In this case,

the impact on an internationally important species is considered to be significant at only a local, rather than international level.

12.3 Baseline Environment

The Proposed Scheme has an overall length of approximately 15.5km with an additional offline cycling corridor approximately 3.9 km. It will be comprised of two main alignments in terms of the route it follows; namely the Tallaght to City Centre section and the Clondalkin to Drimnagh section.

The Tallaght to City Centre section of the Proposed Scheme begins at the junction of Old Blessington Road / Cookstown Way and is routed in a general easterly direction. Hard standing dominates the route between Belgard Square and R819 Greenhills Road, with areas of woodland and grassland habitats present within the grounds of Technological University Dublin (TUD), Tallaght. As the Proposed Scheme extends north-eastwards along R819 Greenhills Road, hard standing again dominates with the River Poddle being crossed by the Proposed Scheme at Bancroft Park. Hard standing dominates the landscape along R819 Greenhills Road up to the M50 with areas of woodland, amenity grassland and scattered trees and parkland also present along the existing road corridor. Residential properties are abundant approaching the M50 flyover. East of the M50, the Proposed Scheme continues along R819 Greenhills Road towards the Walkinstown Roundabout, with a divergent section running through Ballymount Industrial Estate along Calmount Road. Habitats along this section of the Proposed Scheme include grasslands, scrub and immature woodland. From Walkinstown Roundabout, the Proposed Scheme extends eastwards towards the Grand Canal at Dolphin's Barn, running through Drimnagh and Crumlin, with the offline cycling corridor heading eastwards via Bunting Road, Kildare Road and Clogher Road to the Grand Canal at R111 Parnell Road. The dominant habitat along the Proposed Scheme alignment here is residential properties, with amenity grassland present at Bunting Park. At Dolphin's Barn, small areas of amenity and unmanaged grassland and treelines, as well as reed and large sedge swamp habitat, runs alongside the canal. From Dolphin's Barn, the Proposed Scheme travels along R110 Dolphin's Barn Street, Cork Street, St. Luke's Avenue, Dean Street, R137 Patrick Street and Nicholas Street, where it will tie in with existing infrastructure at Christchurch in the City Centre.

The Clondalkin to Drimnagh section of the Proposed Scheme begins at the junction of the R134 New Nangor Road and Woodford Walk and runs along the R134 New Nangor Road, R810 Naas Road, R112 Walkinstown Avenue and R110 Long Mile Road until it reaches Drimnagh, where it then ties in with the Tallaght to City Centre section of the Proposed Scheme. Habitats present along the R134 New Nangor Road, west of the M50, include the Grand Canal, amenity grassland, hedgerows, immature woodland, treelines, unmanaged grassland and the River Camac. As the R134 New Nangor Road travels through industrial lands towards the R810 Naas Road, the dominant habitat type along the existing road is amenity grassland. Hedgerows, ornamental / non-native shrubs, scattered trees and parkland, all of which are associated with commercial / industrial properties, are also present. The River Camac runs along the R134 New Nangor Road also. As the Proposed Scheme approaches the R810 Naas Road there is a large area of scrub and unmanaged grassland between the R134 New Nangor Road and Killeen Road, within which large stands of the non-native invasive Japanese knotweed are present. As the Proposed Scheme moves eastwards along the R810 Naas Road, amenity grassland dominates the verges with managed hedgerows present in the central median. Amenity grassland and hedgerows dominate the verges of R112 Walkinstown Avenue also and residential properties and amenity grassland are found along the R110 Long Mile Road until this section of the Proposed Scheme ties into the Tallaght to City Centre section of the Proposed Scheme at Drimnagh.

12.3.1 Zone of Influence (Zol)

The Zol, or distance over which a likely significant effect may occur, will differ across the KERs, depending on the predicted impacts and the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken has established the habitats and species present along the alignment of the Proposed Scheme. The Zol is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Proposed Scheme. In some instances, the Zol extends beyond the study area as described in Section 12.2.1 (e.g., surface water quality effects of a sufficient magnitude can extend, and affect, receptors at significant distances downstream).

The Zol of the Proposed Scheme in relation to terrestrial habitats is generally limited to the footprint of the Proposed Scheme, and the immediate environs (to take account of shading or other indirect impacts, such as air

quality). Hydrogeological / hydrological linkages (e.g., rivers or groundwater flows) between impact sources and wetland / aquatic habitats can often result in impacts occurring at significant distances.

The underlying aquifers are either Locally Important Bedrock Aquifer (moderately productive only in local zones) or Poor Bedrock Aquifer (generally unproductive except for local zones). These types of aquifers are associated with low permeability which decreases with depth. An upper shallow zone of higher permeability may exist in the top few metres and is associated with relatively short flow paths. Therefore, any influence on the groundwater as a result of the proposed works will be localised and will not extend to any groundwater dependant habitats which are all located over 400m from any proposed work. This Zol is determined by the professional judgement of the hydrogeology specialists. This is further discussed with reference to specific construction activities in Chapter 14 (Land, Soils, Geology & Hydrogeology).

The unmitigated Zol of air quality effects is generally local to the Proposed Scheme and not greater than a distance of 50m from the Proposed Scheme boundary, and 500m from Construction Compound during the Construction Phase, and up to 200m the Proposed Scheme boundary or local road networks experiencing a change in AADT (Annual Average Daily Traffic) flows greater than 1,000 during the Operational Phase (refer to Chapter 7 (Air Quality) for more detail).

With regards to hydrological impacts, the distances over which water-borne pollutants are likely to remain in sufficient concentrations to have a likely significant effect on receiving waters and associated wetland / terrestrial habitat is highly site-specific and related to the predicted magnitude of any potential pollution event. Evidently, it will depend on volumes of discharged waters, concentrations and types of pollutants (in this case; sediment, hydrocarbons, and heavy metals), volumes of receiving waters and the ecological sensitivity of the receiving waters. In the case of the Proposed Scheme, this includes: all estuarine habitats downstream of where the Proposed Scheme will drain to, or cross water bodies listed in Table 12.3 and the marine environment of Dublin Bay (see Figure 12.2 in Volume 3 of this EIAR).

As such, the potential Zol for aquatic plant and animal species includes all estuarine habitats located downstream of where the Proposed Scheme will drain to the proposed crossing points listed in Table 12.3 and the marine environment of Dublin Bay. The Zol for impacts to aquatic fauna species, such as Atlantic salmon *Salmo salar* and lamprey species *Lampetra* spp., is limited to those water courses that will be crossed / intersected by the Proposed Scheme or water bodies to which runoff from the Proposed Scheme could drain to during construction and operation.

Table 12.3: Water bodies Hydrologically Connected to the Proposed Scheme and Within its Zol

Waterbody Name	Connectivity to the Proposed Scheme
River Dodder (Dodder_040)	The River Dodder is not crossed by the Proposed Scheme and is located approximately 220m to the south of the Tallaght to City Centre section of the Proposed Scheme. There are no proposed crossings of the River Dodder.
River Poddle (Poddle_010)	Crossed by the Proposed Scheme at two locations along the Tallaght to City Centre section of the Proposed Scheme; Bancroft Park and under St. Luke's Avenue in the City Centre where the river is culverted. Discharges into the Liffey Estuary Upper at Usher's Quay.
River Camac (Camac_040)	Crossed by the Proposed Scheme in three locations along the Clondalkin to Drimnagh section of the Proposed Scheme; under Nangor Road (R134) to the west of the M50, under the Nangor Road (R134) at Oak Road Business Park and under the Naas Road (R110). Discharges into the Liffey Estuary Upper adjacent to Heuston Station.
Liffey Estuary Upper	Hydrologically connected to the Proposed Scheme via the River Poddle and River Camac. Located approximately 200m to the north of the Proposed Scheme.
Liffey Estuary Lower	Hydrologically connected to the Proposed Scheme via the Liffey Estuary Upper and Grand Canal. Located approximately 1.7km downstream of the River Poddle's discharge point.
Dublin Bay	Located approximately 8.9km downstream of Proposed Scheme. The Liffey Estuary Lower discharges into Dublin Bay.

The Zol for small mammal species, such as the pygmy shrew *Sorex minutus*, would be expected to be limited to no more than approximately 100m from the Proposed Scheme boundary due to their small territory sizes and sedentary lifecycle. The Zol for otters, badgers, Irish stoat, and hedgehogs *Erinaceus europaeus* may extend over greater distances than small mammal and bird species due to their ability to disperse many kilometres from their natal / resting sites. This Zol (i.e. approximately 150m from Proposed Scheme boundary) for badgers and

otters breeding / resting places has been defined in accordance with the Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2005a) and the Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2005b) and the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006b) and is considered to be of a precautionary distance. During construction-related disturbance, the screening effect provided by surrounding vegetation and buildings would likely reduce the actual distance of the Zol for badgers and otters.

The Zol of potential effects to bat roosts would not be expected to exceed approximately 200m in most cases but as effects are dependent on many factors (such as species, roost type, surrounding habitat, commuting routes *etc.*), this is assessed on a case-by-case basis and the Zol may increase / decrease from this distance accordingly. Given the large foraging ranges for some species, the Zol of potential landscape scale impacts, such as habitat loss and severance, could extend for several kilometres from the Proposed Scheme but the most significant effects are likely to occur within 1km of important roost sites (e.g., maternity roosts). Leisler's bats have been recorded foraging up to 13km from maternity roost sites (Shiel *et al.* 1999).

The Zol of the Proposed Scheme in relation to likely significant effects on most breeding bird species is generally limited to habitat loss within the footprint of the Proposed Scheme, and disturbance / displacement during construction and disruption in territorial singing due to noise during operation. Disturbance effects may extend for several hundred metres from the Proposed Scheme.

The Zol in relation to indirect impacts to wintering birds could extend up to approximately 300m from the Proposed Scheme for general construction activities, as many species (such as waterbirds) are highly susceptible to disturbance from loud and unpredictable noise during construction. However, as many estuarine bird species use inland habitat areas at distances from the coast, the Zol for *ex-situ* impacts could extend a considerable distance from the Proposed Scheme. In the case of the Proposed Scheme, impacts to wintering birds within this 300m band could affect the use of potential *ex-situ* sites for bird species listed as SCIs of European sites.

Current understanding of construction related noise disturbance to wintering waterbirds is based on the research presented in Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance by Cutts *et al.* (2009) and Exploring Behavioural Responses of Shorebirds to Impulsive Noise by Wright *et al.* (2010). In terms of construction noise, levels below 50dB (decibels) are not expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect / level of response from birds (i.e., birds becoming alert and some behavioural changes (e.g., reduced feeding activity)), but birds are expected to habituate to noise levels within this range. Noise levels above 70dB are likely result in birds moving out of the affected zone or leaving the site altogether. At approximately 300m, typical noise levels associated with construction activity (British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228-1) (BSI 2008)) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

The Zol in relation to amphibian species is likely to be limited to direct habitat loss and severance within the Proposed Scheme boundary and / or indirect impacts to water quality in wetland habitats hydrologically connected to the Proposed Scheme.

The Zol in relation to the common lizard is likely to be limited to direct habitat loss and severance within and across the Proposed Scheme boundary and disturbance / displacement effects in the immediate vicinity during construction.

12.3.2 Desk Study

The results of the desk study review are provided in Appendix A12.1 in Volume 4 of this EIAR and are incorporated into the sections below under the various headings, as relevant.

12.3.3 Local Biodiversity Areas

The Dublin City Biodiversity Action Plan 2021 – 2025 (DCC 2021) highlights a number of areas considered to be of biodiversity value present within the boundaries of DCC. These areas that are located within the Zol of the Proposed Scheme are provided below:

- Dublin City's Green Infrastructure Network. Habitats within the Proposed Scheme which are considered to contribute to the Green Infrastructure Network include semi-natural calcareous grassland, hedgerows, treelines and woodlands, which support a range of species and act as ecological links / corridors across the wider landscape. Dublin City's network of parks and public green spaces support a variety of species and is considered to be a valuable biodiversity resource. Examples include William Pearse Park, Eamonn Ceannt Park, Bunting Park on the Tallaght to City Centre section of the Proposed Scheme and Lansdowne Valley Pitch and Putt on the Clondalkin to Drimnagh section of the Proposed Scheme;
- Dublin City's network of rivers, streams and riparian zones. The Proposed Scheme is hydrologically connected to River Camac which supports a range of riverine bird species, such as kingfisher *Alcedo atthis*, fish species and white-clawed crayfish *Austropotamobius pallipes*. The Proposed Scheme is hydrologically connected to the River Poddle; however, this river has no known fish populations. The River Poddle is culverted from Harolds Cross to Wellington Quay, where it discharges into the Liffey Estuary Upper. The Proposed Scheme is hydrologically connected to the Liffey Estuary Lower. The River Liffey supports a range of riverine bird species, including kingfisher; a long-established otter population, which by virtue of distance and territory is linked to Qualifying Interest populations from Wicklow Mountains SAC and fish species. The Liffey Estuary is noted as being highly significant regional salmonid catchment for species of Atlantic salmon and brown trout *S. trutta*. It also supports brook lamprey *L. planeri*, river lamprey *L. fluviatilis* and white-clawed crayfish; and
- The Grand Canal is contained within the Zol of the Proposed Scheme. It is noted as an important aspect of Dublin City's Green Infrastructure network, linking the River Shannon to Dublin Bay. It is designated as a pNHA and also supports coarse fish species, including roach *Rutilus*, pike *Esox lucius*, rudd *Scardinius erythrophthalmus*, bream *Abramis brama* and tench *Tinca tinca*. It also contains the legally protected FPO species opposite-leaved pondweed *Groenlandia densa*, as well as the endangered Red List freshwater snail species glutinous snail *Myxas glutinosa*. Otter activity is often found where the canal crosses with streams and rivers throughout the city.

The South Dublin County Development Plan 2022-2028 (SDCC 2022) highlights a number of areas considered to be of biodiversity value present within the SDCC administrative boundary. These areas that are located within the Zol of the Proposed Scheme are provided below:

- Habitats considered to be of importance, such as hedgerows and woodlands, which support a range of species and act as important ecological links / corridors across the wider landscape;
- South Dublin County Councils network of rivers streams and riparian zones contributing to the biodiversity resource of the county. The River Camac supports fish species and provides a wildlife corridor for protected species, such as otter, kingfisher and bats; and
- Network of parks and public green spaces which support a variety of species and habitats and are considered to be a valuable biodiversity resource. Examples include TUD Tallaght, Bancroft Park and Tymon Park on the Tallaght to City Centre section of the Proposed Scheme.

Local biodiversity areas listed above are considered under the relevant flora and / or fauna KERs that rely on these areas in the overall EIAR biodiversity assessment.

12.3.4 Designated Areas for Nature Conservation

12.3.4.1 European Sites

The Proposed Scheme does not overlap with any European site. The nearest European site to the Proposed Scheme is Glenasmole Valley SAC, which is located approximately 2.9km away. The Proposed Scheme is also hydrologically connected to South Dublin Bay and River Tolka Estuary SPA, as well as South Dublin Bay SAC. These European sites are located approximately 6.5km downstream of the point at which the River Poddle discharges into the Liffey Estuary Upper.

There are eight European sites located in Dublin Bay which are hydrologically connected and downstream of the Proposed Scheme: South Dublin Bay SAC, North Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC, Dalkey Islands SPA, Howth Head Coast SPA, North Bull Island SPA and South Dublin Bay and River Tolka SPA. European sites will be hydrologically connected to the Proposed Scheme via the River Camac (Camac_040), River Poddle (Poddle_010), Grand Canal, River Dodder (Dodder_040), the Liffey Estuary Upper

and Liffey Estuary Lower. In addition, the Rye Water Valley / Carton SAC is located upstream of the Proposed Scheme and is hydrologically connected to the Proposed Scheme via the River Liffey.

There are twelve SPAs designated for SCI species that are known to forage and / or roost at inland sites across Dublin City and / or utilise Dublin Bay. These include South Dublin Bay and River Tolka SPA, North Bull Island SPA, Dalkey Islands SPA, Baldoye Bay SPA, Rogerstown Estuary SPA, Skerries Islands SPA, Rockabill SPA, Ireland's Eye SPA, Howth Head Coast SPA, Lambay Island SPA, Malahide Estuary SPA, and The Murrough SPA.

There are two European sites containing marine mammals which are known to frequent Dublin Bay and the Liffey Estuary Lower, namely; Rockabill to Dalkey Island SAC and Lambay Island SAC.

There are 28 European sites (SACs or SPAs) located within the vicinity of the Proposed Scheme, of which 17 are located within the Zol. Each site, their distance to the Proposed Scheme and their designations (QIs / SCIs) are listed in Table 12.4 and illustrated in Figure 12.3 in Volume 3 of this EIAR.

It is confirmed that, for the purposes of the EIAR, these European sites are all valued as being of International Importance.

Table 12.4: European sites (SACs and SPAs) Located within the Zol (highlighted in light blue), and those in the Wider Area, of the Proposed Scheme Boundary

Site Name	Distance	Designation – QIs or SCIs
SAC		
South Dublin Bay SAC [000210]	Approximately 3.9km east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Mudflats and sandflats not covered by seawater at low tide [1140]; • Annual vegetation of drift lines [1210]; • <i>Salicornia</i> and other annuals colonising mud and sand [1310]; and • Embryonic shifting dunes [2110]. <p><i>S.I. No. 525 / 2019 - European Union Habitats (South Dublin Bay Special Area of Conservation 000210) Regulations 2019</i></p> <hr/> <p>Source: Conservation Objectives: South Dublin Bay SAC 000210. Version 1. (NPWS 2013b)</p>
North Dublin Bay SAC [000206]	Approximately 6.2km north-east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Mudflats and sandflats not covered by seawater at low tide [1140]; • Annual vegetation of drift lines [1210]; • <i>Salicornia</i> and other annuals colonising mud and sand [1310]; • Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]; • Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]; • Embryonic shifting dunes [2110]; • Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes') [2120]; • Fixed coastal dunes with herbaceous vegetation ('grey dunes') [2130]*; and • Humid dune slacks [2190]. <p>Annex II Species:</p> <ul style="list-style-type: none"> • Petalwort <i>Petalophyllum ralfsii</i> [1395]. <p><i>S.I. No. 524 / 2019 – European Union Habitats (North Dublin Bay Special Area of Conservation 000206) Regulations 2019</i></p> <p>Source: Conservation Objectives: North Dublin Bay SAC 000206. Version 1. (NPWS 2013a)</p>
Rockabill to Dalkey Island SAC [003000]	Approximately 12.1km south-east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Reefs [1170]. <p>Annex II Species:</p> <ul style="list-style-type: none"> • Harbour porpoise <i>Phocoena phocoena</i> [1351].

Site Name	Distance	Designation – QIs or SCIs
		<p><i>S.I. No. 94 / 2019 – European Union Habitats (Rockabill To Dalkey Island Special Area Of Conservation 003000) Regulations 2019</i></p> <p>Source: Conservation Objectives: Rockabill to Dalkey Island SAC 003000. Version 1. (NPWS 2013d)</p>
Howth Head SAC [000202]	Approximately 11.9km north-east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]; and • European dry heaths [4030]. <p><i>S.I. No. 524 / 2021 - European Union Habitats (Howth Head Special Area of Conservation 000202) Regulations 2021</i></p> <p>Source: Conservation Objectives: Howth Head SAC 000202. Version 1. (NPWS 2016)</p>
Wicklow Mountains SAC [002122]	Approximately 5.3km south of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110]; • Natural dystrophic lakes and ponds [3160]; • Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]; • European dry heaths [4030]; • Alpine and Boreal heaths [4060]; • Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130]; • Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]*; • Blanket bogs (* if active bog) [7130]; • Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110]; • Calcareous rocky slopes with chasmophytic vegetation [8210]; • Siliceous rocky slopes with chasmophytic vegetation [8220]; and • Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]. <p>Annex II Species:</p> <ul style="list-style-type: none"> • Otter <i>Lutra lutra</i> [1355]. <p>Source: Conservation Objectives: Wicklow Mountains SAC 002122. Version 1. (NPWS 2017b)</p>
Baldoyle Bay SAC [000199]	Approximately 11.1km north-east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Mudflats and sandflats not covered by seawater at low tide [1140]; • <i>Salicornia</i> and other annuals colonising mud and sand [1310]; • Atlantic salt meadows (<i>Glauco - Puccinellietalia maritima</i>) [1330]; and • Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]. <p><i>S.I. No. 472 / 2021 - European Union Habitats (Baldoyle Bay Special Area of Conservation 000199) Regulations 2021</i></p> <p>Source: Conservation Objectives: Baldoyle Bay SAC 000199. Version 1. (NPWS 2012b)</p>
Glenasmole Valley SAC [001209]	Approximately 2.9km south of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]; • <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caeruleae</i>) [6410]; and • Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]*. <p><i>S.I. No. 345 / 2021 - European Union Habitats (Glenasmole Valley Special Area of Conservation 001209) Regulations 2021</i></p> <p>Source: Conservation objectives for Glenasmole Valley SAC [001209]. Version 1.0.(NPWS 2021a)</p>
Malahide Estuary SAC [000205]	Approximately 13.8km north-east of the	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Mudflats and sandflats not covered by seawater at low tide [1140]; • <i>Salicornia</i> and other annuals colonising mud and sand [1310];

Site Name	Distance	Designation – QIs or SCIs
	Proposed Scheme	<ul style="list-style-type: none"> • <i>Spartina</i> swards (<i>Spartinion maritimae</i>) [1320]; • Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]; • Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]; • Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]; and • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*. <p><i>S.I. No. 91 / 2019 – European Union Habitats (Malahide Estuary Special Area of Conservation 000205) Regulations 2019</i></p> <p>Source: Conservation Objectives: Malahide Estuary SAC 000205. Version 1. (NPWS 2013c)</p>
Ireland's Eye SAC [002193]	Approximately 15.1km north-east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Perennial vegetation of stony banks [1220]; and • Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]. <p><i>S.I. No. 501 / 2017 – European Union Habitats (Ireland's Eye Special Area of Conservation 002193) Regulations 2017</i></p> <p>Source: Conservation Objectives: Ireland's Eye SAC 002193. Version 1 (NPWS 2017a)</p>
Lambay Island SAC [000204]	Approximately 22.5km north-east of the Proposed Scheme	<p>Annex I Habitats</p> <ul style="list-style-type: none"> • Reefs [1170]; and • Vegetated Sea cliffs of the Atlantic and Baltic coasts [1230]. <p>Annex II Species</p> <ul style="list-style-type: none"> • Grey seal <i>Halichoerus grypus</i> [1364]; and • Harbour seal <i>Phoca vitulina</i> [1365]. <p><i>S.I. No. 294 / 2019 – European Union Habitats (Lambay Island Special Area of Conservation 000204) Regulations 2019</i></p> <p>Source: Conservation Objectives: Lambay Island SAC 000204. Version 1. (NPWS 2013e)</p>
Rogerstown Estuary SAC [000208]	Approximately 18km north-east of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Estuaries [1130]; • Mudflats and sandflats not covered by seawater at low tide [1140]; • <i>Salicornia</i> and other annuals colonising mud and sand [1310]; • Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]; • Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]; • Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]; and, • Fixed coastal dunes with herbaceous vegetation (grey dunes)* [2130]. <p><i>S.I. No. 286 / 2018 European Union Habitats (Rogerstown Estuary Special Area of Conservation 000208) Regulations 2018</i></p> <p>Source: Conservation Objectives: Rogerstown Estuary SAC 000208. Version 1. (NPWS 2013e)</p>
Rye Water Valley/Carton SAC [001398]	Approximately 7.9km north-west of the Proposed Scheme	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Petrifying springs with tufa formation (Cratoneurion) [7220]*. <p>Annex II Species:</p> <ul style="list-style-type: none"> • <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) [1014]; and • <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]. <p><i>S.I. No.494 / 2018 – European Union Habitats (Rye Water Valley/ Carton Special Area of Conservation 001398) Regulations 2018</i></p> <p>Source: Conservation Objectives for Rye Water Valley/Carton SAC [001398]. Version 1.0. (NPWS 2021b)</p>
Knocksink Wood SAC [000725]	Approximately 12.7km south-east of the	<p>Annex I Habitats:</p> <ul style="list-style-type: none"> • Petrifying Springs with Tufa formation (Cratoneurion)* [7220]; • Old Sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]; and

Site Name	Distance	Designation – QIs or SCIs
	Proposed Scheme	<ul style="list-style-type: none"> Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)* [91E0]. <p><i>S.I. No. 93 / 2019- European Union Habitats (Knocksink Wood Special Area of Conservation 000725) Regulations 2019</i> Source: <i>Conservation objectives for Knocksink Wood SAC [000725].</i> Version 1.0 (NPWS 2021b)</p>
Ballyman Glen SAC [000713]	Approximately 15.5km south-east of the Proposed Scheme	<p>Annex I Habitats</p> <ul style="list-style-type: none"> Petrifying Springs with Tufa formation (Cratonuerion)* [7220]; and Alkaline fens [7230] <p><i>S.I. No. 92 / 2019- European Union Habitats (Ballyman Glen Special Area of Conservation 000713) Regulations 2019</i> Source: <i>Conservation objectives: Ballyman Glen SAC [000713].</i> Version 1.0. (NPWS 2019e)</p>
Bray Head SAC [002193]	Approximately 19.7km south-east of the Proposed Scheme	<p>Annex I Habitats</p> <ul style="list-style-type: none"> Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]; and European dry heaths [4030] <p><i>S.I. No. 620 / 2017 - European Union Habitats (Bray Head Special Area of Conservation 000714) Regulations 2017</i> Source: <i>Conservation objectives: Bray Head SAC [000714].</i> Version 1.0. (NPWS 2017c)</p>
SPA		
South Dublin Bay and River Tolka Estuary SPA [004024]	Approximately 3.3km east of the Proposed Scheme	<ul style="list-style-type: none"> Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; Oystercatcher <i>Haematopus ostralegus</i> [A130]; Ringed Plover <i>Charadrius hiaticula</i> [A137]; Grey Plover <i>Pluvialis squatarola</i> [A140]; Knot <i>Calidris canutus</i> [A143]; Sanderling <i>Calidris alba</i> [A144]; Dunlin <i>Calidris alpina</i> [A149]; Bar-tailed Godwit <i>Limosa lapponica</i> [A157]; Redshank <i>Tringa totanus</i> [A162]; Black-headed Gull <i>Chroicocephalus ridibundus</i> [A179]; Roseate Tern <i>Sterna dougallii</i> [A192]; Common Tern <i>Sterna hirundo</i> [A193]; Arctic Tern <i>Sterna paradisaea</i> [A194]; and Wetlands and Waterbirds [A999]. <p><i>S.I. No. 212 / 2010 – European Communities (Conservation of Wild Birds (South Dublin Bay and River Tolka Estuary Special Protection Area 004024) Regulations 2010</i> Source: Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. (NPWS 2015a) and Natura 2000 – Standard Data Form (NPWS 2020a)</p>
North Bull Island SPA [004006]	Approximately 6.2km north-east of the Proposed Scheme	<ul style="list-style-type: none"> Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; Shelduck <i>Tadorna tadorna</i> [A048]; Teal <i>Anas crecca</i> [A052]; Pintail <i>Anas acuta</i> [A054]; Shoveler <i>Anas clypeata</i> [A056]; Oystercatcher <i>Haematopus ostralegus</i> [A130]; Golden Plover <i>Pluvialis apricaria</i> [A140]; Grey Plover <i>Pluvialis squatarola</i> [A141]; Knot <i>Calidris canutus</i> [A143]; Sanderling <i>Calidris alba</i> [A144]; Dunlin <i>Calidris alpina</i> [A149]; Black-tailed Godwit <i>Limosa limosa</i> [A156];

Site Name	Distance	Designation – QIs or SCIs
		<ul style="list-style-type: none"> Bar-tailed Godwit <i>Limosa lapponica</i> [A157]; Curlew <i>Numenius arquata</i> [A160]; Redshank <i>Tringa tetanus</i> [A162]; Turnstone <i>Arenaria interpres</i> [A169]; Black-headed Gull <i>Chroicocephalus ridibundus</i> [A179]; and Wetlands and Waterbirds [A199]. <p><i>S.I. No. 211 / 2010 – European Communities (Conservation of Wild Birds (North Bull Island Special Protection Area 004006) Regulations 2010</i></p> <p>Source: Conservation Objectives: North Bull Island SPA 004006. Version 1. (NPWS 2015b) and Natura 2000 – Standard Data Form (NPWS 2020c)</p>
Dalkey Islands SPA [004172]	Approximately 13.6km south-east of the Proposed Scheme	<ul style="list-style-type: none"> Roseate Tern <i>Sterna dougallii</i> [A192]; Common Tern <i>Sterna hirundo</i> [A193]; and Arctic Tern <i>Sterna paradisaea</i> [A194]. <p><i>S.I. No. 238 / 2010 – European Communities (Conservation of Wild Birds (Dalkey Islands Special Protection Area 004172)) Regulations 2010</i></p> <p>Source: Conservation Objectives for Dalkey Islands SPA [004172]. First Order Site-specific Conservation Objectives Version 1.0 (NPWS 2022d) and Natura 2000 – Standard Data Form (NPWS 2020i)</p>
Baldoyle Bay SPA [004016]	Approximately 11.4km north-east of the Proposed Scheme	<ul style="list-style-type: none"> Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; Shelduck <i>Tadorna tadorna</i> [A048]; Ringed Plover <i>Charadrius hiaticula</i> [A137]; Golden Plover <i>Pluvialis apricaria</i> [A140]; Grey Plover <i>Pluvialis squatarola</i> [A141]; Bar-tailed Godwit <i>Limosa lapponica</i> [A157]; and Wetlands and Waterbirds [A999]. <p><i>S.I. No. 275/2010 – European Communities (Conservation of Wild Birds (Baldoyle Bay Special Protection Area 004016) Regulations 2010</i></p> <p>Source: Conservation Objectives: Baldoyle Bay SPA 004016. Version 1. (NPWS 2013f) and Natura 2000 – Standard Data Form (NPWS 2020b)</p>
Howth Head Coast SPA [004113]	Approximately 14.6km north-east of the Proposed Scheme	<ul style="list-style-type: none"> Kittiwake <i>Rissa tridactyla</i> [A188]. <p><i>S.I. No. 185 / 2012 – European Communities (Conservation of Wild Birds (Howth Head Coast Special Protection Area 004113)) Regulations 2012</i></p> <p>Source: Conservation objectives for Howth Head Coast SPA [004113]. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022b) and Natura 2000 – Standard Data Form (NPWS 2020f)</p>
Wicklow Mountains SPA [004040]	Approximately 6.7km south of the Proposed Scheme	<ul style="list-style-type: none"> Merlin <i>Falco columbarius</i> [A098]; and Peregrine <i>Falco peregrinus</i> [A103]. <p><i>S.I. No. 586 / 2012 – European Communities (Conservation of Wild Birds (Wicklow Mountains Special Protection Area 004040) Regulations 2012</i></p> <p>Source: Conservation Objectives: Wicklow Mountains SPA 004040. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022e) and Natura 2000 – Standard Data Form (NPWS 2020j)</p>
Lambay Island SPA [004069]	Approximately 22.4km north-east of the Proposed Scheme	<ul style="list-style-type: none"> Fulmar <i>Fulmarus glacialis</i> [A009]; Cormorant <i>Phalacrocorax carbo</i> [A017]; Shag <i>Phalacrocorax aristotelis</i> [A018]; Greylag Goose <i>Anser anser</i> [A043]; Lesser Black-backed Gull <i>Larus fuscus</i> [A183]; Herring Gull <i>Larus argentatus</i> [A184]; Kittiwake <i>Rissa tridactyla</i> [A188]; Guillemot <i>Uria aalge</i> [A199]; Razorbill <i>Alca torda</i> [A200]; and Puffin <i>Fratercula arctica</i> [A204].

Site Name	Distance	Designation – QIs or SCIs
		<p><i>S.I. No. 242 / 2010 – European Communities (Conservation of Wild Birds (Lambay Island Special Protection Area 004069)) Regulations 2010</i></p> <p>Source: Conservation objectives for Lambay Island SPA [004069]. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022c) and Natura 2000 – Standard Data Form (NPWS 2020h)</p>
Malahide Estuary SPA [004025]	Approximately 13.8km north-east of the Proposed Scheme	<ul style="list-style-type: none"> • Great Crested Grebe <i>Podiceps cristatus</i> [A005]; • Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; • Shelduck <i>Tadorna tadorna</i> [A048]; • Pintail <i>Anas acuta</i> [A054]; • Goldeneye <i>Bucephala clangula</i> [A067]; • Red-breasted Merganser <i>Mergus serrator</i> [A069]; • Oystercatcher <i>Haematopus ostralegus</i> [A130]; • Golden Plover <i>Pluvialis apricaria</i> [A140]; • Grey Plover <i>Pluvialis squatarola</i> [A141]; • Knot <i>Calidris canutus</i> [A143]; • Dunlin <i>Calidris alpina</i> [A149]; • Black-tailed Godwit <i>Limosa limosa</i> [A156]; • Bar-tailed Godwit <i>Limosa lapponica</i> [A157]; • Redshank <i>Tringa totanus</i> [A162]; and, • Wetland and Waterbirds [A999]. <p><i>S.I. No. 285 / 2011 – European Communities (Conservation of Wild Birds (Malahide Estuary Special Protection Area 004025)) Regulations 2011</i></p> <p>Source: Conservation Objectives: Malahide Estuary SPA 004025. Version 1. t (NPWS 2013g) and Natura 2000 – Standard Data Form (NPWS 2020d)</p>
Ireland's Eye SPA [004117]	Approximately 14.9km north-east of the Proposed Scheme	<ul style="list-style-type: none"> • Cormorant <i>Phalacrocorax carbo</i> [A017]; • Herring Gull <i>Larus argentatus</i> [A184]; • Kittiwake <i>Rissa tridactyla</i> [A188]; • Guillemot <i>Uria aalge</i> [A199]; and • Razorbill <i>Alca torda</i> [A200]. <p><i>S.I. No. 240 / 2010 – European Communities (Conservation of Wild Birds (Ireland's Eye Special Protection Area 004117)) Regulations 2010</i></p> <p>Source: Conservation objectives for Ireland's Eye SPA [004117]. First Order Site-specific Conservation Objectives Version 1.0. (NPWS 2022a) and Natura 2000 – Standard Data Form (NPWS 2020e)</p>
Skerries Islands SPA [004122]	Approximately 27.8km north-east of the Proposed Scheme	<ul style="list-style-type: none"> • Cormorant <i>Phalacrocorax carbo</i> [A017]; • Shag <i>Phalacrocorax aristotelis</i> [A018]; • Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; • Purple Sandpiper <i>Calidris maritima</i> [A148]; • Turnstone <i>Arenaria interpres</i> [A169]; and • Herring Gull <i>Larus argentatus</i> [A184]. <p><i>S.I. No. 245 / 2010 – European Communities (Conservation of Wild Birds (Skerries Islands Special Protection Area 004122)) Regulations 2010.</i></p> <p>Source: Conservation Objectives: Skerries Islands SPA 004122. First Order Site-specific Conservation Objectives Version 1.0 (NPWS 2022f) and Natura 2000 – Standard Data Form (NPWS 2020k)</p>
Rogerstown Estuary SPA [004015]	Approximately 18.3km north-east of the Proposed Scheme	<ul style="list-style-type: none"> • Greylag Goose <i>Anser anser</i> [A043]; • Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; • Shelduck <i>Tadorna tadorna</i> [A048]; • Shoveler <i>Anas clypeata</i> [A056]; • Oystercatcher <i>Haematopus ostralegus</i> [A130]; • Ringed Plover <i>Charadrius hiaticula</i> [A137]; • Grey Plover <i>Pluvialis squatarola</i> [A141]; • Knot <i>Calidris canutus</i> [A143]; • Dunlin <i>Calidris alpina</i> [A149];

Site Name	Distance	Designation – QIs or SCIs
		<ul style="list-style-type: none"> Black-tailed Godwit <i>Limosa limosa</i> [A156]; Redshank <i>Tringa totanus</i> [A162]; and, Wetland and Waterbirds [A999]. <p><i>S.I. No. 271 / 2010 – European Communities (Conservation of Wild Birds (Rogerstown Estuary Special Protection Area 004015) Regulations 2010</i></p> <p>Source: Conservation Objectives: Rogerstown Estuary SPA 004015. Version 1. (NPWS 2013h) and Natura 2000 – Standard Data Form (NPWS 2020g)</p>
Rockabill SPA [004014]	Approximately 28.5km north-east of the Proposed Scheme	<ul style="list-style-type: none"> Purple Sandpiper <i>Calidris maritima</i> [A148]; Roseate Tern <i>Sterna dougallii</i> [A192]; Common Tern <i>Sterna hirundo</i> [A193]; and, Arctic Tern <i>Sterna paradisaea</i> [A194]. <p><i>S.I. No. 94 / 2012 – European Communities (Conservation of Wild Birds (Rockabill Special Protection Area 004014) Regulations 2012</i></p> <p>Source: Conservation Objectives: Rockabill SPA [004014]. Version 1. (NPWS 2013i) and Natura 2000 – Standard Data Form (NPWS 2020m)</p>
The Murrrough SPA [004186]	Approximately 29.2km south-east of the Proposed Scheme	<ul style="list-style-type: none"> Red-throated Diver <i>Gavia stellata</i> [A001]; Greylag Goose <i>Anser anser</i> [A043]; Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]; Wigeon <i>Anas penelope</i> [A050]; Teal <i>Anas crecca</i> [A052]; Black-headed Gull <i>Chroicocephalus ridibundus</i> [A179]; Herring Gull <i>Larus argentatus</i> [A184]; and, Little Tern <i>Sterna albifrons</i> [A195]. <p><i>S.I. No. 298 / 2011 – European Communities (Conservation of Wild Birds (The Murrrough Special Protection Area 004186)) Regulations 2011</i></p> <p>Source: Conservation Objectives: The Murrrough SPA 004186. First Order Site-specific Conservation Objectives Version 1.0. (NPWS, 2022g) and Natura 2000 – Standard Data Form (NPWS 2020l)</p>

12.3.4.2 Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs)

NHAs are designations under Section 18 of the Wildlife (Amendment) Act 2000 to protect habitats, species or geology of national importance.

In addition to NHAs, pNHAs are sites of significance for wildlife and habitats and were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. pNHAs are offered protection in the interim period under the county or city development plans which requires that planning authorities give due regard to their protection in planning policies and decisions. The Proposed Scheme lies within the administrative boundaries of South Dublin County Development Plan 2022-2028 (SDCC 2022) and Dublin City Development Plan 2022-2028 (DCC 2022).

Many of the pNHA sites, and some of the NHAs in Ireland overlap with the boundaries of European sites.

The closest nationally designated site to the Proposed Scheme is the Grand Canal pNHA, which will be traversed by the Proposed Scheme at Dolphins Barn Bridge. The next closest nationally designated site is the Dodder Valley pNHA which lies approximately 920m south-east of the Proposed Scheme.

There are six pNHAs that are located downstream of the Proposed Scheme in Dublin Bay. These pNHAs are North Dublin Bay pNHA, Dolphins, Dublin Docks pNHA, Booterstown Marsh pNHA, Howth Head pNHA, Dalkey Coastal Zone and Killiney Hill pNHA, and South Dublin Bay pNHA. These sites will be hydrologically connected to the Proposed Scheme via the Grand Canal, River Poddle, River Camac, River Dodder and River Liffey. These pNHAs lie within the administrative boundaries of the South Dublin County Development Plan 2022-2028, Dublin City Development Plan 2022-2028 and / or Fingal County Development Plan 2023 - 2029 (FCC 2023).

There is one NHA and thirteen pNHAs containing SCI species that are known to forage and/or roost at inland sites across Dublin. These include Malahide Estuary pNHA, Baldoyle Bay pNHA, Rogerstown pNHA, Portrairie Shore pNHA, North Dublin Bay pNHA, Dolphins, Dublin Docks pNHA, South Dublin Bay pNHA, Booterstown Marsh pNHA, Dalkey Coastal Zone and Killiney Hill pNHA, Ireland's Eye pNHA, Rockabill Island pNHA, the Murrough pNHA, Lambay Island pNHA, and Skerries Islands NHA.

There is one NHA and 27 pNHAs located in the wider area of the Proposed Scheme. These are listed in Table 12.5 and illustrated in Figure 12.4 in Volume 3 of this EIAR. Table 12.5 lists these sites, their distance from the Proposed Scheme, and the ecological features for which the sites are designated / proposed. 15 of these are located within the Zol of the Proposed Scheme (see Table 12.5).

These pNHAs are valued as being of National Importance.

Table 12.5: NHA and pNHAs located within the Zol of the Proposed Scheme Boundary (highlighted in light blue), and those in the Wider Area of the Proposed Scheme Boundary

Site Name	Distance	Description
NHAs		
Skerries Island NHA [001218]	Approximately 27.8km north-east of the Proposed Scheme	See Table 12.4 under Skerries Island SPA.
pNHAs		
Booterstown Marsh pNHA [001205]	Approximately 5.6km south-east of the Proposed Scheme	See Table 12.4 under South Dublin Bay and River Tolka Estuary SPA.
Grand Canal pNHA [002104]	Traversed by the Proposed Scheme	Diversity of species canal supports and presence of legally protected plant species, opposite-leaved pondweed <i>Groenlandia densa</i> .
South Dublin Bay pNHA [000210]	Approximately 3.9km east of the Proposed Scheme	See 6 under South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA.
Royal Canal pNHA [002103]	Approximately 2.1km north of the Proposed Scheme	Diversity of species canal supports and presence of legally protected plant species, opposite-leaved pondweed <i>Groenlandia densa</i> .
North Dublin Bay pNHA [000206]	Approximately 3km east of the Proposed Scheme	See Table 12.4 under North Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA.
Dolphins, Dublin Docks pNHA [000201]	Approximately 4.9km east of the Proposed Scheme	See Table 12.4 under South Dublin Bay and River Tolka Estuary SPA.
Dalkey Coastal Zone and Killiney Hill pNHA [001206]	Approximately 10.8km south-east of the Proposed Scheme	Good example of a coastal system with habitats ranging from sub-littoral to coastal heath. Flora is well developed and includes some scare species. The islands are important bird sites. See also Table 12.4 under Rockabill to Dalkey Island SAC and Dalkey Islands SPA.
Liffey Valley pNHA [000128]	Approximately 2.9km north of the Proposed Scheme	Presence of legally protected plant species, hairy St. John's-wort <i>Hypericum hirsutum</i> , rare Red List plant species green figwort <i>Scrophularia umbrosa</i> and yellow archangel <i>Lamiastrum galeobdolon</i> and the diversity of habitat present.
Fitzsimon's Wood pNHA [001753]	Approximately 7.3km south-east of the Proposed Scheme	Birch woodland, which is very rare in County Dublin.
Dingle Glen pNHA [001207]	Approximately 11.9km south-east of the Proposed Scheme	Variety of habitat present, including woodland.
Santry Demesne pNHA [000178]	Approximately 6.3km north-east of the Proposed Scheme	Presence of legally protected plant species, hairy St. John's-wort <i>Hypericum hirsutum</i> , and woodland.
Dodder Valley pNHA [000991]	Approximately 920m south of the Proposed Scheme	The last remaining stretch of natural riverbank vegetation on the River Dodder in the built-up Greater Dublin Area (GDA).
Ballybetagh Bog pNHA [001202]	Approximately 12.3km south-east of the Proposed Scheme	Marshland.
Howth Head pNHA [000202]	Approximately 11.8km north-east of the Proposed Scheme	See Table 12.4 under Howth Head SAC and Howth Head Coast SPA.
Baldoyle Bay pNHA [000199]	Approximately 11.1km north-east of the Proposed Scheme	See Table 12.4 under Baldoyle Bay SAC and Baldoyle Bay SPA.

Site Name	Distance	Description
Feltrim Hill pNHA [001208]	Approximately 11.3km north-east of the Proposed Scheme	Good example of knoll-reef phenomenon. Previously known to contain two rare plant species, namely spring squill <i>Scilla verna</i> and long-stalked crane's-bill <i>Geranium columbinum</i> .
Sluice River Marsh pNHA [001763]	Approximately 11.9km north-east of the Proposed Scheme	Freshwater marsh.
Glenasmole Valley pNHA [001209]	Approximately 2.9km south of the Proposed Scheme	See Table 12.4 under Glenasmole Valley SAC.
Ireland's Eye pNHA [000203]	Approximately 15.1km north-east of the Proposed Scheme	See Table 12.4 under Ireland's Eye SAC and Ireland's Eye SPA.
Malahide Estuary pNHA [000205]	Approximately 13.8km north-east of the Proposed Scheme	See Table 12.4 under Malahide Estuary SAC and Malahide Estuary SPA.
Lugmore Glen pNHA [001212]	Approximately 2.6km south of the Proposed Scheme	Presence of the rare Red Data Book species yellow archangel (<i>Lamiastrum galeobdolon</i>).
Rye Water Valley/Cartron pNHA [001398]	Approximately 7.9km north-west of the Proposed Scheme	Linear riverine site known to support Priority Annex I Petrifying springs with tufa formation (Cratoneurion) as well as two Annex II species snails, namely: narrow-mouthed whorl snail <i>Vertigo angustior</i> and Desmoulin's whorl snail <i>V. moulinsiana</i> .
Portraine Shore pNHA [001215]	Approximately 18.2km north-east of the Proposed Scheme	See Table 12.4 under Rogerstown Estuary SAC and Rogerstown Estuary SPA.
Rogerstown Estuary pNHA [000208]	Approximately 18km north-east of the Proposed Scheme	See Table 12.4 under Rogerstown Estuary SAC and Rogerstown Estuary SPA.
Lambay Island pNHA [000204]	Approximately 22.5km north-east of the Proposed Scheme	See Table 12.4 under Lambay Island SAC and Lambay Island SPA.
The Murrough pNHA [000730]	Approximately 27.8km south-east of the Proposed Scheme	See Table 12.4 under The Murrough Wetlands SAC and The Murrough SPA.
Slade of Saggart and Crooksling Glen pNHA [000211]	Approximately 5.1km south-west of the Proposed Scheme	Wooded river valley and small wetland system. Presence of rare plant species (yellow archangel), rare invertebrate (<i>Halticoptera patellana</i>) and a variety of wildfowl species.
Rockabill pNHA [000207]	Approximately 28.5km north-east of the Proposed Scheme	See Table 12.4 under Rockabill SPA

12.3.4.3 Other Designated Sites

Other designations recognised in the Greater Dublin Area (GDA) including Ramsar wetlands sites and United Nations Education, Scientific and Cultural Organisation (UNESCO) Dublin Bay Biosphere are considered in terms of the overall with European and National sites. Three Special Area Amenity Area Order (SAAO) are also local to specific Bus Connects Core Bus Corridors but are nonetheless captured in the overall EIAR biodiversity assessment and the NIS by virtue of overlapping nature designations, namely European and Nationally designated sites.

12.3.4.3.1 Ramsar Sites

The Convention on Wetlands is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar. The official name of the treaty 'The Convention on Wetlands of International Importance especially as Waterfowl Habitats' reflects the emphasis on the protection of wetlands primarily as habitat for waterbirds.

There are a number of Ramsar sites within the vicinity of the Proposed Scheme, namely:

- Rogerstown Estuary (Site code 412);
- Broadmeadow Estuary (Site code 833);
- Baldoyle Bay (Site code 413);
- North Bull Island (Site code 406); and
- Sandymount Strand / Tolka Estuary (Site code 832).

As these Ramsar sites overlap with European sites and / or NHAs / pNHAs for which this EIAR assessment is considering, no further discussion is provided.

12.3.4.3.2 UNESCO Dublin Bay Biosphere

Dublin Bay was initially recognised by the United Nations Education, Scientific and Cultural Organisation (UNESCO) for its rare and internationally important habitats and species of wildlife. The North Bull Island supports a variety of plants and wildlife including an internationally significant population of light-bellied Brent geese that overwinters in the bay. UNESCO's concept of a Biosphere has evolved to include not just areas of ecological value but also the areas around them and the communities that live and work within these areas. Dublin Bay Biosphere Reserve now extends to over 300 km² of marine and terrestrial habitat encompassing North Bull Island and ecologically significant habitats such as the Tolka and Baldoyle Estuaries, Howth Head, Dalkey Island, Killiney Hill and Booterstown Marsh. Over 300,000 people live within the newly enlarged Biosphere.

While the Biosphere designation does not strictly add any specific new legal protection, it greatly enhances the many legal protections that already exist by improving the coordination and management of the three functions in a holistic and integrated way. In this respect the biodiversity assessment for the EIAR and the AA for the Proposed Scheme collectively addresses the key biodiversity elements of the Biosphere designation, and no further discussion is provided in this regard.

12.3.4.3.3 Special Amenity Area Order (SAAO)

The objective of the Special Amenity Area Order is primarily to protect outstanding landscapes, nature and amenities and were originally placed on a statutory footing under the Local Government (Planning and Development) Act 1963, as amended, and re-enacted under section 202 of the Planning and Development Act 2000.

Three such Special Amenity Area Orders have been recognised in Ireland, all of them in the Greater Dublin Area and can cross local authority administrative boundaries. None are intersected by the Proposed Scheme They include:

- North Bull Island;
- Howth Head; and
- Liffey Valley.

The designations reinforces protection for green belts via land plans and objectives contained therein. As such these areas have been considered in the overall EIAR biodiversity assessment and AA, respectively, by virtue of overlapping nature designations.

12.3.5 Habitats

12.3.5.1 Overview

The results of the habitat surveys along the alignment of the Proposed Scheme are described below by habitat type (Fossitt 2000). The habitats described below relate to habitat areas within or adjacent to the Proposed Scheme, as shown on Figure 12.5 in Volume 3 of this EIAR along with the full habitat survey results. The results and summary of the findings of the aquatic habitat surveys have been incorporated into the relevant habitat descriptions.

The habitat types recorded along the footprint of the Proposed Scheme, as discussed in this Section, are as follows:

- Flower beds and borders (BC4);
- Stonewalls and other stonework (BL1);
- Buildings and artificial surfaces (BL3);
- Exposed sand, gravel and till (ED1);
- Spoil and bare ground (ED2);
- Recolonising bare ground (ED3);
- Reed and large sedge swamps (FS1);

- Depositing/ lowland rivers (FW2);
- Canals (FW3);
- Drainage ditches (FW4);
- Amenity Grassland (Improved) (GA2);
- Dry meadows and grassy verges (GS2);
- Residential;
- (Mixed) broadleaved woodland (WD1);
- Mixed broadleaf/conifer woodland (WD2);
- Scattered trees and parkland (WD5);
- Hedgerows (WL1);
- Treelines (WL2);
- Scrub (WS1);
- Immature woodland (WS2); and
- Ornamental/ non-native shrub (WS3).

None of the habitats listed above correspond to Annex I Qualifying Interest habitats. This includes Dry meadows and grassy verges habitat (GS2), which in certain situations corresponds to Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) (6510). The species and management of the habitat along the Proposed Scheme is not analogous to the Annex I hay meadow habitat.

12.3.5.2 Flower beds and borders (BC4)

This habitat includes ornamental planting associated with commercial developments or industrial complexes, and planting at roundabouts and along roadsides in suburban areas. This habitat type was identified in approximately 11 locations (although this is variable depending on seasonal management) across the Proposed Scheme, the largest area of this habitat type consists of planted beds on a road median at Kevin Street Upper. Other locations where this habitat type occurs include Christchurch, Peace Park, Weaver Park and St. James' Terrace.

Ornamental non-native species present at this habitat include butterfly bush *Buddleja davidii*, cabbage palm *Cordyline* spp., dogwood species *Cornus* spp., pampas grass *Cortaderia selloana*, cotoneaster species *Cotoneaster* spp., montbretia *Crococsmia x crocosmiiflora*, fuchsia *Fuchsia magellanica*, New Zealand broadleaf *Griselinia littoralis*, hebe species *Hebe* spp., hydrangea species *Hydrangea* spp., iris species *Iris* spp., and cherry *Prunus kanzan*.

Native species recorded in this habitat type include bedding plants, geranium species *Geranium* spp., lavender *Lavandula* spp., rose species *Rosa* spp., common valerian *Valeriana officinalis*, birch species *Betula* spp., and rowan *Sorbus aucuparia*.

This habitat type was also found in mosaics with the following habitats: amenity grassland (improved) (GA2), buildings and artificial surfaces (BL3), scattered trees and parkland (WD5); and ornamental/ non-native shrub (WS3).

This habitat type is of Local Importance (Lower Value) due to its high incidence of non-native species.

12.3.5.3 Stone walls and other stonework (BL1)

Stone walls were present in five locations across the Proposed Scheme, comprising either property boundaries or roadside boundaries. The largest area of this habitat was located along the R819 / Greenhills Road at Ballymount Industrial Estate. Other areas of this habitat type are located at R819 / Greenhills Road from the junction of Airton Road, south along the R819 / Greenhills Road to the entrance to TU Dublin Greenhills road campus entrance, Crumlin Children's Hospital, and Loretto Sundrive Road. This habitat type was also present in the form of stone steps on the banks of the Grand Canal at Dolphins Barn bridge (outside the Proposed Scheme red line boundary).

The majority of the stone walls recorded along the Proposed Scheme were well maintained and free from vegetation. This habitat category was also used to describe stone bridges, steps and stone buildings. Where vegetation was present it included butterfly bush and common valerian.

This habitat type is of Local Importance (Lower Value) due to being a built / artificial surface with low floristic species diversity.

12.3.5.4 Buildings and artificial surfaces (BL3)

This habitat type includes all buildings (i.e., domestic, commercial and industrial), roads, car parks, artificial recreation surfaces and other concrete / hard standing areas. This habitat type was the most commonly encountered habitat and was present across the entire length of the Proposed Scheme, owing to the largely urban and suburban nature of the study area.

This habitat type was also found in association with the following habitats; flower beds and borders (BC4), spoil and bare ground (ED2), recolonising bare ground (ED3), amenity grassland (GA2), dry meadows and grassy verges (GS2), scattered trees and parkland (WD5) and scrub (WS1).

This habitat type is of Local Importance (Lower Value), due to being characterised by built or artificial surfaces and being devoid of vegetation.

12.3.5.5 Exposed sand, gravel or till (ED1)

This habitat type was assigned to habitats which consisted of till or boulder clay. An area of exposed sand, gravel or till was identified at Tailors Hall on High Street. This habitat consists of spoil heaps containing railway ballast and rubble. The location of this habitat type on High Street is the rear aspect of An Taisce offices which are accessed on Back Lane. The parking area has a substrate of railway ballast which extends around the building where a treeline was identified.

Within this habitat are mosaics of treelines (WL2).

This habitat type is of Local Importance (Lower Value) due to the disturbed and transient nature of this habitat type.

12.3.5.6 Spoil and bare ground (ED2)

This habitat type, which is often ephemeral in nature, was present throughout the Proposed Scheme in small areas of bare ground, often associated with access ways, such as gravel driveways. Larger areas of this habitat type were identified along R819 / Greenhills Road within the Tallaght to City Centre section of the Proposed Scheme.

Plant species recorded within this habitat include yarrow *Achillea millefolium*, barren brome grass *Bromus sterilis*, butterfly bush, common thistle *Cirsium vulgare*, hawk's-beard *Crepis* spp., cock's-foot *Dactylis glomerata*, willowherb species *Epilobium* spp., fescue species *Festuca* spp., Yorkshire fog *Holcus lanatus*, bramble *Rubus fruticosus* agg., common ragwort *Jacobaea vulgaris*, common poppy *Papaver rhoeas*, colt's-foot *Tussilago farfara*, and common nettle *Urtica dioica*.

This habitat type was also found in mosaics with the following habitat types; buildings and artificial surfaces (BL3), recolonising bare ground (ED3), amenity grassland (GA2), and scrub (WS1).

This habitat type is of Local Importance (Lower Value) due to the low species diversity of this highly disturbed habitat.

12.3.5.7 Recolonising bare ground (ED3)

This habitat type was assigned to areas of disturbed ground and / or artificial surfaces which have been recolonised by plants, and vegetation cover is now greater than 50%. This habitat type was identified in four

locations on the Clondalkin to Drimnagh section of the Proposed Scheme, including R134 New Nangor Road, opposite Diageo, Electrolux Naas Road and a small area at Parkwest, R134 Long Mile Road.

Most of the vegetation recorded were ruderal species typical of this habitat type. Species included yellow-wort *Blackstonia perfoliate*, butterfly bush, creeping thistle *Cirsium arvense*, common thistle, willowherb species, horsetail species *Equisetum* spp., fescue species, Yorkshire-fog, common poppy, ribwort plantain *Plantago lanceolata*, Japanese knotweed *Reynoutria japonica* (a Third schedule invasive species), bramble, broad-leaved dock *Rumex obtusifolius*, common ragwort and common nettle.

This habitat type also occurred in mosaics with the following habitat types; buildings and artificial surfaces (BL3) and spoil and bare ground (ED2).

This habitat type is of Local Importance (Lower Value) due to its low species diversity and disturbed nature.

12.3.5.8 Reed and large sedge swamps (FS1)

This habitat type includes wetland areas of species-poor herbaceous vegetation stands that are dominated by reeds and other large grasses or large, tussock-forming sedges. This was identified on both banks of the Grand Canal east of Dolphins Barn bridge. Species present included common reed *Phragmites australis*, wild angelica *Angelica sylvestris* and meadowsweet *Filipendula ulmaria*.

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding landscape.

12.3.5.9 Depositing / lowland rivers (FW2)

This habitat type refers to the River Camac (Camac_040) and River Poddle (Poddle_010). This habitat type is present at a number of locations across the Proposed Scheme as discussed below.

The Proposed Scheme will cross the River Camac at a number of locations on the Clondalkin to Drimnagh section of the Proposed Scheme; principally at Yellowmeadows R134 New Nangor Road (referred to as CBC0809AR001), at the junction between Oak Road and R134 New Nangor Road (referred to as CBC0809AR002) and at the R810 Naas Road (illustrated in Figure 12.2 in Volume 3 of this EIAR). The River Camac is above ground at both locations on R134 New Nangor Road and is culverted beneath the R810 Naas Road where it then re-surfaces on the southern side. The River Camac will cross the Proposed Scheme at R810 Naas Road, Bluebell and from this point, the river travels north-west for approximately 4.6km, until it converges with the River Liffey.

The River Camac is classified as having 'Poor' status for the period of 2013 to 2018 and is deemed to be 'At Risk' of failing to meet its requirements under the Water Framework Directive (EPA 2018). Significant pressures include urban runoff from diffuse sources causing nutrient and organic pollution, as well as hydromorphological impacts as result of significant culverting. The results of biological water quality assessment, based on Q-sampling, carried out by Triturus Environmental Ltd. indicated that the River Camac is of "Poor" biological water quality (Q3).

Riparian habitats identified along the banks of the River Camac include immature woodland (WS2), dry meadows and grassy verges (GS2), amenity grassland (GA2), scattered trees and parkland (WD5), ornamental / non-native shrub (WS3) and scrub (WS1). Riparian plant species identified along the banks of the River Camac included field bindweed *Convolvulus arvensis*, hoary willowherb *Epilobium parviflorum*, Yorkshire-fog, common reed, bramble, crack willow *Salix fragilis*, elder *Sambucus nigra* and bittersweet nightshade *Solanum dulcamara*.

The section of the River Camac adjacent to Yellowmeadows R134 New Nangor Road (referred to as CBC0809AR001) has been historically straightened and heavily modified, with a sloping retaining wall present along the south bank of the river (adjoining residential areas). According to surveys conducted by Triturus Environmental Ltd, bank heights were approximately 2-3m. The channel averaged 3-4m wide and 0.2-0.3m, with locally deeper glides and to 0.5m. Shallow fast glides predominated with occasional riffle area (20%) and very little pool habitat (5%). The channel featured an open masonry culvert in the vicinity of the survey site with only localised accumulations of cobble and medium to coarse gravels on top. Sand was occasional. Siltation was moderate overall with some accumulations in association with marginal and mid-channel macrophyte beds. Boulder was almost entirely absent. The north bank was heavily scrubbed with primarily ornamental species like

red osier dogwood and *Cotoneaster* spp., with frequent butterfly bush and hedge bindweed. Downstream, a mature willow-dominated treeline was present along the river, with ash and sycamore also recorded. The river margins were dominated by linear belts of reed canary grass with abundant nettle. Lesser water parsnip, watercress and localised brooklime *Veronica beccabunga* were present in the margins. Instream macrophytes were rare given the concrete riverbed. Cobble zones supported occasional spiked water milfoil *Myriophyllum spicatum*. Bryophytes were poorly represented. Filamentous algal cover was relatively high (20%) indicating enrichment. Numerous point sources were present locally, adjoining from the Nangor Road bank (Triturus Environmental Ltd. 2022).

The section of the River Camac which lies adjacent to the junction between Oak Road and R134 New Nangor Road (referred to as CBC0809AR002) has also been historically straightened and modified upstream and downstream of the existing R134 road culvert. However, according to surveys carried out by Triturus Environmental Ltd. (2022), good recovery was evident instream, despite being surrounded by industrial / urban areas. Upstream of the culvert, the river averaged 3-4m wide and 0.5-1m deep with locally deeper glides and pools to 1.2m. The profile was 90% deep glides with localised pool areas. The substrata were dominated by relatively clean, unbedded / mobile fine to coarse gravels (70%) with low siltation (only light plumes underfoot). Cobble and small boulder was occasional (10%). Silt beds were present marginally and in association with abundant growth of instream macrophytes. Downstream of the R134 culvert (an extensive twin-bore 3m metal pipe, 75m long) the river was 3m wide on average and 0.4-0.6m deep, with locally deeper pools to 0.8-1m. The flow was greater than upstream and fast glide predominated (60%), with occasional riffle areas and localised pools (10%). Given the high flow rates, the substrata was dominated by cobble (50%) with occasional boulder. Medium to coarse gravels were frequent (30%) and present in small patches locally and interstitially. Sand / silt accumulations were present in pool slacks near the culvert. Overall siltation was moderate. The substrata were relatively compacted (in contrast to upstream slower glide habitat). Downstream, riparian shading was high given dense bramble-dominated scrub with mature treelines on both banks of sycamore, poplar *Populus* spp., crack willow, osier and elder. Dogwood, wild angelica, ivy, nettle and hogweed were abundant also. Winter heliotrope was frequent along both banks. Upstream, the open banks sloped to the river and supported abundant reed canary grass and occasional bramble scrub. Macrophyte growth was dominated by abundant spiked water milfoil (50% cover) and crisp-leaved pondweed *Potamogeton crispus* (20%), with the margins and riparian slopes dominated by reed canary grass. Downstream, given high shading, instream macrophytes were limited to marginal watercress. Aquatic mosses were limited to localised *Cinclidotus fontinaloides*. The aquatic bryophyte community was poorly represented (Triturus Environmental Ltd. 2022).

Coolfan Stream (Camac_040) is a small watercourse which rises directly east of Newlands Golf Course and flows in a north-easterly direction before it converges with the River Camac (Camac_040) at R810 Naas Road. Much of its course is culverted under Ballymount Industrial Estate.

Robinhood Stream (Camac_040) is a small watercourse which rises underneath the Lower Ballymount Business Area South and flows in a north-westerly direction before it converges with Coolfan Stream (Camac_040) approximately 150m south of R110 Long Mile Road which subsequently joins the River Camac (Camac_040). Much of its course is dominated by significant culverting before it joins Coolfan Stream.

The Proposed Scheme will cross the River Poddle at two locations on the Tallaght to City Centre section of the Proposed Scheme; at Bancroft Park on R819 Greenhills Road (referred to as CBC0809AR003) and at a culverted location at R110 St. Luke's Avenue in the City Centre.

The River Poddle flows above ground at CBC0809AR003 and flows through Bancroft Park, and is culverted beneath the City Centre from Harolds Cross to its outfall on Usher's Quay. The River Poddle has an unassigned WFD status; however, it is considered to be 'At Risk' of failing to meet its WFD objectives under the EU Water Framework Directive (2000 / 60 / EC) (EPA 2018). Significant pressures include urban runoff from diffuse sources causing nutrient and organic pollution, as well as hydro-morphological impacts as result of significant culverting.

The riparian habitat type identified along the section of the River Poddle in Bancroft Park on the R819 Greenhills Road was dry meadows and grassy verges (GS2). Plant species identified here included hoary willowherb, field bindweed and common nettle.

According to surveys carried out by Triturus Environmental Ltd. (2022), the section of the River Poddle at Bancroft Park on R819 Greenhills Road (referred to as CBC0809AR003) has been historically straightened and deepened,

with a two-stage channel evident. The river emerges from an extensive underground culvert at the R819 road crossing. Bank heights in the deep U-shaped channel were 2.5-3m. The river averaged ≤ 1 m wide in a 2.5-3m wide channel. The site was shallow with depths averaging 0.1-0.2m with only very localised, small pool to 0.3m. Shallow glide predominated (60%) with occasional riffle zones and localised small pool. The substrata was dominated by cobble (30%) and small boulder which was heavily silted and compacted. Some medium to coarse gravels were present interstitially (30%). Siltation was high overall although sediment accumulations were largely absent at the swift flowing site. Hydrocarbon and silt plumes were evident underfoot, locally. Natural bank erosion was evident and was contributing to siltation, in addition to surface water run-off from adjoining hard standing areas (BL3). The site was bordered by scattered trees and parkland habitat (WD5) with ornamental hedging. The riparian areas were scrubbed over with nitrophilous species such as great willowherb, nettle, hedge bindweed, meadowsweet, meadow buttercup *Ranunculus acris*, common knapweed *Centaurea nigra*, creeping thistle, tormentil *Potentilla erecta*, wild carrot, dog rose *Rosa canina*, gorse *Ulex europaeus*, ragwort *Jacobaea vulgaris* and rank grasses. Very dense bramble scrub was present in the vicinity of the R819 road culvert. Encroachment of the small channel by terrestrial species was relatively high and shading resulted in a lack of macrophyte growth. Filamentous algae was profuse (30% cover), indicating heavy enrichment (Triturus Environmental Ltd, 2022).

The River Dodder (Dodder_040) will not be crossed by the Proposed Scheme. However, it is located approximately 200m south of the Proposed Scheme and will run parallel from Belgard Square West to R819 Greenhills Road for approximately 1.2km. The Dodder_040 has a Poor WFD Status and is At Risk of not achieving Good Status by 2027 and is facing significant pressure due to urban runoff from diffuse sources causing nutrient and organic pollution.

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding landscape.

12.3.5.10 Canals (FW3)

The Proposed Scheme traverses the Grand Canal at Dolphins Barn bridge (illustrated in Figure 12.2 in Volume 3 of this EIAR).

The Grand Canal Main Line (Liffey and Dublin Bay) (hereafter referred to as the Grand Canal) is an artificial waterbody, primarily used for recreation. Constructed in the 18th century, the canal traverses the country from Dublin to Shannon for approximately 131km. Waterways Ireland are responsible for the monitoring of this waterbody. The WFD also considers heavily modified waterbodies (HMWB) and artificial waterbodies (AWB). The WFD requires HMWB and AWB to achieve Good Ecological Potential rather than Good Status. The land use associated with the section of the canal contained within the study area, is mostly urban / industrial.

According to the results of the desk study, records of the Flora (Protection) Order 2022 species, opposite-leaved pondweed exist from the Grand Canal (Grid O13G). The Grand Canal was not surveyed in respect of the Proposed Scheme, as there is no construction planned within the Canal itself. Its presence however has previously been noted on the Royal and Grand Canals (BEC 2011).

Species recorded along the canal banks include yarrow, wild angelica, creeping thistle, hoary willowherb, meadowsweet, Yorkshire-fog, common reed, greater plantain *Plantago major*, creeping buttercup *Ranunculus repens*, common ragwort, alexanders *Smyrniolum olusatrum*, common dandelion *Taraxacum officinale* agg. and common nettle.

The Grand Canal is designated as a pNHA. This habitat type is therefore valued as being of National Importance.

12.3.5.11 Drainage ditches (FW4)

This habitat type comprises artificial linear water bodies or wet channels, and constructed channels from natural water bodies that have been excavated or modified to enhance drainage and control flow.

A drainage ditch was identified in one location on R134 New Nangor Road at Woodford Walk, on the Clondalkin to Drimnagh section of the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). The adjacent habitat was identified as amenity grassland (GA2) with an overhead canopy of treeline (WL2). The drainage ditch was dry and clear of vegetation.

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area.

12.3.5.12 Amenity grassland (Improved) (GA2)

Amenity grassland was a commonly recorded habitat across the Proposed Scheme. The largest areas of this habitat type are present as parklands and sports pitches. This habitat type is also present in small areas located across the entirety of the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). The largest areas of this habitat were identified along R819 Greenhills Road at Tymon Park and L4004 Calmount Road, R134 New Nangor Road, John F. Kennedy Drive and R110 Long Mile Road. Other areas of this habitat type included Bunting Park and Eamonn Ceannt Park.

Amenity grassland was dominated by common grass species such as Yorkshire-fog, perennial ryegrass *Lolium perenne* and annual meadow grass. The most commonly encountered forb species included daisy *Bellis perennis*, ribwort plantain, greater plantain, common selfheal *Prunella vulgaris*, birds-foot trefoil *Lotus corniculatus*, broad-leaved dock, common dandelion, silverweed *Argentina anserina*, white clover *Trifolium repens*, creeping buttercup and common nettle.

This habitat type often occurred in mosaics with buildings and artificial surfaces (BL3), flower beds and borders (BC4), spoil and bare ground (ED2), ornamental/ non-native shrub (WS3), hedgerows (WL1), treelines (WL2), immature woodland (WS2) and scrub (WS1).

This habitat type is of Local Importance (Lower Value) due to its low species diversity and abundance in the wider area.

12.3.5.13 Dry meadows and grassy verges (GS2)

This habitat type is comprised of unmanaged grassland areas including areas of parkland following a low maintenance regime and roadside verges. This habitat type was recorded in several areas of varying sizes across the Proposed Scheme. On the Tallaght to City Centre section of the Proposed Scheme prominent areas of this habitat were identified at Tymon Park. This comprised an area of approximately 2.5ha (hectare) being managed as wildflower meadows by South Dublin County Council (SDCC). This habitat type was also identified within the Astro Park on R819 Greenhills Road and along the banks of the Grand Canal at Dolphins Barn bridge.

Along the Clondalkin to Drimnagh section of the Proposed Scheme, areas of this habitat type were recorded in the following locations; Assumption School on R110 Long Mile Road and along R134 New Nangor Road (as illustrated in Figure 12.5 in Volume 3 of this EIAR).

Grass species present in this habitat included yorkshire-fog, wall barley *Hordeum murinum*, barren brome-grass, oat-grass species *Arrhenatherum elatius*, cock's-foot, fescue species, perennial ryegrass and annual meadow grass. Forb species present included yarrow, scarlet pimpernel *Anagallis arvensis*, common knapweed, red valerian *Centranthus ruber*, creeping thistle, common thistle, hawksbeard, crested dog's-tail *Cynosurus cristatus*, wild teasel *Dipsacus fullonum*, globular thistle *Echinops ritro*, rosebay willowherb *Chamaenerion angustifolium*, hoary willowherb, horsetail species, spurge species *Euphorbia sp.*, meadowsweet, fumitory *Fumaria officinalis*, cleavers *Galium aparine*, lady's bedstraw *Galium verum*, crane's-bill geranium, common ivy *Hedera helix*, common hogweed *Heracleum sphondylium*, field scabious *Knautia arvensis*, bird's-foot trefoil, common restharrow *Ononis repens*, winter heliotrope, ribwort plantain, creeping cinquefoil, bracken *Pteridium aquifolium*, creeping buttercup, bramble, broad-leaved dock, common ragwort, alexanders, smooth sow-thistle, snowberry *Symphoricarpos albus*, common comfrey, common dandelion, garden thyme *Thymus vulgaris*, red clover, gorse species *Ulex sp.*, common nettle, tufted vetch, bush vetch *Vicia sepium* and goat willow *Salix caprea*.

This habitat type also occurred in mosaics with buildings and artificial surfaces (BL3), scattered trees and parkland (WD5) and scrub (WS1).

Although this habitat does not correspond to the Annex I Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) (6510) owing to its management regime, it is rated as being of Local Importance (Higher Value) due to its high species diversity.

12.3.5.14 Residential

This non-Fossitt classification is used to represent residential properties along the Proposed Scheme corridor and generally consists of a mosaic of buildings and artificial surfaces (BL3), amenity grassland (GA2), flower beds and borders (BC4), ornamental shrubs (WS3) and hedgerows (WL1). By virtue of the abundance of urban and suburban landscape through which the Proposed Scheme is located, this habitat type was commonly encountered across the entire scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR).

This habitat type is of Local Importance (Lower Value), due to the general lack of species diversity which reflects the nature of paved and artificial surfaces.

12.3.5.15 (Mixed) broadleaved woodland (WD1)

This habitat was identified at five locations along the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). This habitat type comprised of linear strips and pockets of woodland at The Priory on Main Street, opposite Westpark Fitness on the R819 Greenhills Road, at the northern corner of Tymon Park, on R819 Greenhills Road at the M50 Bridge and on the R134 New Nangor Road at the M50 bridge.

Tree species recorded at these locations include field maple *Acer campestre*, maple species *Acer* spp., alder *Alnus glutinosa*, birch species, hawthorn *Crataegus monogyna*, beech *Fagus sylvatica*, ash *Fraxinus excelsior*, larch species *Larix* spp., sycamore *Acer pseudoplatanus*, poplar species *Populus* spp., aspen *Populus tremuloides*, rowan and small-leaved lime *Tilia cordata*. Where present understories and ground flora species include cock's-foot, Yorkshire-fog, annual meadow grass, common ivy, common hogweed, cow parsley, tutsan *Hypericum androsaemum*, winter heliotrope, rose species, bramble, broad-leaved dock, elder, common ragwort, alexanders and common nettle.

This habitat type also occurred as a mosaic with scrub (WS1).

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area and is relatively species-rich in the context of existing road corridor and surrounding built environment/habitats.

12.3.5.16 Mixed broadleaved / conifer woodland (WD2)

This habitat classification describes areas of mixed stands of broadleaved trees and conifers. It was identified in one location at The Priory on the Tallaght to City Centre section of the Proposed Scheme. Tree species identified at this location include leyland cypress, sycamore, ash, elm species *Ulmus* spp., spruce species *Picea* spp., Monterey Cypress *Cupressus macrocarpa* horse chestnut *Aesculus hippocastanum* and London plane *Platanus x acerifolia*.

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats.

12.3.5.17 Scattered trees and parkland (WD5)

This habitat type comprises areas of scattered trees, standing alone or in small clusters, which are a prominent structural or visual feature of the habitat. This habitat type was identified at approximately 25 locations across the Proposed Scheme, often associated with parks and playing pitches (illustrated in Figure 12.5 in Volume 3 of this EIAR). The most significant areas of this habitat type were present along R819 Greenhills Road, at Kilakee Drive, Bunting Park and at Old County Road, along R134 New Nangor Road at Oak Road, at Diageo and on the corner of John F. Kennedy Drive.

Tree species identified at these locations included field maple, maple species, horse chestnut, alder, birch species, hornbeam *Carpinus Fastigiata Lucas*, sweet chestnut *Castanea sativa*, beech, ash, pine species *Pinus* spp., scots pine *Pinus sylvestris*, London plane, sycamore, poplar species, cherry, oak species *Quercus* spp., willow species *Salix* spp., rowan, Swedish whitebeam *Sorbus intermedia*, small-leaved lime, elm species and crab apple *Malus* spp. The understory was comprised of cow parsley, creeping thistle, common thistle, common ivy, bramble, curled dock *Rumex crispus*, common nettle and Yorkshire-fog, which were all commonly found.

This habitat type also occurred in mosaics with the following habitats; buildings and artificial surfaces (BL3), flower beds and borders (BC4) and dry meadows and grassy verges (GS2).

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats.

12.3.5.18 Hedgerows (WL1)

Hedgerows were identified in multiple locations across the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). These consisted of linear strips of shrubby vegetation, often containing trees, which frequently demarcated property/field boundaries. Most of the hedgerows which were recorded along the Proposed Scheme consisted of screening vegetation at commercial properties, along roadsides and within the vegetated median of larger roads. Substantial areas of this habitat type are present along R819 Greenhills Road, at Bancroft Park, Tymon Park, L4004 Calmount Road, Crumlin Children's Hospital, R134 New Nangor Road and on the road medians along R810 Naas Road. This habitat was identified along road medians at Belgard Square, Main Street Tallaght, along R110 Dolphins Barn Street and along R112 Walkinstown Avenue.

The species composition varied greatly within this habitat type. Tree species consisted of field maple, maple species, horse chestnut, alder, grey alder *Alnus incana*, birch species, hornbeam, sweet chestnut, conifer species, hazel *Corylus avellana*, hawthorn, cypress species *Cupressus* sp., beech, copper beech *Fagus sylvatica* f. *purpurea*, ash, larch species, pine species, sycamore, plane species *Platanus* spp., poplar species, aspen, cherry, cherry laurel *Prunus laurocerasus*, oak species, goat willow, crack willow, willow species, elder, whitebeam *Sorbus aria*, yew *Taxus baccata*, small-leaved lime, elm species and holly *Ilex aquifolium*.

Shrub species present included spotted laurel *Aucuba japonica*, bamboo species *Bambusoideae* subfamily, barberry species *Berberis* spp., butterfly bush, dogwood species, cotoneaster species, cabbage palm, bay laurel *Laurus nobilis*, garden privet *Ligustrum Ovalifolium*, mallow, dog rose, Japanese rose *Rosa rugosa*, snowberry, *fuchsia* spp., hebe spp., rose species and bramble.

Ground flora and forb species consist of common ivy, St. John's wort species, common knapweed, creeping thistle, common thistle, hawksbeard, hoary willowherb, cleavers, lady's bedstraw, herb Robert *Geranium robertianum*, common hogweed, prickly lettuce *Lactuca serriola*, yarrow, hedge bindweed *Calystegia sepium*, bird's-foot trefoil, ribwort plantain, creeping cinquefoil, curled dock, broad-leaved dock, common ragwort, alexanders, smooth sow-thistle, field bindweed, traveller's-joy *Clematis vitalba*, colt's-foot, common nettle, common valerian, bush vetch and cow parsley. Grass species include cock's-foot, couch grass *Elymus repens*, Yorkshire-fog, annual meadow grass and oat-grass species.

This habitat type also occurred in mosaics with the following habitats: amenity grassland (GA2), scrub (WS1), treelines (WL2) and buildings and artificial surfaces (BL3).

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area.

12.3.5.19 Treelines (WL2)

This habitat is comprised of narrow rows or single lines of trees which are greater than 5m in height. This habitat type was recorded widely across the study area of the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). In the context of the Proposed Scheme, treelines habitat type is found typically bordering adjacent parkland and areas with urban street planting along footpaths/ strips of amenity grassland and road edges. Larger areas of this habitat type are present at Belgard Square, along R819 Greenhills Road, at the M50 motorway bridge crossing on R819 Greenhills Road, L4004 Calmount Road, Treepark Road, Bunting Road and along the Grand Canal. Frequent urban street planting was present along R110 Long Mile Road, Dolphins Barn Street, Cork Street, Kevin Street Upper, Drimnagh Road, Kildare Road, Clogher Road R137 Patrick Street and R108 High Street. Tree planting is also present in the grounds of Christchurch.

Species frequently recorded included field maple, maple species, alder, birch species, hornbeam, hazel, hawthorn, Leyland cypress *Cupressus x leylandii*, cypress species, eucalyptus *Eucalyptus gunnii*, ash, holly, crab apple *Malus domestica*, London plane, sycamore, plane species, poplar species, aspen, cherry, oak species, crack willow, other willow species, elder, whitebeam, rowan, Swedish whitebeam, small-leaved lime, Japanese

cherry *Prunus serrulate*, pedunculate oak *Quercus robur*, large-leaved lime *Tilia platyphyllos*, laburnum *Laburnum anagyroides* and dogwood species. The understory consists of a variety of species including bramble, common thistle, bedstraw, common hogweed, common ragwort, alexanders, common nettle, Yorkshire-fog and cock's-foot.

This habitat type also occurred in mosaics with exposed sand, gravel or till (ED1), amenity grassland (GA2), hedgerows (WL1) and ornamental / non-native shrub (WS3).

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats.

12.3.5.20 Scrub (WS1)

Scrub was identified in approximately 35 locations across the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). Large areas of this habitat type were identified at several areas around Ballymount Industrial Estate, R819 Greenhills Road, Tymon Park and L4004 Calmount Road. It was also present on R134 New Nangor Road at the M50 motorway bridge and at Woodies Shopping Unit. Smaller areas were identified at Belgard Square, Main Street, R110 Dolphins Barn Street and St. Luke's Avenue.

Tree and shrub species recorded consisted of hawthorn, ash, mallow, sycamore, blackthorn *Prunus spinosa*, goat willow, elder, elm species, field maple, cotoneaster species, St. John's wort species, Japanese rose, rose species, bramble and gorse species. Ground cover and forb species recorded included cow parsley, butterfly bush, hedge bindweed, pea shrub *Caragana arborescens*, creeping thistle, common thistle, traveller's-joy, field bindweed, hawksbeard, wild teasel, rosebay willowherb, hoary willowherb, horsetail species, lady's bedstraw, common ivy, common hogweed, prickly lettuce, creeping cinquefoil, broad-leaved dock, common ragwort, alexanders, smooth sow-thistle, common nettle, common valerian, cocks-foot, Yorkshire-fog, meadow foxtail *Alopecurus pratensis* and annual meadow grass. It should be noted that ground cover and forb species were generally sparse within this habitat owing to the dominance of tree and shrub species which excludes sufficient light penetration for a rich forb or ground layer to establish. Japanese knotweed was also identified in this habitat type at R134 / New Nangor Road.

This habitat type also occurred in mosaics with hedgerow (WL1), buildings and artificial surfaces (BL3), spoil and bare ground (ED2), amenity grassland (GA2), dry meadows and grassy verges (GS2), immature woodland (WS2) and (mixed) broadleaved woodland (WD1).

This habitat type is of Local Importance (Lower Value) due to the relative lack of overall floristic diversity owing to the dominance by tree and / or shrub species.

12.3.5.21 Immature woodland (WS2)

This habitat type was identified at three locations across the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR).

The largest area this habitat type was identified to the rear of Ballymount Civic Amenity Site approximately 0.5ha. Immature woodland also bordered the R819 Greenhills Road north of the M50 motorway bridge crossing and thin linear strips on the R134 New Nangor Road at Woodford Walk.

Tree species identified at these locations include cherry species *prunus sp.*, goat willow, white willow *Salix alba*, sycamore, dogwood species *Cornus spp.*, silver birch *Betula pendula*, ash and beech. The understory was commonly comprised of hairy willowherb *Epilobium hirsutum*, common dandelion, common figwort *Scrophularia nodosa*, rosebay willowherb, bramble, common thistle and broad-leaved dock. Grasses include Yorkshire-fog, cock's-foot and perennial ryegrass.

This habitat type was recorded in mosaic with amenity grassland (GA2) and scrub (WS1).

This habitat type is of Local Importance (Higher Value) as it is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats.

12.3.5.22 Ornamental / non-native shrub (WS3)

Areas of ornamental / non-native shrub were generally associated with amenity and landscape planting at commercial properties. This habitat was identified across the footprint of the Proposed Scheme (illustrated in Figure 12.5 in Volume 3 of this EIAR). Substantial areas of this habitat type bordered areas of commercial property along R819 Greenhills Road, R134 New Nangor Road, Belgard Square, L4004 Calmount Road and Calmount Avenue. The remaining locations were isolated areas of commercial planting in carparks along the Proposed Scheme including Westpark, Daybreak, and Ballymount Civic Amenity Centre. This habitat type was also observed on road medians along R110 Long Mile Road, Drimnagh Road and at Walkinstown Roundabout.

Species identified included maple species, purple maple *Acer palmatum Atropurpureum*, palm species *Arecaceae* spp., spotted laurel, barberry species, butterfly bush, conifer species, dogwood species, pampas grass, cotoneaster species, montbretia species, cypress species, copper beech, fuchsia species, hebe species, St. John's wort species, holly, laurel, lavender species, birds-foot trefoil, oleander, cherry, cherry laurel, oak species, Japanese rose, rose species, rosemary *Salvia rosmarinus*, elder, shrubs, whitebeam, rowan, Swedish whitebeam, snowberry and small-leaved lime.

This habitat type was recorded in mosaics with the following other habitat types; flower beds and borders (BC4), amenity grassland (GA2) and treelines (WL2).

This habitat type is of Local Importance (Lower Value) due to its anthropogenic nature and relative low species diversity.

12.3.6 Rare and Protected Plant Species

There were no protected plant species listed on the Flora (Protection) Order 2022 identified within the footprint of the Proposed Scheme during field surveys.

The desk study returned records of a total of eleven species listed on the Flora (Protection) Order 2022 across the wider study area (i.e., grid Squares O02, O03, O12 and O13) and are listed in Appendix 12.1 in Volume 4 of this EIAR. There were four historical records from 1800's and 1920's. Records within close proximity to the Proposed Scheme included one record of opposite-leaved pondweed within approximately 1km north of the Proposed Scheme, along the Grand Canal at Clondalkin Industrial Estate on R134 New Nangor road in 1999. However the NBDC online database maps its presence per distribution tetrad as also being along much of the downstream parts of the Grand Canal including potentially other areas where the Proposed Scheme crosses the Grand Canal. The conservation status of this species is 'Vulnerable according to Irelands Red List No. 10: Vascular Plants 2016 (Jackson *et al.*, 2016). No rare or protected plant species were recorded during the aquatic surveys carried out by Triturus Environmental Ltd, 2022.

Populations of flora species listed on the Flora (Protection) Order 2022 are valued as of National Importance.

All other Red and non-Red listed flora are considered to be of Local Importance (Higher Value).

12.3.7 Non-Native Invasive Plant Species

There was one non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations, 2011 which was identified along the Proposed Scheme; Japanese knotweed. The six locations of this Third Schedule non-native invasive plant species are summarised below in Table 12.6 and shown on Figure 12.6 in Volume 3 of the EIAR.

The desk study returned records of a total of 19 species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations across the wider study area (i.e., Grid Squares O02, O03, O12 and O13) and are listed in Appendix A12.1 in Volume 4 of this EIAR.

Many of the 19 species listed were recorded within 1km of the Proposed Scheme (NBDC online database 2022).

On the Tallaght to City Centre section of the Proposed Scheme, records returned within approximately 1km include Himalayan balsam *Impatiens glandulifera* and giant-rhubarb *Gunnera tinctoria* at Tymon Park, recorded in 2017 and 2015, respectively. On the Clondalkin to Drimnagh section of the Proposed Scheme records returned within approximately 1km include Himalayan balsam at Corkagh Park and Kingswood Park in 2017, several records of Japanese knotweed along the Grand Canal at R134 / New Nangor Road recorded in 2013, 2014, and 2019, as well as the delisted Canadian waterweed *Elodea canadensis* recorded in 2009. A record was returned of Spanish bluebell *Hyacinthoides hispanica* at Corkagh Park recorded in 2016 and at Eamonn Ceannt Park, Kimmage, recorded in 2018. There was one record of three-cornered garlic *Allium triquetrum* at Bangor Road recorded in 2019. Third Schedule Invasive plant species records along the Grand Canal include several records of Nuttall's Waterweed *Elodea nuttallii* recorded in 2009 and 2018 and New Zealand pigmyweed *Crassula helmsii* at Dolphins Barn in 2009. There were two records of parrot's-feather *Myriophyllum aquaticum* at Drimnagh in 2009 and a historical record of water fern *Azolla filiculoides* at Dolphins Barn in 1984 (NBDC Online Database 2022). These species were not present within the footprint of the Proposed Scheme. Canadian waterweed *Elodea canadensis*, which was documented along the Grand Canal, was delisted as a third schedule species, with the introduction of the European Communities (Birds and Natural Habitats) (Amendment) Regulations 2015, S.I. No. 355 / 2015.

Records returned within approximately 1km of the Clondalkin to Drimnagh section of the Proposed Scheme included Canadian waterweed, giant hogweed *Heracleum mantegazzianum*, Indian balsam, Japanese knotweed, bohemian knotweed and Nuttall's waterweed, which is associated with the Grand Canal.

Table 12.6: Summary of Non-native Invasive Plant Species Listed in the Third Schedule of the Birds and Habitats Regulations Recorded along or adjacent to the Proposed Scheme

Reference	Species	Description	Within Proposed Scheme Boundary (Y / N)
CBC0809IAPS01	Japanese knotweed <i>Reynoutria japonica</i>	Stand approximately 3m x 3m to the rear of Greenhills Motors. Also assumed to be present in the area of scrub between L4004 / Calmount Road and R819 / Greenhills Road, due to recorded Japanese knotweed in close proximity to this area.	Y (edge of permanent land take at boundary fence of commercial facility)
CBC0809IAPS02	Japanese knotweed <i>Reynoutria japonica</i>	Extensive stand adjacent to Woodies. Accurate estimate of size not feasible as restricted access and view.	Y (within temporary land take boundary- area proposed for Construction Compound TC12)
CBC0809IAPS03	Japanese knotweed <i>Reynoutria japonica</i>	Extensive stand adjacent to Woodies. Accurate estimate of size not feasible as restricted access and view.	Y (within temporary land take boundary- area proposed for Construction Compound TC12)
CBC0809IAPS04	Japanese knotweed <i>Reynoutria japonica</i>	Extensive stand adjacent to Woodies. Accurate estimate of size not feasible as restricted access and view.	Y (within temporary land take boundary- area proposed for Construction Compound TC12)
CBC0809IAPS05	Japanese knotweed <i>Reynoutria japonica</i>	Extensive stand adjacent to Woodies. Accurate estimate of size not feasible as restricted access and view.	Y (within temporary land take boundary- area proposed for Construction Compound TC12)
CBC0809IAPS06	Japanese knotweed <i>Reynoutria japonica</i>	Treated stand approximately 3m x 3m adjacent to Lidl.	N

12.3.8 Mammals

12.3.8.1 Bats

Bats, including their breeding and resting places, are protected under the Wildlife Acts. All bat species are listed on Annex IV of the Habitats Directive, with the lesser horseshoe bat being also listed on Annex II. Bats are also afforded strict protection under the Habitats Directive and the (Birds and Natural Habitats) Regulations.

Bat surveys were carried out across four seasons between 2018 and 2020 (as described in Section 12.2.3.5). Four transects were surveyed within the footprint of the Proposed Scheme; three along the Tallaght to City Centre section of the Proposed Scheme and one along the Clondalkin to Drimnagh section of the Proposed Scheme. The transect along the Clondalkin to Drimnagh section of the Proposed Scheme was located along the R134 New Nangor Road between Oak Road and Willow Road, referred to as CBC0809BT001. Transects along the Tallaght to City Centre section of the Proposed Scheme were located along R819 Greenhills Road between Greenhills Motor Spares and Chadwicks Home Improvement Store, referred to as CBC0809BT002, along R819 Greenhills Road between Tymon Park and Calmount Avenue, referred to as CBC0809BT003 and along Blessington Road, Main Street Road and Old Greenhills Road in Tallaght as far as Astro Park Tallaght, referred to as CBC0809BT004. The results of these are described below in Sections 12.3.8.1.1 to Section 12.3.8.1.7 and are also presented in Figure 12.7.1 in Volume 3 of this EIAR. The structure of this Section is such that each bat species is described in turn. The results of the various surveys are presented to allow an understanding of each species in terms of its distribution across the Proposed Scheme.

All bat species' populations in County Dublin are valued as being of Local Importance (Higher Value) given the legal protection afforded to them, and due to their common presence throughout the Greater Dublin Area (GDA). In an Irish context, the conservation status of these species in Ireland is designated as 'Least Concern' (Marnell *et al.* 2019).

12.3.8.1.1 Leisler's bat *Nyctalus leisleri*

Leisler's bat *Nyctalus leisleri* was recorded along all of the four transects surveyed between 2018 and 2020. A total of 26 bat passes attributed to Leisler's bats were identified in these locations between 2018 and 2020. There were no recordings of this species in 2019. Leisler's bat activity was highest in 2018 with 23 bat passes; The highest level of activity was along CBC0809BT001 (R134 New Nangor Road) with 12 bat passes, there were four bat passes along CBC0809BT003 (R819 Greenhills Road) and seven bat passes between Tallaght Village and Astro Park along CBC0809BT004. There were two bat passes attributed to this species in Spring 2020; one of which was on CBC0809BT004 and the other on R819 Greenhills Road CBC0809BT002. There was one bat pass attributed to this species in Summer 2020 along CBC0809BT002.

The results of the bat surveys as they relate to the Leisler's bat are shown on Figure 12.7.1 in Volume 3 of this EIAR.

No roost sites for Leisler's bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that Leisler's bat are known to occur across the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes several records of live sightings within approximately 1km of the Proposed Scheme, including records at R134 / New Nangor Road recorded in 2005 and 2007 and John F. Kennedy Industrial Estate recorded in 2007 (NBDC Online Database 2022).

12.3.8.1.2 Common pipistrelle bat *Pipistrellus pipistrellus*

Common pipistrelle bat *Pipistrellus pipistrellus* was recorded along all the four transects surveyed between 2018 and 2020. A total of 82 recordings of common pipistrelle bat were identified at these locations between 2018 and 2020. Common pipistrelle bat activity was highest at Tallaght Village CBC0809BT004, with 41 recordings of this species occurring here in the Summer 2020. There were 17 recordings of this species in 2018 at Tallaght Village CBC0809BT004 and 17 south of Lidl on R819 Greenhills Road along CBC0809BT003. In 2019, there were four recordings in total, three of which were along R134 New Nangor Road CBC0809BT001 and one at Tallaght Village CBC0809BT004. There were two recordings of this species in Spring 2020 at Tallaght Village CBC0809BT004.

The results of the bat surveys as they relate to the common pipistrelle bats are shown on Figure 12.7.1 in Volume 3 of this EIAR.

No roost sites for common pipistrelle bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that common pipistrelle bat are known to occur across the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes several records of live sightings located within approximately 1km of the Proposed Scheme. These include records at R134 New Nangor Road, recorded in 2005 and 2007, John F. Kennedy Industrial Estate, recorded in 2007, and three records at Dodder Valley, recorded in 2007 (NBDC Online Database 2022).

12.3.8.1.3 Nathusius' pipistrelle bat *Pipistrellus nathusii*

Nathusius' pipistrelle bat *Pipistrellus nathusii* was not recorded across the study area of the Proposed Scheme during the walked transect surveys.

No roost sites for Nathusius' pipistrelle bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that Nathusius' pipistrelle bat are known to occur within approximately 2km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). Therefore, it may be assumed that this species is present within the wider study area. This includes live records along the Grand Canal west of Charlemont Street recorded in 2009 (NBDC Online Database 2022).

12.3.8.1.4 Soprano pipistrelle bat *Pipistrellus pygmaeus*

Soprano pipistrelle bat *Pipistrellus pygmaeus* was recorded along three of the four transects surveyed between 2018 and 2020; CBC0809BT001 on the Clondalkin to Drimnagh section of the Proposed Scheme, CBC0809BT003 and CBC0809BT004. A total of 18 recordings of soprano pipistrelle bat were identified in these locations between 2018 and 2020. Soprano pipistrelle bat activity was highest along R134 New Nangor Road CBC0809BT001, with 11 recordings attributed to this species occurring here in 2019 and two in 2018. There were two recordings of this species in Spring 2020; one each at R819 Greenhills Road CBC0809BT003 and Tallaght Village CBC0809BT004. In Summer 2020, there were three recordings of this species at Tallaght Village CBC0809BT004.

The results of the bat surveys as they relate to the soprano pipistrelle bats are shown on Figure 12.7.1 in Volume 3 of this EIAR.

No roost sites for soprano pipistrelle bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that soprano pipistrelle bat are known to occur across the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes several records of live sightings within approximately 1km of the Proposed Scheme, including records at R134 New Nangor Road, recorded in 2005 and 2007, at John F. Kennedy Industrial Estate, recorded in 2007, and at Dodder Valley Tallaght, recorded in 2007 (NBDC Online Database 2022).

12.3.8.1.5 Unidentified Pipistrelle Species

Common pipistrelle bats have their peak echolocation call strength at 45kHz and soprano pipistrelle bats at 55kHz. Pipistrelle bat species that echolocate between 48 and 52kHz cannot be accurately identified by their calls and are described as "unidentified" pipistrelle bat species.

Pipistrelle species bat calls that could not be classified as either characteristic of common or soprano pipistrelle were identified at two locations surveyed between 2018 and 2020; CBC0809BT001 on the Clondalkin to Drimnagh section of the Proposed Scheme and CBC0809BT003. A total of 11 recordings of unidentified pipistrelle species were identified in these locations during surveys carried out in 2018. Unidentified bat activity was highest at Lidl on R819 Greenhills Road CBC0809BT003, with six recordings of this species occurring here and five recordings at R134 New Nangor Road along the Grand Canal CBC0809BT001. The results of the bat surveys as they relate to the unidentified pipistrelle bats are shown on Figure 12.7.1 in Volume 3 of this EIAR.

12.3.8.1.6 Brown Long-Eared Bat *Plecotus auritus*

Brown long-eared bat *Plecotus auritus* was not recorded across the study area of the Proposed Scheme during the walked transect surveys.

No roost sites for brown long-eared bat were recorded during any of the surveys for the Proposed Scheme.

The desk study found that brown long-eared bat are known to occur within 2.5km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). Therefore, it may be assumed that this species is present within the wider study area. This includes a record of one live sighting in Bushy Park, recorded in 2007, and another at Ballymount Park recorded in 2010 (NBDC Online Database 2022).

12.3.8.1.7 *Myotis* bat species

Myotis bat species was not recorded across the study area of the Proposed Scheme during any of the walked transect surveys.

The desk study found that *Myotis* bat species including Daubenton's bat *Myotis daubentonii*, Natterer's bat *M.nattereri* and whiskered bat *M. mystacinus* are known to occur within approximately 1km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes records of live sightings of Daubenton's bat at several locations along the Grand Canal at R134 New Nangor Road recorded in 2005 and 2007 (NBDC Online Database 2022).

12.3.8.1.8 Potential Roost Features (PRFs)

During the earlier stage of the surveys a number of trees or groups of trees having potential to support roosting bats (PRFs) were identified. Owing to design refinements, PRFs within the Proposed Scheme were revisited in 2022. The trees identified as having potential to support roosting bats, i.e., containing PRFs, are listed in Table 12.11 and shown on Figure 12.7.2 in Volume 3 of this EIAR. Each tree, or grouping of homogenous trees, was identified with regard to their potential to support roosting bats after Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins 2016). Trees with negligible suitability for roosting bats are not described or mapped as they are assessed as not having potential to support roosting bats.

Seven trees with single or multiple PRFs are required to be removed to facilitate the Proposed Scheme. A further five trees with single or multiple PRFs are inside the permanent and temporary land take boundary for the Proposed Scheme but are being retained, as is a single structure which is immediately adjacent to the Proposed Scheme, as indicated on the Landscaping General Arrangement (BCIDA-ACM-UBR_ZZ-0809_XX_00-DR-LL-9001) for the Proposed Scheme.

Table 12.7: Summary of Potential Roost Features (PRFs) recorded within the footprint of the Proposed Scheme

Reference	Species	Description	Inside/ Outside Redline Boundary	Required to be removed
CBC0809PRF001	2 no. Oak species <i>Quercus</i> spp.	Dense Ivy Suitable size to contain other PRFs	Inside and outside	Inside- retained – At edge Outside – to be removed
CBC0809PRF002	Ash and Beech <i>Fraxinus excelsior</i> and <i>Fagus sylvatica</i>	Knotholes	Outside	Retained
CBC0809PRF003	Cherry <i>Prunus</i> spp.	Dense Ivy	Outside	Retained
CBC0809PRF004	Ash <i>Fraxinus excelsior</i>	Dense Ivy	Inside	To be removed
CBC0809PRF005	Ash <i>Fraxinus excelsior</i>	Dense Ivy	Inside	Retained
CBC0809PRF006	Ash <i>Fraxinus excelsior</i>	Peeling bark	Outside	Retained
CBC0809PRF007	Ash <i>Fraxinus excelsior</i>	Dense Ivy	Inside	To be removed
CBC0809PRF008	Ash <i>Fraxinus excelsior</i>	Dense Ivy	Inside	To be removed
CBC0809PRF009	<i>Fraxinus excelsior</i>	Ivy could be hiding PRF	Inside	To be removed

Reference	Species	Description	Inside/ Outside Redline Boundary	Required to be removed
CBC0809PRF010	<i>Fraxinus excelsior</i>	Ivy could be hiding PRF	Inside	To be removed
CBC0809PRF011	<i>Fraxinus excelsior</i>	Ivy not suitable but could be hiding PRFs	Inside	To be removed
CBC0809PRF012	N/A	House	Outside	Retained

Note: A description of each different type of PRF, as referred to in Table 112.7, is provided in Andrews (2018).

12.3.8.2 Badger

Badger, and their breeding and resting places, are legally protected under the Wildlife Acts. No evidence of badger (e.g., setts or evidence of badger activity) were recorded during the multi-disciplinary surveys carried out along the Proposed Scheme.

Despite this, badger are widely distributed throughout the Greater Dublin Area (GDA), often utilising public parks and residential gardens. The desk study returned two records, found within 1km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details). This includes a live sighting at Lansdowne Valley, Drimnagh recorded in 2018 approximately 300m from the Proposed Scheme, a sighting at Bancroft Park approximately 200m from the Proposed Scheme and throughout grid squares O02 and O12 (NBDC online database 2022). As such, it has been assumed that badger may occur in vegetated areas adjacent to the Proposed Scheme.

The local badger population is deemed to be of Local Importance (Higher Value) due to the known presence of resident populations within the wider environment of the Proposed Scheme, which are valued as being of local importance as they are a Wildlife Acts protected species.

12.3.8.3 Otter

Otter, and their breeding and resting places, are legally protected under the Wildlife Acts. Otter are also listed on Annex II and Annex IV of the Habitats Directive.

A desk study was carried out to identify all hydrological crossing points within the footprint of the Proposed Scheme. Construction methodologies which involved in-stream works, modifications to banks or significant disturbance were deemed to require habitat suitability assessments for otter. Previous iterations of the Proposed Scheme identified three sites where water bodies may be subject to significant disturbance as a consequence of the construction of the Proposed Scheme; survey site CBC0809AR001 on the River Camac, CBC0809AR002 on the River Camac and CBC0809AR003 on the River Poddle. A corridor of approximately 150m upstream and downstream from these locations were surveyed to identify the presence of otter holts in October 2020.

A desk study found that otter are known to occur within 1km of the Proposed Scheme and across the wider study area, including the River Poddle, River Camac, River Dodder and Grand Canal. Records include a single spraint along the River Poddle, recorded underneath a footbridge in Tymon North Park between April 2018 and April 2019². Separately, a total of eight signs of otter activity, including four spraints, were recorded on the River Camac during the Dublin City Otter Survey 2019 (Macklin *et al.*, 2019). Spraint and prey remains were recorded along the River Camac, as it flows alongside the R134 New Nangor Road, east of the M50 motorway. A single holt and sprainting post was recorded along the River Camac at Bluebell, approximately 360m north of the Proposed Scheme.

A total of eight otter signs comprising spraints, latrine and a couch were recorded along the length of the River Camac, whereas only two number signs were recorded along the River Poddle during the 2019 study (Macklin *et al.*, 2019). During the same survey, the unculverted River Dodder had 47 otter signs, including 30 spraints and six holts. The Proposed Scheme crosses the River Camac twice and the River Poddle one, whereas at its closest point, the Proposed Scheme lies approximately 220m north of the River Dodder. Otter are also known to occur

along the Grand Canal (NPWS 2009), with a live sighting recorded at Dolphins Barn Bridge in 2014 (NBDC Online Database, 2022).

No signs of otter, an Annex II species, were recorded during surveys within the footprint of the Proposed Scheme during multidisciplinary surveys. No signs of otter were recorded within 150m upstream and downstream of the proposed crossing points of the River Camac and the River Poddle. While no otter holts were recorded during surveys in 2022, a potential otter slide was noted in riparian vegetation along the northern side of the Grand Canal (downstream of where it flows under the M50) in March 2022. The July 2022 survey of the aquatic sites recorded two number mixed age otter spraints along the River Camac near the Nangor Road culvert, which is proposed to be extended by approximately 4metres.

In an Irish context, the conservation concern of otter is 'Least Concern' (Marnell *et al.*, 2019) due to population recoveries since 2009. However, otter remains 'Near Threatened' at a European and Global context (Roos *et al.*, 2015) and is listed on Annex II and Annex IV of the Habitats Directive. The national population of adult breeding female otters in the Republic of Ireland was estimated at 7,800 in the National Otter Survey of Ireland 2010 / 12 (Reid *et al.*, 2013), the most recent survey of its type undertaken. The local otter population in the vicinity of the Proposed Scheme is unlikely to comprise 1% of the national population (e.g., 78 breeding female otters).

The nearest European site for which this species is designated is the Wicklow Mountains SAC, which is located approximately 5.3km south of the Proposed Scheme. The Proposed Scheme including the upper sections of the River Camac is located within the Liffey and Dublin Bay catchment and the Liffey_SC_090 (Clondalkin to Drimnagh section) and Dodder_SC_010 (Tallaght to City Centre section) sub catchments. The River Liffey, River Dodder and their tributaries are known to support otter. Current guidance in respect of the hydrological distance that territorial otters roam suggests a range of approximately 7.5km for females and 21km for male otters (O'Neill *et al.*, 2009). Therefore, some watercourses in proximity to the Proposed Scheme, particularly in its southern extent along the Tallaght to City Centre section, could potentially be associated with QI populations associated with the Wicklow Mountains SAC. Wicklow Mountains SAC is located within the Dodder_SC_010 sub catchment, within which the Tallaght to City Centre section of the Proposed Scheme is also located. As such, populations of otter within the footprint of the Proposed Scheme are potentially connected to the SAC population.

Despite the fact that otter is of "Least Concern" from an Irish perspective and is known to be abundant in watercourses in and around Dublin City, considering the above, the local otter population is valued as being of County importance given that it cannot be ruled out as being from the Wicklow Mountains SAC population.

12.3.8.4 Marine Mammals

The Proposed Scheme is hydrologically connected to Dublin Bay via the River Camac (Camac_040), Grand Canal, River Poddle (Poddle_010), the Liffey Estuary Upper and Liffey Estuary Lower. There were no dedicated marine mammal surveys carried out as part of the assessment due to the Proposed Scheme being located inland.

Harbour seal, grey seal, and harbour porpoise are known to be present in Dublin Bay. Both seal species are listed on Annex II of the habitats directive and harbour porpoise is listed on Annex II of the Habitats Directive. The nearest European site for which harbour seal and grey seal have been designated is Lambay Island SAC located approximately 22.6km from the Proposed Scheme. The nearest European site for which harbour porpoise has been designated is Rockabill to Dalkey Island SAC located approximately 12.2km from the Proposed Scheme.

Harbour porpoise, harbour seal and grey seal are valued as being of International Importance as they are listed on Annex II of the Habitats Directive and a QI species designated as part of Rockabill to Dalkey Island SAC, and Lambay Island SAC. As such, these species are valued as Internationally Important and are considered to be of high conservation concern. A number of protected marine mammals are known to occur within Dublin Bay and off the Dublin coast downstream of the Proposed Scheme, including:

- Common Dolphin *Delphinus delphis*;
- Minke Whale *Balaenoptera acutorostrata*;
- White-beaked Dolphin *Lagenorhynchus albirostris*;
- Pygmy Sperm whale *Kogia breviceps*;
- Bottle-nosed Dolphin *Tursiops truncatus*;

- Humpback Whale *Megaptera novaeangliae*;
- Sperm Whale *Physeter macrocephalus*;
- Striped Dolphin *Stenella coeruleoalba*;
- Risso's Dolphin *Grampus griseus*; and
- Northern Bottle-nosed Whale *Hyperoodon ampullatu*.

Bottle-nosed dolphin is common to Irish coastlines, particularly the west coast, throughout the year and are infrequently recorded within Dublin Bay. There are two SACs designated for Bottle-nosed dolphin; the Lower River Shannon SAC and the West Connaught Coast SAC, both located along the western coast. This species is protected under Annex II and Annex IV of the Habitats Directive and the Wildlife Acts and as such, the local population is valued as National Importance.

Common dolphin and Risso's dolphin, are found both in inshore and offshore coastal waters and are occasionally sighted in Dublin Bay. Minke whales and humpback whale species are migratory and frequent Irish coastlines each year. White-beaked dolphin, sperm whale, striped dolphin, and northern bottle-nosed whale are pelagic species and are rarely sighted in Dublin Bay, favouring the offshore waters of the continental shelf. Pygmy Sperm whales are rare to the Irish coastline, with only one record identified in Dublin Bay. These species are protected under the Wildlife Acts and Annex IV of the Habitats Directive) and are valued as National Importance.

12.3.8.5 Other Mammal Species

No other protected mammal species were recorded during the multi-disciplinary surveys carried out along the Proposed Scheme. The desk study returned records for the following terrestrial mammal species, protected under the Wildlife Acts, and which are known to occur within approximately 1km of the Proposed Scheme (see Appendix A12.1 in Volume 4 of this EIAR for further details):

- Pine Marten *Martes martes*;
- Red Squirrel *Sciurus vulgaris*; and
- Hedgehog *Erinaceus europaeus*.

The local populations of these species are deemed to be of Local Importance (Higher Value) due to the known presence of resident populations within the wider environment of the Proposed Scheme, and the fact that they are Wildlife Acts protected species.

Evidence of fox *Vulpes vulpes* and rabbit *Oryctolagus cuniculus* were also recorded across the study area within areas of suitable habitat. Although these species are not afforded legal protection under the Wildlife Acts, they form part of the local biodiversity resource and are noted here in that context.

12.3.9 Birds

12.3.9.1 Breeding Birds

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the Birds Directive and / or as SCIs within designated European sites.

No dedicated breeding bird surveys were carried out for the Proposed Scheme.

A habitat suitability assessment for nesting kingfisher, an Annex I bird species, was carried out in October 2020 which recorded suitable habitat for nesting kingfisher within 500m of the proposed crossing point of the River Camac. A number of overhanging trees along the River Camac were considered to have some roosting / fishing potential for kingfisher, however, the riverbanks are largely overgrown or reinforced with cement. There are also high levels of disturbance along the River Camac from traffic and dogs. No habitat suitable to support nesting kingfisher was recorded at the River Poddle crossing point. The desk study found that kingfisher are known to occur within 1km of the Proposed Scheme and across the wider study area (NBDC Online Database 2022). Kingfisher are known to occur on the River Camac (Friends of the Camac 2022) and there are also records of kingfisher on the Grand Canal, which is hydrologically connected to the Proposed Scheme (FERS 2018).

The full results of the desk study, including records of breeding bird species considered to be of conservation concern, are presented in Appendix A12.1 in Volume 4 of this EIAR. These species are considered to be KERs of the Proposed Scheme and include the following:

- SCIs, for a breeding population, of SPAs;
- Species listed under Annex I of the Birds Directive; and
- Red and Amber Birds of Conservation Concern in Ireland (BoCCI) species listed for their breeding populations (Gilbert *et al.*, 2021).

The results of the breeding bird desk review carried out to inform this assessment are summarised below.

The desk study returned records of a total of 84 protected and / or Red / Amber listed for their breeding populations across the study area (i.e., grid Squares O03 and O13). Records included 24 species listed under Annex I of the Birds Directive, 28³ SCI species, and an additional 16 Red listed and 16 Amber listed species. This includes 30 species with breeding and wintering populations. These species are grouped into habitat preferences and are discussed below in relation to their presence within the footprint of the Proposed Scheme.

Several bird species for which records were returned in the desk study are those typically found in coastal, estuarine and intertidal habitats, such as the Liffey Estuary and Dublin Bay. Many gull, auk, shearwater and tern species breed in steep inaccessible cliffs i.e., Howth Head, offshore islands, Dublin Port. Seabirds such as terns, guillemots and kittiwakes *Rissa tridactyla* nest on the cliffs and crevices of Rockabill Island in Dublin Bay SPA (Birdwatch Ireland 2020). Fulmar *Fulmarus glacialis*, shag *Phalacrocorax aristotelis*, razorbill *Alca torda* and gannet *Morus bassanus* nest in the cliffs of Irelands Eye SPA, which also has numbers of large gulls, cormorant *Morus bassanus* and puffin *Fratercula arctica* (Merne and Madden 2000). Gulls favour nesting along coasts on shingle and cliffs but may utilise inland public areas for scavenging and buildings for roof nesting (Birdwatch Ireland 2020).

The majority of records along the Proposed Scheme comprise bird species common to suburban habitats (including residential and parkland areas), such as gull and garden bird species. Residential habitats and scattered trees and parkland, hedgerows, treelines, broadleaved woodland and amenity grassland habitats were observed in several locations across the Proposed Scheme including Walkinstown Park, Lansdowne Valley, Pearse Park, Eamonn Ceannt Park, TUD Tallaght, Bancroft Park, Tymon Park and St. Patrick's Park. These species therefore are likely to use lands within the footprint of the Proposed Scheme for breeding and foraging.

Breeding species which are associated with buildings were returned from the desk study include swallows, swift and martins (Birdwatch Ireland, 2020). Swallows and starlings occurred across the study area and may therefore utilise buildings adjacent to the Proposed Scheme. Building nesting raptors including kestrel *Falco tinnunculus* occurred infrequently across the wider study area, these may utilise open green spaces and trees adjacent to the Proposed Scheme, although are unlikely to form part of the core foraging territory generally favouring larger habitats. Several species of warblers and raptors which favour woodlands, agricultural lands and upland heathland areas were identified during the desk study (Appendix A12.1. in Volume 4 of this EIAR). Some agricultural lands, and open areas were identified at locations to the north and west of the Proposed Scheme. As such, some of these species may utilise the lands at these locations. Due to the largely urban setting of the Proposed Scheme, these habitat types are not present, or are highly fragmented within the boundary of the Proposed Scheme. As such, these species are not deemed to be present in significant numbers. However, they may be present in larger parks and greenspaces in the lands surrounding the Proposed Scheme, e.g., Tymon Park, Clonmacnoise Roundabout, Eamonn Ceannt Park, Syngé Street GAA Pitches, Beechfield Road Sports Grounds, Pearse Memorial Park and Brickfields Park (NPWS Online Database 2022).

Wetland and riverine bird species identified during the desk study (Appendix A12.1. in Volume 4 of this EIAR), include gulls, waders, waterfowl, swans, ducks, and herons which utilise intertidal zones, freshwater lakes, ponds, canals, and rivers. Suitable habitats within close proximity to the Proposed Scheme include the Grand Canal at Dolphins Barn, River Camac at R134 New Nangor Road and R810 Naas Road and River Poddle at R819 Greenhills Road containing populations of swan, coot, heron and little grebe. Rivers are important nesting and foraging sites for species such as kingfisher and grey wagtail within the Proposed Scheme. The Proposed Scheme crosses the River Camac at three locations on the Clondalkin to Drimnagh section of the Proposed

³ Note that some species listed on Annex I of the Birds Directive are also SCI species.

Scheme and once on the Clondalkin to Drimnagh section of the Proposed Scheme (illustrated in Figure 12.3 in Volume 3 of this EIAR). The Proposed Scheme crosses the River Poddle at two locations, on the Tallaght to City Centre section of the Proposed Scheme at the rivers source on R819 Greenhills Road and at a culverted point on St. Luke's Avenue.

Kingfisher were not recorded during multidisciplinary surveys within the footprint of the Proposed Scheme.

Records of breeding birds relevant to the Proposed Scheme are listed in Table 12.8.

Table 12.8: Desk Study Records of Breeding Birds of Conservation Concern Adjacent to the Proposed Scheme

Common Name / Scientific Name / BTO Code	Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	Nearest SPA Designated for SCI Species
Barn swallow <i>Hirundo rustica</i> (SL)	Bancroft Park Tymon Park	Amber (B)	-	-
Black guillemot <i>Cephus grille</i> (TY)	Wellington Quay, River Liffey	Amber (B)	-	-
Black-headed gull <i>Chroicocephalus ridibundus</i> (BH) (The NBDC still refer to Generic species as Larus, although in this report Chroicocephalus is used)	Tymon Park Kilnarnagh	Amber (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 3.3km
Common coot <i>Fulica atra</i> (CO)	Tymon Park Sean Walsh Park Clondalkin area Grid O03K Grand Canal, Dolphins Barn	Amber (B/W)	-	Lough Derravaragh SPA approximately 67km
Common kestrel <i>Falco tinnunculus</i> (K.)	Tymon Park Clondalkin area Grid O03K Dolphins Barn area Grid O13G	Red (B)	-	-
Common kingfisher <i>Alcedo atthis</i> (KF)	Tymon Park	Amber (B)	✓	River Boyne and River Blackwater SPA approximately 33.7km
Common linnet <i>Carduelis cannabina</i> (L.)	Tallaght area Grid O02Y Kilnarnagh Grid O02Z Red Cow roundabout area Grid O03V Dolphins Barn area Grid O13G	Amber (B)	-	-
Common redshank <i>Tringa tetanus</i> (RK)	Tymon Park	Red (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 3.2km
Common snipe <i>Gallinago gallinago</i> (SN)	Tymon Park Sean Walsh Park Red Cow roundabout area Grid O03V	Red (B/W)	-	-
Common starling <i>Sturnus vulgaris</i> (SG)	Throughout Grids O02, O03, O12, O13	Amber (B)	-	-
Eurasian Tree sparrow <i>Passer montanus</i> (TS)	Kilnarnagh area Grid O02Z Clondalkin area Grid O03K	Amber (B)	-	-
European greenfinch <i>Carduelis chloris</i> (GR)	Tallaght area Grid O02Y Kilnarnagh Grid O02Z	Amber (B)	-	-
Goldcrest <i>Regulus regulus</i> (GC)	Tallaght area Grid O02Y Kilnarnagh Grid O02Z Clondalkin area Grid O03K Dolphins Barn area Grid O13G	Amber (B)	-	-

Common Name / Scientific Name / BTO Code	Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W - Wintering)	Annex I	Nearest SPA Designated for SCI Species
Great cormorant <i>Phalacrocorax carbo</i> (CA)	Tymon Park Clondalkin area Grid O03K Crumlin area Grid O1332	Amber (B/W)	-	Ireland's Eye SPA approximately 15.1km
Grey heron <i>Ardea cinerea</i> (H.)	Tallaght area Grid O02Y Kilnamanagh Grid O02Z	Green (B)	-	Wexford Harbour and Slobs SPA approximately 89.1km
Grey wagtail <i>Motacilla cinerea</i> (GL)	Tallaght area Grid O02Y Clondalkin area Grid O03K Dolphins Barn area Grid O13G	Red (B)	-	-
Herring gull <i>Larus argentatus</i> (HG)	Tymon Park Red Cow roundabout area Grid O03V	Amber (B/W)	-	Ireland's Eye SPA approximately 15.1km
House martin <i>Delichon urbicum</i> (HM)	Dolphins Barn area Grid O13G	Amber (B)	-	-
House sparrow <i>Passer domesticus</i> (HS)	Tallaght area Grid O02Y and Kilnamanagh Grid O02Z	Amber (B)	-	-
Lesser black-backed gull <i>Larus fuscus</i> (LB)	Tymon Park Grand Canal, Dolphins Barn Red Cow Roundabout area Grid O03v	Amber (B/W)	-	Lambay Island SPA approximately 15.1km
Little egret <i>Egretta garzetta</i> (ET)	Sean Walsh Park Red cow roundabout area Grid O03V Tallaght area Grid O104293	Green (B)	✓	-
Meadow pipit <i>Anthus pratensis</i> (MP)	Dolphins Barn area Grid O13G Red Cow roundabout area Grid O03V	Red (B)	-	-
Mew gull <i>Larus canus</i> (CM)	Tymon Park Red cow roundabout area Grid O03V Grand Canal, Dolphins Barn Grid O138326	Amber (B/W)	-	Dundalk Bay SPA approximately 57.4km
Mute swan <i>Cygnus olor</i> (MS)	Tymon Park Sean Walsh Park Clondalkin area Grid O03K Grand Canal, Dolphins Barn O138326	Amber (B/W)	✓	-
Northern lapwing <i>Vanellus vanellus</i> (L.)	Tymon Park Grange Castle Road approximately 300m from buffer of Clondalkin Grid O03K	Red (B/W)	-	Boyne Estuary SPA approximately 41.5km
Peregrine falcon <i>Falco peregrinus</i> (PE)	Within Grid O02 Kilnamanagh area O02Z	Green (B)	✓	Wicklow Mountains SPA approximately 6.8km
Sand martin <i>Riparia riparia</i> (SM)	Clondalkin area Grid O03K	Amber (B)	-	-
Skylark <i>Alauda arvensis</i> (S.)	Kilnamanagh Red Cow roundabout area Grid O03V	Amber (B)	-	-
Yellowhammer <i>Emberiza citrinella</i> (Y)	Kilnamanagh area O02Z Red Cow roundabout area Grid O03V	Red (B)	-	-

Due to the presence of suitable breeding and / or foraging habitat directly adjacent to the Proposed Scheme, the local breeding bird populations are considered to be of International Importance where they belong to SPA populations and / or are listed on the Annex I of the Birds Directive. All other breeding bird populations are considered to be of Local Importance (Higher Value).

12.3.9.2 Wintering Birds

As previously mentioned all wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the Birds Directive, and / or as SCIs within designated European sites. A total of 63 wintering bird surveys were carried out for the Proposed Scheme at five sites across two survey seasons (2020-2021 and 2021-2022). Survey areas included amenity grassland sections along R819 Greenhills Road to the west of the M50, referred to as CBC0809WB001, at grassland area adjacent to Templewoods residential area off R819 Greenhills Road, referred to as CBC0809WB002, Tymon Park along R819 Greenhills Road, referred to as CBC0809WB003, at amenity grassland along Calmount Road, referred to as CBC0809WB004, and amenity grassland at Bunting Park, referred to as CBC0809WB005. 23 of these were conducted at two sites located at Birchview Avenue CBC0809WB005 and Tymon Park along R819 Greenhills Road CBC0809WB003 which were surveyed over seven consecutive weeks across February and March 2020, and additionally twice a month, between the months November 2020 and February 2021. The remaining 40 surveys were conducted at Bunting Park CBC0809WB001, grassland adjacent to Calmount Road within Ballymount Industrial Estate CBC0809WB002 and a playing pitch to the west of R819 Greenhills Road CBC0809WB004, between the months November 2020 and February 2021 to capture design changes. This limitation has been incorporated into the assessment.

Field surveys were carried out twice a month, between the months November 2020 and March 2021. One survey in early January 2021 was cancelled owing to change in government restrictions in relation to COVID-19 and clarification of permission to undertake fieldwork. Winter bird surveys were also undertaken here between October 2021 and March 2022 to capture data during the 2021-2022 season.

The characteristics of the five wintering bird transects are summarised below:

- CBC0809WB001: The characteristics of the transect area reveal that the ground was maintained through cutting by the local authority. Grass cover is linear and moderate across the survey period and low in height. Disturbance was noted as moderate within the site such as dogs on the leash and neighbouring traffic congestion of R819 Greenhills Road. Gulls were observed within the transect during periods of loafing/feeding by discarded food from the neighbouring housing estates;
- CBC0809WB002: The characteristics of the transect area reveal that the ground was partly maintained through cutting by the local authority and partly maintained through no cutting under the Pollinator scheme. Grass cover is moderate across the survey period and partly low (football pitch) and high (Pollinator area) in height. Southern part is used as a Gaelic pitch, northern part is an open green space, and transect is next to treeline. Disturbance was noted as moderate within the site and occasionally used by dog walkers or recreational activities (golf and running). Gulls were observed feeding within the football pitch;
- CBC0809WB003: The characteristics of the transect area reveal that the ground was not maintained. Grass cover is moderate across the survey period and at various heights. The northern part of the transect was kept at a low height due to the disturbance by vehicles and recreational walkers and had several bare ground patches. The southern part of the transect was not maintained resulting in a high vegetation height. Disturbance in both parts of the transect were high due to public use (recreational walkers / runners) and dogs off the leash. The football pitches at the bottom of the slope were observed having Brent geese feeding on the grass, but otherwise gulls on the ground were more frequently observed during the survey period;
- CBC0809WB004: The characteristics of the transect area reveal that the ground was maintained through cutting within Ballymount business park. Grass cover is moderate across the survey period and low in height with a high bryophyte cover. Disturbance was noted as moderate within the site as public access was limited but high neighbouring vehicle activity at the business park during the working week. Herring gull was observed using this area during the survey period; and
- CBC0809WB005: The characteristics of the transect area, in Bunting Park, reveal that the ground was maintained through cutting. Grass cover was moderate across the survey period and low in height. Disturbance was noted as very high within the site as dogs were regularly off the leash, other activities included horse presence and vehicle presence (motocross and quad bikes). Grass damage was evident by small patches of burning within the middle of the transect. No Brent goose activity was observed on this site during the 2020/2021 survey period, one dropping was observed on the western side of the park. A number of gull species were frequently observed using the park during the survey period.

Owing to minor design refinements in Q4 2022, an additional walkover visit of some areas, where changes in the location or extent of some Construction Compounds or small changes in the red line boundary were revisited to confirm usage by wintering birds. The key change with respect to the location of Construction Compounds and wintering bird sites was newly proposed Construction Compound TC3 and by extension TC4 previously identified as TC3, corresponded to CBC0809WB01 and a reduction in the extent of lands required for Construction Compound TC8. All of which, overlapped with wintering bird transects.

Species identified included herring gull, black-headed gull and common gull. Table 12.9 provides a summary of the findings of the winter bird surveys with respect to those species which are of highest conservation concern and were recorded within winter bird survey sites. Table 12.10 displays the wintering bird survey results in comparison to the 1% of their International and National populations.

Table 12.9: Wintering Birds of Conservation Concern Recorded during the Winter Bird Transect Surveys

Common Name / Scientific Name / BTO Code	Site: Peak Count and Activity in the Study Area (Date)	Conservation Importance			Surveyor Observations outside of transect
		BoCCI (B - Breeding/W - Wintering)	Annex I	SCI	
CBC0809WB001 - Amenity Grassland along Greenhills Road (west of M50)					
Grey heron <i>Ardea cinerea</i> (H.)	1 bird loafing on site (06/10/2021)	Green	-	✓	N/A
Black-headed gull <i>Chroicocephalus ridibundus</i> (BH)	3 birds loafing on site (06/10/2021)	Amber (B/W)	-	✓	N/A
Herring gull <i>Larus argentatus</i> (HG)	5 birds loafing on site (18/01/2022)	Amber (B/W)	-	✓	N/A
CBC0809WB002 - Templewoods Grassland					
Herring gull <i>Larus argentatus</i> (HG)	2 birds foraging on site (21/12/2021)	Amber (B/W)	-	✓	N/A
CBC0809WB003 - Tymon Park					
Light-bellied Brent goose <i>Branta bernicla hrota</i> (BG)	No birds observed for transect	Amber (W)	-	✓	45 birds feeding on football pitch near transect (24/11/2021)
Oystercatcher <i>Haematopus ostralegus</i> (OC)	2 birds flying north-west over site (18/01/2022)	Red (B/W)	-	✓	N/A
Black-headed gull <i>Chroicocephalus ridibundus</i> (BH)	1 bird flying east over site (09/11/2021)	Amber (B/W)	-	✓	65 birds feeding on football pitch near transect (24/11/2021)
Lesser back-backed gull <i>Larus fuscus</i> (LB)	N/A	Amber (B/W)	-	✓	One bird flying over transect (22/02/2021)
CBC0809WB004 - Calmount Road Amenity Grassland					
Herring gull <i>Larus argentatus</i> (HG)	6 birds foraging on site (08/03/2022)	Amber (B/W)	-	✓	N/A
Lesser back-backed gull <i>Larus fuscus</i> (LB)	1 bird loafing on site (29/03/2022)	Amber (B/W)	-	✓	N/A
CBC0809WB005 - Bunting Park					
Light-bellied Brent goose <i>Branta bernicla hrota</i> (BG)	No birds observed for transect, but one dropping recorded (09/02/2021)	Amber (W)	-	✓	
Black-headed gull <i>Chroicocephalus ridibundus</i> (BH)	73 birds foraging on site (01/02/2022)	Amber (B/W)	-	✓	N/A
Herring gull <i>Larus argentatus</i> (HG)	9 birds foraging on site (26/10/2021)	Amber (B/W)	-	✓	N/A
Common gull	15 birds loafing on site	Amber (B/W)	-	✓	N/A

Common Name / Scientific Name / BTO Code	Site: Peak Count and Activity in the Study Area (Date)	Conservation Importance			Surveyor Observations outside of transect
		BoCCI (B - Breeding/W - Wintering)	Annex I	SCI	
<i>Larus canus</i> (CM)	(11/01/2022)				
Mediterranean gull <i>Larus melanocephalus</i> (MU)	CBC0809WB005: One bird feeding within transect (09/03/2021)	Amber (B)	✓	-	N/A

Table 12.10: Wintering bird species recorded during wintering bird surveys in comparison to the 1% of its International and National Populations

Common Name / Scientific Name / BTO Code	Site Peak Counts	Associated European sites within the Zol	1% of International Population	1% of National Population
Light-bellied Brent goose <i>Branta bernicla hrota</i> (BG)	1 dropping	South Dublin Bay and River Tolka Estuary SPA North Bull Island SPA Baldoyle Bay SPA Malahide Estuary SPA Rogerstown Estuary SPA Skerries Islands SPA The Murrrough SPA	400	350
Common gull <i>Larus canus</i> (CM)	15	-	16,400	n/a
Black-headed gull <i>Chroicocephalus ridibundus</i> (BH)	73	South Dublin Bay and River Tolka Estuary SPA North Bull Island SPA The Murrrough SPA	31,000	n/a
Herring gull <i>Larus argentatus</i> (HG)	9	Ireland's Eye SPA Lambay Island SPA Skerries Islands SPA	14,400	n/a
Lesser back-backed gull <i>Larus fuscus</i> (LB)	1	-	5,500/ 6,300	n/a
Oystercatcher <i>Haematopus ostralegus</i> (OC)	2	South Dublin Bay and River Tolka Estuary SPA Malahide Estuary SPA North Bull Island SPA Rogerstown Estuary SPA	8,200	610
Grey heron <i>Ardea cinerea</i> (H.)	1	-	5,000	25
Mediterranean gull <i>Larus melanocephalus</i> (MU)	1	-	2,400	n/a

A review of a study into light-bellied Brent goose inland feeding sites (Scott Cawley Ltd., 2017) has identified no known SPA wintering bird feeding sites in the footprint of the Proposed Scheme. However, there are six known inland wintering bird feeding sites within approximately 300m of the Proposed Scheme i.e., the disturbance Zol⁴. These sites include Tymon Park (major importance); Beechfield Road Sports Grounds Walkinstown (high importance); Pearse Memorial Park Crumlin (high importance); Clonmacnoise Roundabout / Crumlin (major importance); Syngé St. GAA Pitches / Crumlin (major importance); and Brickfields Park / Crumlin (high importance). Light-bellied Brent geese were not observed utilising any of the survey sites, however one dropping was noted on one occasion at Bunting Park (CBC0809WB005). Light-bellied Brent goose activity was observed

⁴ Major importance site 401+ geese; high importance site 51-400 geese; and moderate importance site 1-50 geese as defined by Benson's study in 2009. - Benson (2009). *Use of Inland Feeding Sites by Light-bellied Brent Geese in Dublin 2008-2009: A New Conservation Concern?* Irish Birds 8: 563-570.

on Tymon Park 140m east of the Proposed Scheme (adjacent to CBC0809WB003) during the 2020/2021 survey period, a flock of 45 were present feeding on a football pitch at this location.

The full results of the desk study, including records of wintering bird species considered to be of conservation concern, are presented in Appendix A12.1. in Volume 4 of this EIAR. These species are considered to be KERs of the Proposed Scheme and include the following:

- SCIs, for a wintering population, of SPAs;
- Species listed under Annex I of the Birds Directive; and,
- Red and Amber BoCCI species listed for their wintering populations.

The desk study returned records of a total of 44 regularly occurring wintering bird species across the study area (i.e., grid Squares O03 and O13). Records included 9 species listed under Annex I of the Birds Directive, 32⁵ SCI species, an additional two Red listed and one Amber listed species. This includes 30 species with breeding and wintering populations. These species are grouped into habitat preferences and are discussed below in relation to their presence within the footprint of the Proposed Scheme.

Downstream of the Proposed Scheme, Dublin Bay also supports Internationally Important numbers of bar-tailed godwit *Limosa lapponica* and black-tailed godwit *Limosa limosa* and between June and September (Tierney *et al.* 2017). An additional 20 species occurred in Nationally important numbers across the Bay in 2013 and 2016. These included pintail *Anas acuta*, shelduck *Tadorna tadorna*, shoveler *Anas clypeata*, teal *Anas crecca* and wigeon *Mareca penelope*, which favoured Dollymount Strand and North Bull Island, while great crested grebe *Podiceps cristatus* and ringed plover *Charadrius hiaticula* favoured Sandymount Strand. Curlew *Numenius arquata*, dunlin *Calidris alpina*, greenshank *Tringa nebularia*, grey heron, grey plover *Pluvialis squatarola*, knot *Calidris canutus*, little egret *Egretta garzetta*, oystercatcher *Haematopus ostralegus*, red-breasted merganser *Mergus serrator*, red-throated diver *Gavia stellata*, redshank *Tringa totanus*, sanderling *Calidris alba* and turnstone *Arenaria interpres* were recorded across all areas of Dublin Bay. Records for wintering bird species returned in the desk study are those typically found in coastal, estuarine and intertidal habitats, such as the Liffey Estuary and Dublin Bay. These largely include seabirds, waders, waterfowl, ducks, geese and gulls. With the exception of geese, gulls and waders utilising inland feeding sites throughout the winter months, these species are unlikely to utilise lands adjacent to the Proposed Scheme in large numbers.

The wider study area of Dublin Bay, located approximately 3.3km east of the Proposed Scheme, is considered of significant ornithological importance as it supports an Internationally Important population of light-bellied Brent goose. This SCI species may use open parkland and grassland adjacent to the study area for foraging purposes. A review of a study into light-bellied Brent goose inland feeding sites (Scott Cawley Ltd. 2017) has identified seven known inland wintering bird feeding sites within approximately 300m of the Proposed Scheme and are listed below. The importance of these sites is given relative to flock sizes of geese (major importance site 401+ geese, high importance site 51 to 400 geese and moderate importance site 1 to 50 geese (Benson 2009)).

- Tymon Park, immediately adjacent to the Proposed Scheme (major importance);
- Clonmacnoise Roundabout, approximately 130m south of Kildare Road (major importance);
- Eamonn Ceannt Park, approximately 270m south of Clogher Road (major importance);
- Synge St. GAA Pitches, approximately 50m south of R110 / Crumlin Road (major importance);
- Beechfield Road Sports Grounds, approximately 200m south-west of Walkinstown Roundabout (high importance);
- Pearse Memorial Park, Crumlin, approximately 100m south of Kildare Road (high importance); and
- Brickfields Park, approximately 250m north of R110 / Crumlin Road (high importance).

Desk study records of wintering bird species utilising lands adjacent to the Proposed Scheme are provided in Table 12.11.

⁵ Note that some species listed on the Annex I of the Birds Directive are also SCI species.

Table 12.11: Desk Study Records of Wintering Birds of Conservation Concern Adjacent to the Proposed Scheme

Common Name / Scientific Name / BTO Code	Activity and Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W – Wintering)	Annex I	Nearest SPA designated for SCI species
Light-bellied Brent goose <i>Branta bernicla hrota</i> (BG)	Tymon Park Dolphins Barn Grid O137323	Amber (W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 3km
Common coot <i>Fulica atra</i> (CO)	Tymon Park Grid O0929 Sean Walsh Park Grid O090273 Clondalkin area Grid O03K Grand canal Dolphins Barn Grid O138326	Amber (B/W)	-	Lough Derravaragh SPA approximately 67km
Common pochard <i>Aythya farina</i>	Tymon Park Red cow roundabout area Grid O03V	Red (B/W)	-	Lough Derravaragh SPA approximately 67km
Common redshank <i>Tringa tetanus</i> (RK)	Tymon Park	Red (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 3km
Common snipe <i>Gallinago gallinago</i>	Tymon Park Sean Walsh Park Red Cow roundabout area Grid O03V	Amber (B/W)	-	-
Great cormorant <i>Phalacrocorax carbo</i> (CA)	Tymon Park Clondalkin area Grid O03K Crumlin area Grid O1332	Amber (B/W)	-	Ireland's Eye SPA approximately 15.1km
Mallard <i>Anas platyrhynchos</i> (MA)	Throughout Grid O13, and within Grids O02, O03, O12 Tymon Park Sean Walsh Park Clondalkin area Grid O03K	Amber (B/W)	-	Dundalk Bay SPA approximately 57.4km
Mute swan <i>Cygnus olor</i> (MS)	Tymon Park Sean Walsh Park Clondalkin area Grid O03K Grand Canal, Dolphins barn	Amber (B/W)	-	-
Northern lapwing <i>Vanellus vanellus</i> (L.)	Tymon Park Grange Castle Road approximately 300m from buffer of Clondalkin Grid O03K	Red (B/W)	-	Boyne Estuary SPA approximately 41.5km
Tufted duck <i>Aythya fuligula</i> (TU)	Tymon Park Clondalkin area Grid O03K Grand Canal, Dolphins Barn	Amber (B/W)	-	Lough Derravaragh SPA approximately 67km
Whooper swan <i>Cygnus cygnus</i> (WS)	Tymon Park	Amber (W)	✓	Lough Derravaragh SPA approximately 67km
Herring gull <i>Larus argentatus</i> (HG)	Tymon Park Red cow roundabout area Grid O03V	Amber (B/W)	-	Ireland's Eye SPA approximately 15.1km
Lesser black-backed gull <i>Larus fuscus</i> (LB)	Tymon Park Grand Canal, Dolphins Barn Red Cow roundabout area Grid O03V	Amber (B/W)	-	Lambay Island SPA approximately 22.3

Common Name / Scientific Name / BTO Code	Activity and Distribution in the Study Area	Conservation Importance		
		BoCCI (B – Breeding / W – Wintering)	Annex I	Nearest SPA designated for SCI species
Black-headed gull <i>Chroicocephalus ridibundus</i> (BH)	Tymon Park Kilnamanagh	Amber (B/W)	-	South Dublin Bay and River Tolka Estuary SPA approximately 3.3km

Due to the presence of suitable foraging and / or roosting habitat directly adjacent to the Proposed Scheme, the local wintering bird populations are considered to be of International Importance where they belong to SPA populations and / or are listed on the Annex I of the Birds Directive. All other wintering bird populations are considered to be of Local Importance (Higher Value).

12.3.10 Reptiles

Common lizard are legally protected under the Wildlife Acts. Common lizard were not recorded during the multi-disciplinary surveys and no suitable habitat was confirmed within the footprint of the Proposed Scheme.

The desk study did not return records of common lizard within the wider study area. This species is strongly associated with heathland and coastal dune habitats; neither habitat types were identified within the Proposed Scheme boundary (Marnell 2002; Farren *et al.* 2010). However, it cannot be ruled out that these species are not in the wider study area.

Common lizard are deemed to be of Local Importance (Higher Value).

12.3.11 Amphibians

The common frog and the smooth newt are legally protected under the Wildlife Acts. The common frog is also listed under Annex V of the Habitats Directive. No evidence of common frogs or smooth newt were identified along the Proposed Scheme during the multi-disciplinary surveys.

Suitable amphibian habitat (i.e., surface water / drainage features with stagnant, relatively unpolluted water and well vegetated banks) was identified within the footprint of the Proposed Scheme. This includes scattered areas of vegetated riverbank along the Grand Canal, River Poddle and River Camac. A dry drainage ditch was identified on R134 New Nangor Road at Woodford Walk, on the Clondalkin to Drimnagh section of the Proposed Scheme.

The desk study returned records for common frog within approximately 1km of the Proposed Scheme. This includes records of this species at Balrothery recorded in 2010, New Ireland Road recorded in 2011, Main Road Tallaght recorded in 2014 on the Tallaght to City Centre section of the Proposed Scheme and at Brandon Road recorded in 2014 on the Clondalkin to Drimnagh section of the Proposed Scheme. There were no records of smooth newt within 1km of the Proposed Scheme (NBDC Online Database 2022).

Amphibians are deemed to be of Local Importance (Higher Value).

12.3.12 Fish

Fish species are protected under the Fisheries Acts and by fishing by-laws. Atlantic salmon, river lamprey and the brook lamprey are listed on Annex II of the EU Habitats Directive. Fish surveys were carried out as part of the field surveys on the River Camac at Yellowmeadows (CBC0809AR001) (at the R134 New Nangor Road (CBC0809AR002) and the River Poddle adjacent to Bancroft Park Estate / Astro park, Tallaght (CBC0809AR003), although fisheries assessment were undertaken (Triturus Environmental Ltd, 2020) (refer to Appendix A12.2 in Volume 4 of this EIAR – sites 4, 5 and 6 of the report corresponding with the Proposed Scheme surveys references CBC0809AR001, CBC0809AR002 and CBC0809AR003, respectively).

The desk study identified three proposed crossing where water bodies may be subject to significant disturbance as a consequence of the Proposed Scheme. These are located on R134 New Nangor Road at CBC0809AR001 and CBC0809002 on the River Camac on the Clondalkin to Drimnagh section of the Proposed Scheme and on R819 Greenhills Road on River Poddle at CBC0809AR003.

The River Camac with a catchment length of approximately 24km, rises at Mount Seskin and then flows westward into Brittas Lake, through Saggart and north-east through Clondalkin, Bluebell, Inchicore and discharges into the Liffey Estuary Lower at Heuston Station (Macklin *et al.* 2019).

The River Camac catchment was surveyed by Inland Fisheries in August 2013 and September 2017. Monitoring locations within close proximity to the Proposed Scheme included Riverside Bridge 09C020310, which is located approximately 650m upstream of the Proposed Scheme at R134 New Nangor Road, and Camac Close Emmet Rd 09C020500 approximately 3km downstream of CBC0809WCP017 at R810 Naas Road. The Riverside site was assigned an ecological status of "Moderate". In 2019 the River Camac was assigned a Q-Value of 3 with an overall Ecological Fish Status of "Poor" (EPA 2019).

The River Poddle is approximately 11.6km in length (much of it culverted). Its catchment covers an area of approximately 16,400ha and flows from north of Tallaght Village to the River Liffey at Wellington Quay (SDCC, 2020). There is one monitoring site on the Poddle River Catchment which was surveyed by Inland Fisheries Ireland in September 2007. The monitoring location is at The Priory, Kimmage Road, approximately 4.9km downstream of CBC0809WCP020 at R819 Greenhills Road. The River Poddle was assigned an Ecological Fish Status of Poor in the 2016-2021 period (EPA 2022b).

The Grand Canal extends upstream from Dublin port in a westerly course via Tullamore to join the River Shannon near Banagher. As such, it is classed as an artificial water body. The Grand Canal achieved Good Ecological Potential (GEP) in the 2016-2021 period (EPA 2022b).

12.3.12.1 Salmonid Species

The Proposed Scheme is hydrologically connected to the Liffey Estuary Lower via the River Camac and River Poddle.

Aquatic surveys conducted at the three locations CBC0809AR001, CBC0809AR002 and CBC0809AR003 are presented below. The results of the aquatic surveys conducted at the River Camac site adjacent to Yellowmeadows R134 New Nangor Road referred to as CBC0809AR001 site described some moderate value for salmonids but the river provided far superior habitat both upstream and (especially) downstream. Spawning and nursery value was limited but nonetheless present (moderate value only). Holding habitat is good despite the lack of pool areas given the undercut banks / overhanging reed canary grass vegetation.

The results of the aquatic surveys, conducted at the River Camac site adjacent to the junction between Oak Road and R134 New Nangor Road referred to as CBC0809AR002, noted that it offered some very good salmonid habitat (brown trout only). Upstream of the culvert provided excellent quality spawning and nursery habitat (among the best on the entire river) with very good holding habitat for abundant adult trout in undercut banks/under overhanging reed canary grass. A single mature crack willow approximately 10m upstream of the culvert provided an excellent deep holding pool for adult salmonids was preliminarily noted in 2020. However, the 2022 survey noted that it had been removed, thus the absence of shading formerly provided by the tree considerably reduced the value of this pool. Downstream, whilst spawning and nursery value was somewhat reduced, adult holding habitat was very good given undercut banks and prominent submerged tree roots (willow and sycamore).

The desk study returned several records for Atlantic salmon on the Liffey Estuary Lower (Kelly *et al.*, 2012). The River Liffey is a highly significant regional salmonid catchment for species of Atlantic salmon. Brown trout were recorded in the Liffey Estuary Upper during a fish survey carried out by Inland Fisheries Ireland in 2010 (Kelly *et al.*, 2010).

Fish surveys carried out as part of WFD monitoring in 2011 did not identify Atlantic salmon species in the River Camac (Kelly *et al.*, 2012). The River Camac contains stocks of Brown Trout to supplement recreational angling and bolster declining wild stocks (Eastern Regional Fisheries Bord 2006). A fish survey on the River Camac carried out by Inland Fisheries Ireland in 2011 for the Water Framework Directive found brown trout were second

most abundant fish species. A subsequent survey carried out in 2017 found they were found the most abundant species (Matson *et al.*, 2019).

The River Poddle is considered a non-salmonid system due to the presence of impassable features to fish movement, particularly at the lower reaches of the system (SDCC 2020).

The River Dodder (Dodder_040) will not be crossed by the Proposed Scheme. However, it is located approximately 200m south of the Proposed Scheme and will run parallel from Belgard Square West to R819 Greenhills Road for approximately 1.2km.

The Grand Canal is not considered suitable for migratory salmonid species and so salmonids are not considered further in this assessment.

Atlantic salmon are valued as being of International Importance and Brown trout are valued as being of County Importance.

12.3.12.2 Lamprey Species

The results of the aquatic surveys conducted at the three locations CBC0809AR001, CBC0809AR002 and CBC0809AR003 indicate that lamprey habitat was limited with little ammocoete habitat.

The results surveys conducted at the River Camac site adjacent to Yellowmeadows R134 New Nangor Road referred to as CBC0809AR001 site indicated lamprey ammocoete habitat was present very locally also but spawning habitat was poor (few finer gravels present given high flows rates and concreted bed) (Triturus Environmental Ltd. 2022).

The results of the aquatic surveys conducted at the River Camac site adjacent to the junction between Oak Road and R134 New Nangor Road referred to as CBC0809AR002 indicated lamprey ammocoete habitat was present both upstream and downstream of the culvert, usually in association with instream macrophyte beds (Triturus Environmental Ltd. 2022).

The desk study returned records for lamprey species in the River Camac as part of the National Research Survey Programme by Inland Fisheries Ireland at a location within Corkagh Park, approximately 2.5km upstream of the Proposed Scheme at R134 New Nangor Road (Matson *et al.* 2019). The desk study also returned records for lamprey species in the River Liffey (which is downstream of the Camac and Poddle Rivers) (in the case of river Lamprey *Lampetra fluviatilis* only) (Kelly *et al.* 2012; IFI 2010). Previous surveys in the River Liffey have recorded lamprey species.

The River Poddle was only known to support three-spined stickleback, with significant instream fish migration barriers present (Triturus Environmental Ltd, 2022) and as such, are not deemed to contain lamprey species.

The Grand Canal is not considered suitable for lamprey species due to its lacustrine-like (lake-like) environment and so lamprey are not considered further in this assessment.

Lamprey species are valued as being of National Importance.

12.3.12.3 European Eel

The results of the aquatic surveys conducted at the three locations CBC0809AR001, CBC0809AR002 and CBC0809AR003. Potential eel habitat was noted only at site CBC0809AR002.

The results of the aquatic surveys conducted at the River Camac site adjacent to the junction between Oak Road and R134 New Nangor Road referred to as CBC0809AR002 indicated European eel habitat was good throughout but better upstream (Triturus Environmental Ltd, 2022).

The desk study returned records for European eel *Anguilla Anguilla* on the River Camac in a fish survey carried out by Inland Fisheries Ireland in 2011 for the Water Framework Directive. European eel was recorded at Riverside Bridge which is located approximately 650m upstream of the Proposed Scheme at R134 New Nangor

Road (Kelly *et al.*, 2012). The desk study returned records of European eel in the Liffey Estuary Upper during a WFD fish monitoring survey conducted in September 2010 (Kelly *et al.* 2010).

The River Poddle is considered a non-salmonid system due to the presence of impassable features to fish movement at the lower reaches of the system (SDCC 2020).

This species is the most threatened fish in Irish freshwaters (King *et al.*, 2011) and the alarming decline of the species in recent decades has resulted in a classification of 'Critically Endangered' (Jacoby and Gollock 2014).

European eel populations are valued as being of National Importance.

12.3.12.4 All Other Fish Species

Other fish species recorded from the three aquatic survey sites CBC0809AR001, CBC0809AR002 and CBC0809AR003 were limited, reflecting the poor water quality and siltation levels, as well as heavily modified sections of the two watercourses which was less than favourable to fish passage.

Three-spined stickleback *Gasterosteus aculeatus* were noted as being abundant at CBC0809AR001. A fish survey carried out by Inland Fisheries Ireland in 2017 found a total of two other fish species; minnow *Phoxinus phoxinus* and three-spined stickleback which were recorded along the River Camac (Kelly *et al.*, 2012).

A survey conducted by Inland Fisheries Ireland in the Liffey Estuary Upper during 2010 recorded nine fish species including sand goby *Pomatoschistus minutus*, three spined stickleback *Gasterosteus aculeatus*, flounder *Platichthys flesus*, cod *Gadus morhua*, whiting *Merlangius merlangus* and roach *Rutilus rutilus* (Kelly *et al.* 2010).

The Grand Canal is known as a major angling destination and species present include common bream, tench, common rudd, common perch *Perca fluviatilis* and pike *Esox lucius*. It also has a population non-native invasive roach, a species listed on the of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (Waterways Ireland, 2017). The Grand Canal section from Dolphin's Barn to Portobello has good stocks of tench particularly from the Parnell Road stretch to the 7th Lock at Portobello. Pike and roach are also present (IFI 2020).

No other fish species were recorded from CBC0809AR003, although given the modified nature of much of the Poddle and poor water quality, it would likely only be of value for three-spined stickleback (Triturus Environmental Ltd 2022 Appendix A12.2 in Volume 4 of this EIAR). The river is also culverted for much of its length which lowers its suitability for instream fauna.

These other species are valued as being of Local Importance (Higher Value), although it is recognised that the three-spined stickleback is tolerant of polluted waters and disturbance.

12.3.13 Aquatic Invertebrates and Freshwater Molluscs

12.3.13.1 White-clawed Crayfish

White-clawed crayfish *Austropotamobius pallipes* are legally protected under the Wildlife Acts and are also listed on Annex II of the Habitats Directive. Ireland remains the only part of the EU with no introduced species of crayfish, and as such, is of key conservation concern.

The results of the aquatic surveys conducted by Triturus Environmental Ltd., at the Yellowmeadows R134 New Nangor Road site referred to as CBC0809AR001 site indicated that white-clawed crayfish were present at a 'low' density >0 to <1 per 10 refugia; *sensu* (Peay 2003). A total of two crayfish were recorded via sweep netting, with two males (32mm and 35mm carapace length, respectively) captured from areas overhung by reed canary grass vegetation (Triturus Environmental Ltd, 2022).

The River Camac site at the junction between Oak Road and R134 New Nangor Road site referred to as CBC0809AR002 found that holding habitat was very good given undercut banks and prominent submerged tree roots (willow and sycamore) which offered 'excellent' refugia for white-clawed crayfish. These were recorded at

'moderate' densities (≥ 1 to < 3 per 10 refugia; Peay 2003). A total of eight crayfish were recorded via sweep netting, with males, females and juveniles present, ranging from 19-41mm carapace length in a 2020 survey, although this number increased to 25 crayfish (all age groups) (Triturus Environmental Ltd. 2022, Appendix A12.2 in Volume 4 of this EIAR).

The desk study found that the white clawed crayfish population on the River Camac are reportedly widespread in upper courses over limestone at two unnamed localities (Reynolds 2007). During the Dublin City Otter survey carried out during 2019, it was noted that no white-clawed crayfish were observed downstream of the M50, while evident extant populations exist upstream at Clondalkin (Macklin *et al.*, 2019). The desk study returned four records within approximately 1km of the Proposed Scheme, with three live records recorded in 2007 and one in 2010 at Riversdale Bridge RS09C020310 which is located approximately 650m upstream of the Proposed Scheme at R134 New Nangor Road (NBDC Online Database 2022) (see Appendix A12.1 in Volume 4 of this EIAR).

There was no evidence of white-clawed Crayfish in the River Poddle and there is no documented records of their previously having been there.

The nearest European site designated for white-clawed crayfish is the River Barrow and River Nore SAC, which is located approximately 42km south-west of the Proposed Scheme in the River Barrow catchment, River Nore catchment and River Ballyteigue-Bannow catchment. As such they are not considered as a QI population species in the NIS which accompanies the planning application for the Proposed Scheme. However, owing to the instream works in the River Camac associated with the Proposed Scheme at the junction between Oak Road and R134 New Nangor Road, they are considered in this Chapter. White-clawed crayfish populations are valued as being of County Importance.

12.3.13.2 Freshwater Molluscs

Specific surveys for freshwater molluscs were not carried out as part of this assessment by virtue of the Proposed Scheme. However, no red listed mollusc species were recorded during the aquatic surveys conducted along the River Camac or the River Poddle to inform the Proposed Scheme (Triturus Environmental Ltd, 2022).

The desk study found that glutinous snail are known to occur adjacent to the Proposed Scheme, with a live records from 2003 on the Grand Canal at ninth lock Clondalkin, approximately 800m upstream of the Proposed Scheme, Suir Road, Drimnagh, approximately 1km upstream from the Proposed Scheme and Donore Avenue bridge, adjacent to the terminus of the Clondalkin to Drimnagh section of the Proposed Scheme. Further records were returned from 2003 for orb pea mussel at Donore Avenue Bridge adjacent to the terminus of the Clondalkin to Drimnagh section of the Proposed Scheme, the 'Endangered' listed iridescent pea mussel *Pisidium pulchellum*, west of Fonthill on the Grand Canal, approximately 2km upstream of the Proposed Scheme and lake orb mussel *Musculium lacustre*, on the Grand Canal at Drimnagh, approximately 1km upstream of the Proposed Scheme (NBDC Online database 2022) (see Appendix A12.1 in Volume 4 of this EIAR). The species glutinous snail, orb pea mussel and iridescent pea mussel are listed as 'Endangered' and lake orb mussel is listed as 'Vulnerable' in the Ireland Red List No. 2 Non-Marine Molluscs (Byrne *et al.*, 2009).

Glutinous snail and pea orb mussel populations are valued as being of County Importance.

12.3.13.3 Marsh Fritillary Butterfly

Marsh fritillary *Euphydryas aurinia* are legally protected under Annex II of the Habitats Directive. Surveys for marsh fritillary were not carried out as part of this assessment. In an Irish context, the conservation status of these species in Ireland is designated as 'Vulnerable' (Regan *et al.*, 2010).

The desk study (see Appendix A12.1 in Volume 4 of this EIAR) did not return records for marsh fritillary within the footprint of the Proposed Scheme. Desk study records in the wider area were largely historical (pre-1980s). Recent records for marsh fritillary were identified approximately 3km south of the Proposed Scheme at Killakee, Rathfarnham in 2019 (NBDC Online Database 2022). This red listed butterfly is also known to occur to the east of the Proposed Scheme at North Bull Island in 2019 (NBDC Online Database 2022).

Marsh fritillary are restricted to habitats containing a low, open sward with abundant devil's-bit scabious *Succisa pratensis* including sand dunes, calcareous grassland, fens, raised and blanket bogs, upland heaths and grasslands. Neither devil's-bit scabious nor these habitats were recorded within the footprint of the Proposed Scheme.

As such, marsh fritillary are not considered further in the assessment.

12.3.13.4 Other Invertebrates

The desk study (see Appendix A12.1 in Volume 4 of this EIAR) returned records for several invertebrates that are red listed on the Ireland Red List No. 4: Butterflies (Regan *et al.* 2010), Ireland Red List No. 6: Damselflies and Dragonflies (Odonata) (Nelson *et al.* 2011), Ireland Red and Regional Red List of Irish Bees 2006 (Fitzpatrick *et al.* 2006; NBDC Online Database 2022).

Butterfly are known to favour nectar-rich flowers which provide larval foodplants. Preferred species include cock's-foot grass, bird's-foot trefoil, common nettle, cuckoo flower *Cardamine pratensis*, garden nasturtium *Tropaeolum majus*, common holly and common ivy (Butterfly Conservation Ireland 2020).

Corresponding habitats along the Proposed Scheme are located in parkland with scattered trees (WD5), dry meadows and grassy verges (GS2) and amenity grasslands (GA2). Scattered trees and parkland are present along R819 Greenhills Road, at Kilakee Drive, Bunting Park and at Old County Road, R134 New Nangor Road at Oak Road, at Diageo and on the corner of John F. Kennedy Drive. Larger areas of amenity grassland are present at Tymon Park and L4004 Calmount Road, R134 New Nangor Road, John F. Kennedy Drive and R110 Long Mile Road. Other areas of this habitat type included Bunting Park and Eamonn Ceannt Park. GS2 habitats were identified at Tymon Park. This comprised an area of approximately 2.5ha are being managed as wildflower meadows by South Dublin County Council. This habitat type was also identified within Astro Park on R819 Greenhills Road, Assumption School on R110 Long Mile Road and along R134 New Nangor Road. These habitats were identified along the route of the Proposed Scheme in fragmented pockets of small and medium size. Species diversity was low in terms of foodplants in these habitats. Butterfly communities that are known to survive in highly fragmented landscapes are mobile species that can feed off a range of plants (Öckinger *et al.* 2010).

Bees favour sites with lots of flowers in unimproved grasslands and hay meadows. Improved agricultural grassland (GA1) habitats were not identified along the Proposed Scheme. Agricultural lands are located approximately 3km to the west of the Proposed Scheme. The preferred foodplants for bees are native species with white, blue or yellow flowers (Fitzpatrick 2006). Small, fragmented sites where suitable floral species were recorded along the Proposed Scheme include areas of ornamental flower beds (BC4) within residential gardens; parkland with scattered trees (WD5) and amenity grasslands (GA2).

Bumblebees may have large ranges and require large areas with varied habitats providing long flowering periods to support viable populations. Bees do not cope well with habitat fragmentation which can isolate species, ultimately reducing gene flow and genetic diversity, increasing their vulnerability to other stressors such as disease and internal parasites. Species with specialist foodplants or limited dispersal abilities can be particularly vulnerable to habitat loss and degradation (Biesmeijer *et al.*, 2006), leading to increasing dominance by a smaller number of generalist species.

Loss of natural and semi-natural habitats has been a key driver in pollinators who require a balanced diet from a range of plant species throughout their active foraging season which lasts from early spring until late autumn (TCD 2017). There are small, isolated and fragmented sites along the route of the Proposed Scheme, including wildflower areas within Tymon Park and within private gardens as part of the All-Ireland Pollinator Plan. Golf Course Superintendents Association of Ireland (GCSAI), green schools and the Gaelic Athletic Association (GAA) are all partner organisations of the All-Ireland Pollinator Plan 2021-2025 (NBDC 2021).

The majority of these other invertebrate species favour species rich semi-natural grasslands and meadows, upland heath and sand dunes. Habitats within close proximity to the Proposed Scheme which correspond to species requirements include species poor dry meadows and grassy verges, and areas of ornamental planting along roadsides, parkland, and gardens. Such habitats are fragmented and highly disturbed and are therefore deemed unsuitable for significant populations of red-listed invertebrates (Biesmeijer *et al.*, 2006; Öckinger *et al.*, 2010). As such, other invertebrates are not considered further in the assessment.

12.3.14 Summary Ecological Valuation and Identification of KERs

Table 12.12 summarises the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance. KERs are highlighted in blue in Table 12.12. Species, habitats and features not qualifying as KERs are not subjected to impact assessment in line with current best practice of assessing the impacts on what are determined to be important ecological or biodiversity features, as per the CIEEM Guidelines (CIEEM 2018) and the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009).

All designated areas for nature conservation that lie within the Zol of the Proposed Scheme are considered to be KERs given that they are sites selected specifically for biodiversity conservation and are potentially at risk of impacts from the Proposed Scheme. Those designated areas for nature conservation that lie beyond the Zol of the Proposed Scheme are not considered to be at risk of impact and are therefore not considered to be KERs.

In all cases, habitat and species valued as being of Local Importance (Higher Value), or higher, are considered to be KERs as they are important contributors to the local biodiversity resource and are of conservation concern, at least locally.

Habitats valued as being of a Local Importance (Lower Value) are not considered to be KERs in this assessment. This is not to say that they are of no biodiversity value, but that impacts on these habitat types in their local context are not likely to result in a significant effect on biodiversity. It should be noted that this relates to the impact on the habitat itself as distinct from considering the role these habitat types play in supporting KER fauna species. The impacts of the Proposed Scheme in that sense are captured and assessed under the relevant species' headings in Section 12.4.

These lower biodiversity value habitats include built or artificially created habitats, transient habitats as a result of disturbance, or those that have been highly anthropogenically modified (e.g., BL1, BL2, BL3, GA2 and WS3). These habitat types tend to be associated with residential, commercial or industrial development, roads and highly managed amenity areas. It also includes grassland habitats that are relatively species poor and improved.

In some cases, Local Importance (Lower Value) habitat can be associated with, or develop into, higher value habitats and where this is the case it is captured in valuing and considering whether a particular habitat type is a KER for this assessment.

Non-native invasive plant species are not considered as KERs, as they can result in negative effects on biodiversity, and it is in that context they are included within the impact assessment.

Table 12.12: Summary of Ecological Valuation and Identification of KERs

Ecological Receptor	Ecological Valuation	KER?
Designated Sites		
North Dublin Bay SAC [000206]	International Importance	Yes
South Dublin Bay SAC [000210]	International Importance	Yes
Rockabill to Dalkey Island SAC [003000]	International Importance	Yes
Lambay Island SAC [000204]	International Importance	Yes
Wicklow Mountains SAC [002122]	International Importance	Yes
South Dublin Bay and River Tolka Estuary SPA [004024]	International Importance	Yes
Baldoye Bay SPA [004016]	International Importance	Yes
North Bull Island SPA [004006]	International Importance	Yes
Malahide Estuary SPA [004025]	International Importance	Yes
Ireland's Eye SPA [004117]	International Importance	Yes
Howth Head Coast SPA [004113]	International Importance	Yes
Rogerstown Estuary SPA [004015]	International Importance	Yes

Ecological Receptor	Ecological Valuation	KER?
Lambay Island SPA [004069]	International Importance	Yes
Dalkey Islands SPA [004172]	International Importance	Yes
Skerries Islands SPA [004122]	International Importance	Yes
The Murrrough SPA [004186]	International Importance	Yes
Rockabill SPA [004014]	International Importance	Yes
All other SAC or SPA sites	International Importance	No – beyond Zol
Skerries Islands NHA [001218]	National Importance	Yes
Grand Canal pNHA [002104]	National Importance	Yes
North Dublin Bay pNHA [000206]	National Importance	Yes
South Dublin Bay pNHA [000210]	National Importance	Yes
Malahide Estuary pNHA [000205]	National Importance	Yes
Santry Demesne pNHA	National Importance	Yes
Dolphins, Dublin Docks pNHA [000201]	National Importance	Yes
Boosterstown Marsh pNHA [001205]	National Importance	Yes
Howth Head pNHA [000202]	National Importance	Yes
Baldoyle Bay pNHA [000199]	National Importance	Yes
Dalkey Coastal Zone and Killiney Hill pNHA [001206]	National Importance	Yes
Ireland's Eye pNHA [000203]	National Importance	Yes
Portraine Shore pNHA [001215]	National Importance	Yes
Rogerstown Estuary pNHA [000208]	National Importance	Yes
Lambay Island pNHA [000204]	National Importance	Yes
The Murrrough pNHA [000730]	National Importance	Yes
Dodder Valley pNHA	National Importance	Yes
All other NHA or pNHA sites	National Importance	No – beyond Zol
Habitats		
Flower beds and bordes (BC4)	Local Importance (Lower Value)	No
Stonewalls and other stonework (BL1)	Local Importance (Lower Value)	No
Buildings and artificial surfaces (BL3)	Local Importance (Lower Value)	No
Exposed sand, gravel and till (ED1)	Local Importance (Lower Value)	No
Spoil and bare ground (ED2)	Local Importance (Lower Value)	No
Recolonising bare ground (ED3)	Local Importance (Lower Value)	No
Reed and large sedge swaps (FS1)	Local Importance (Higher Value)	Yes
Depositing / lowland rivers (FW2)	Local Importance (Higher Value)	Yes
Canals (FW3)	National Importance	Yes
Drainage ditches (FW4)	Local Importance (Higher Value)	Yes
Amenity grassland (improved) (GA2)	Local Importance (Lower Value)	No
Dry meadows and grassy verges (GS2)	Local Importance (Higher Value)	Yes
Residential	Local Importance (Lower Value)	No
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Yes
Mixed broadleaf/conifer woodland (WD2)	Local Importance (Higher Value)	Yes
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Yes
Hedgerows (WL1)	Local Importance (Higher Value)	Yes
Treelines (WL2)	Local Importance (Higher Value)	Yes

Ecological Receptor	Ecological Valuation	KER?
Scrub (WS1)	Local Importance (Lower Value)	No
Immature woodland (WS2)	Local Importance (Higher Value)	Yes
Ornamental / non-native shrub (WS3)	Local Importance (Lower Value)	No
Flora Species		
Flora Species listed on the Flora Protection Order	National Importance	Yes
Flora Species on Irelands Red lists (Vulnerable or of higher concern concern)	Local Importance (Higher Value)	No
All other non-Red listed flora species	Local Importance (Lower Value)	No
Non-native invasive plant species	N/A	No
Fauna Species		
Bats	Local Importance (Higher Value)	Yes
Badger	Local Importance (Higher Value)	Yes
Otter	County Importance	Yes
Marine mammals (Annex I species of nearby SACs: harbour porpoise, harbour seal and grey seal)	International Importance	Yes
Marine mammals (all other marine mammals)	County Importance	Yes
Other mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Yes
SCI / Annex I bird species	International Importance	Yes
All other Red listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	Yes
All other Amber listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	Yes
Any other Green listed bird species (non-SCI breeding populations)	Local Importance (Higher Value)	Yes
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Yes
Reptiles	Local Importance (Higher Value)	Yes
Amphibians	Local Importance (Higher Value)	Yes
Atlantic salmon	International Importance	Yes
Brown trout	County Importance	Yes
European eel / Lamprey	National Importance	Yes
All other fish species	Local Importance (Higher Value)	Yes
Invertebrates (white clawed crayfish and freshwater molluscs)	National Importance	Yes
All other non-Red listed invertebrates and Insects	Local Importance (Lower Value)	No
Non-native invasive animal species	N/A	N/A
Local Biodiversity Areas (Local Biodiversity Areas not discussed under designated sites, flora and / or fauna – of which overlap in part with national designation as listed previously and / or are intersected by the Proposed Scheme)		
South Dublin County Green Infrastructure (River Camac captured in habitats)	County Importance	No by virtue of avoidance
Dublin City's Green Infrastructure Network (River Camac and Grand Canal captured under habitats, Wintering birds sites captured under Birds and habitats)	County to National Importance	Yes, but covered by pNHA and Rivers FW2. Not considered as a separate KER

12.4 Potential Impacts

The following Section presents the assessment of potential impacts on biodiversity within the Zol of the Proposed Scheme. As outlined in Section 12.2.4, this is focused on the KERs identified in Section 12.3.14. This includes consideration of the “Do Nothing impact” scenario i.e., the existing trends with the potential to affect biodiversity in the absence of the Proposed Scheme.,

12.4.1 Characteristics of the Proposed Scheme

A detailed description of the proposed road development and construction activities are provided in Chapter 4 (Proposed Scheme Description), and Chapter 5 (Construction). The main characteristics of the Proposed Scheme of relevance to the ecological assessment are outlined under the Construction and Operational Phases in Sections 12.4.1.1 and 12.4.1.5.

12.4.1.1 Construction Phase

The main characteristics of the Construction Phase of the Proposed Scheme that have potential for ecological impact are:

- Site preparation and clearance;
- Construction Compound development;
- Removal of existing boundaries, pavements, lighting columns, bus stops, and signage ;
- Protection and / or diversion of buried services;
- Road construction for new link roads and dedicated bus route;
- Road widening, pavement reconstruction, and kerb improvements;
- Reconfiguration of traffic lanes throughout;
- Reconnection of existing and new drainage infrastructure into the existing surface water drainage infrastructure;
- Installation of new bus stops and junction / roundabout modifications;
- Provision of new structures (bridges, retaining walls etc. (e.g., R819 Greenhills Road Pedestrian and Cycle bridges over the M50; R134 New Nangor Road / R810 Naas Road / R110 Long Mile Road junction Pedestrian and Cycle Bridge, retaining walls at Calmount Road Extension and the extension of River Camac culvert and new headwall at R134 Nangor Road and L5568 Oak Road intersection);
- Temporary and permanent land take at a number of key areas including:
 - i. Temporary land take to facilitate the installation of Construction Compounds at the following locations:
 1. Construction Compound TC1 located in an area of amenity grassland at the western end of Old Blessington Road, adjacent to the junction with the N81 Tallaght bypass;
 2. Construction Compound TC2 located in an area of amenity grassland along R819 Greenhills Road, immediately south of the junction of Bancroft Park and R819 Greenhills Road;
 3. Construction Compound TC3 located in in an area of amenity grassland / scrub along R819 Greenhills Road, between Birchview Avenue and R819 Greenhills Road;
 4. Construction Compound TC4 located in an area of amenity grassland along R819 Greenhills Road, between Treepark Road and R819 Greenhills Road;
 5. Construction Compound TC5 located in an area of unmanaged grassland along R819 Greenhills Road, to the north of Tymon Lane, south-east of the M50 Motorway;
 6. Construction Compound TC6 located in an area of amenity grassland along R819 Greenhills Road, outside Tallaght Truck Dismantlers, north-east of the M50 Motorway;

7. Construction Compound TC7 located in green space along R819 Greenhills Road, between Ballymount Avenue and R819 Greenhills Road;
 8. Construction Compound TC8 located in an area of amenity grassland at Bunting Park, along Bunting Road;
 9. Construction Compound TC9 located in an area of green space along R110 Crumlin Road, immediately west of the junction of Rafter's Road and the R110 Crumlin Road;
 10. Construction Compound TC10 located in an area of green space along R110 Crumlin Road, immediately east of the junction of Rutland Avenue and the R110 Crumlin Road;
 11. Construction Compound TC11 located in an area of hardstanding at Dean Street / R137 Patrick Street;
 12. Construction Compound TC12 in an area of scrub and unmanaged grassland between R134 New Nangor Road and Killeen Road; and
 13. Construction Compound TC13 located in an area of hardstanding along R110 Long Mile Road, south of the New Nangor Road / Naas Road / Long Mile Road junction.
- ii. Temporary land-take at the following locations to facilitate the construction of retaining walls:
1. Temporary loss of scrub and hardstanding habitats at Calmount Road / R819 Greenhills Road to facilitate construction of retaining wall RW01;
 2. Temporary loss of scrub and hardstanding at Calmount Road / R819 Greenhills Road to facilitate construction of retaining wall RW02;
 3. Temporary loss of hardstanding at R110 Long Mile Road / Slievebloom Park to facilitate construction of retaining wall RW03;
 4. Temporary loss of hardstanding at R810 Naas Road / R134 New Nangor Road junction to facilitate construction of retaining wall RW04; and
 5. Temporary loss of hardstanding at R810 Naas Road / R134 New Nangor Road junction to facilitate construction of retaining wall RW05.
- iii. Permanent land take at the following locations:
1. Car park and amenity grassland at Belgard Square West between Belgard Square South and Old Blessington Road to facilitate the construction of Tallaght Bus Interchange;
 2. Amenity grassland between R819 Greenhills Road and Tymonville Crescent to facilitate the provision of Sustainable Drainage Systems (SuDs) features;
 3. Amenity grassland areas and treelines between Birchview Avenue / Treepark Road and Parkview west of R819 Greenhills Road to facilitate new bus only route works and provision of cycling and pedestrian infrastructure;
 4. Scrub, spoil and bare ground, dry meadows and grassy verges, hedgerows and amenity grassland habitat between R819 Greenhills Road and Ballymount Avenue to accommodate the extension of Ballymount Avenue and the new junction between the two roads;
 5. A range of managed habitats to accommodate section of cycle lane only in both directions along Greenhills Road between Ballymount Avenue and Calmount Avenue and between Calmount Avenue and Calmount Road;
 6. Street planting (treelines) along Calmount Road to facilitate the provision of cycling infrastructure;
 7. Scrub habitat west of R819 Greenhills Road to facilitate new Calmount Avenue link road and roundabout connection to R819 Greenhills Road; and
 8. Scrub habitat east of Calmount Road to facilitate extension of Calmount Road and new junction between Calmount Road and R819 Greenhills Road.
- Property boundary reinstatement, signage replacement;
 - Relocation of and / or installation of lighting columns;
 - Reinstatement of temporary land acquisitions; and

- Landscaping and tree planting.

12.4.1.1.1 Surface Water Drainage Infrastructure

The surface water drainage system for the Proposed Scheme will discharge to three surface water receptors during construction: Camac_040, Poddle_010 and Dodder_040, as well as existing combined sewers which ultimately discharge to the Liffey Estuary Lower via Ringsend WwTP. During construction, overland flows may discharge to the following additional waterbodies: Liffey Estuary Upper and Grand Canal. All operational drainage outfall discharges to surface waters represent point discharges. For the Proposed Scheme, there will be a net increase of 59,368m² in the impermeable area ultimately discharging to Dublin Bay. The drainage design principles ensure that all runoff from increases in impermeable areas will be attenuated and there will be no net increase in the surface water flow discharged to these receptors.

Full details of proposed drainage infrastructure are provided in Chapter 13 (Water) and the Proposed Surface Water Drainage Works drawings (BCIDA-ACM-DNG_RD-0809_XX_00-DR-CD-9001) in Volume 3 of this EIAR.

12.4.1.1.2 Construction Compounds

Thirteen (13) Construction Compounds will be required along the length of the Proposed Scheme to facilitate construction:

- Construction Compound TC1 located in an area of amenity grassland at the western end of Old Blessington Road, adjacent to the junction with the N81 Tallaght bypass;
- Construction Compound TC2 located in an area of amenity grassland along R819 Greenhills Road, immediately south of the junction of Bancroft Park and R819 Greenhills Road;
- Construction Compound TC3 located in an area of amenity grassland / scrub along R819 Greenhills Road, between Birchview Avenue and R819 Greenhills Road;
- Construction Compound TC4 located in an area of amenity grassland along R819 Greenhills Road, between Treepark Road and R819 Greenhills Road;
- Construction Compound TC5 located in an area of unmanaged grassland along R819 Greenhills Road, to the north of Tymon Lane, south-east of the M50 Motorway;
- Construction Compound TC6 located in an area of amenity grassland along R819 Greenhills Road, outside Tallaght Truck Dismantlers, north-east of the M50 Motorway;
- Construction Compound TC7 located in green space along R819 Greenhills Road, between Ballymount Avenue and R819 Greenhills Road;
- Construction Compound TC8 located in an area of amenity grassland at Bunting Park, along Bunting Road;
- Construction Compound TC9 located in an area of green space along R110 Crumlin Road, immediately west of the junction of Rafter's Road and the R110 Crumlin Road;
- Construction Compound TC10 located in an area of green space along R110 Crumlin Road, immediately east of the junction of Rutland Avenue and the R110 Crumlin Road;
- Construction Compound TC11 located in an area of hardstanding at Dean Street / R137 Patrick Street;
- Construction Compound TC12 in an area of scrub and unmanaged grassland between R134 New Nangor Road and Killeen Road; and
- Construction Compound TC13 located in an area of hardstanding along R110 Long Mile Road, south of the New Nangor Road / Naas Road / Long Mile Road junction.

As shown in Image 12.1 to Image 12.13, the Construction Compounds will contain a site office and welfare facilities for NTA personnel and contractor personnel. Limited car parking will be allowed at the Construction Compounds. Materials such as topsoil, subsoil, concrete, rock etc. will be stored at the Construction Compounds for reuse, as necessary. Items of plant and equipment will also be stored within the Construction Compounds. The Construction Compounds will be in place for the duration of the Construction Phase of the Proposed Scheme, estimated at approximately 36 months.

The Construction Compounds will be engineered with appropriate services. Water, wastewater, power and communications connections will be organised by the appointed contractor. At work areas along the Proposed Scheme where permanent provisions (for the duration of the construction programme) are not practicable, appropriate temporary provisions will be made, including the use of generators, if required. Temporary welfare facilities will need to be used, for example, portable toilets in the vicinity of works. Wastewater from temporary welfare facilities will be collected and disposed of to a suitably licenced facility.

Appropriate environmental management measures will be implemented at the Construction Compounds, for example, to minimise the risk of fuel spillage and to ensure that the Construction Compounds and the approaches to it are appropriately maintained. Further information on the air quality, noise and vibration, and water related mitigation measures that will be implemented are described in Chapter 7 (Air Quality), Chapter 9 (Noise & Vibration) and Chapter 13 (Water) of this EIAR.

The Construction Compounds will be in place for the duration of the Construction Phase of the Proposed Scheme.

Following completion of the Construction Phase, the Construction Compound areas will be cleared and reinstated to match pre-existing conditions.

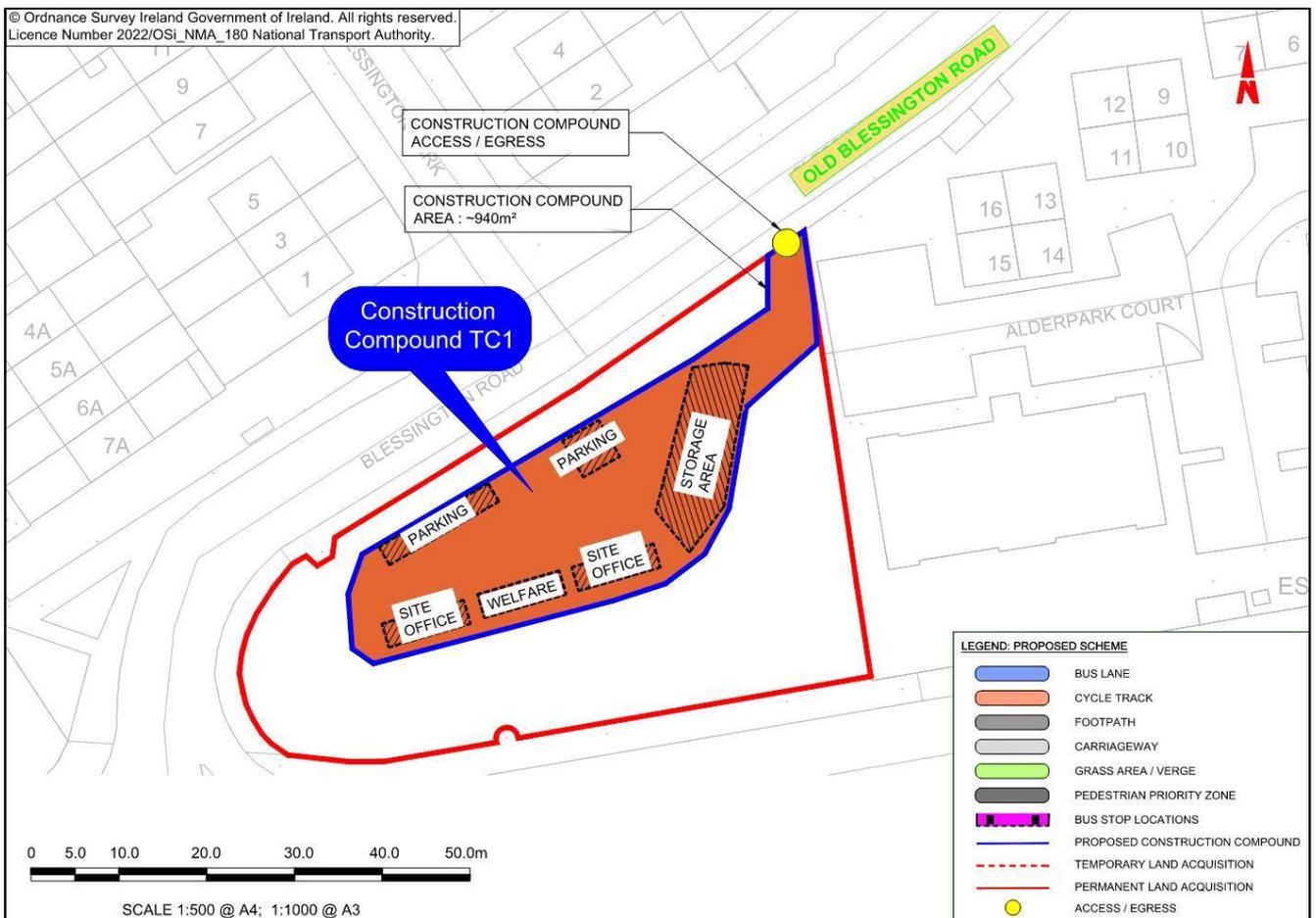


Image 12.1: Location and Extent of Construction Compound TC1

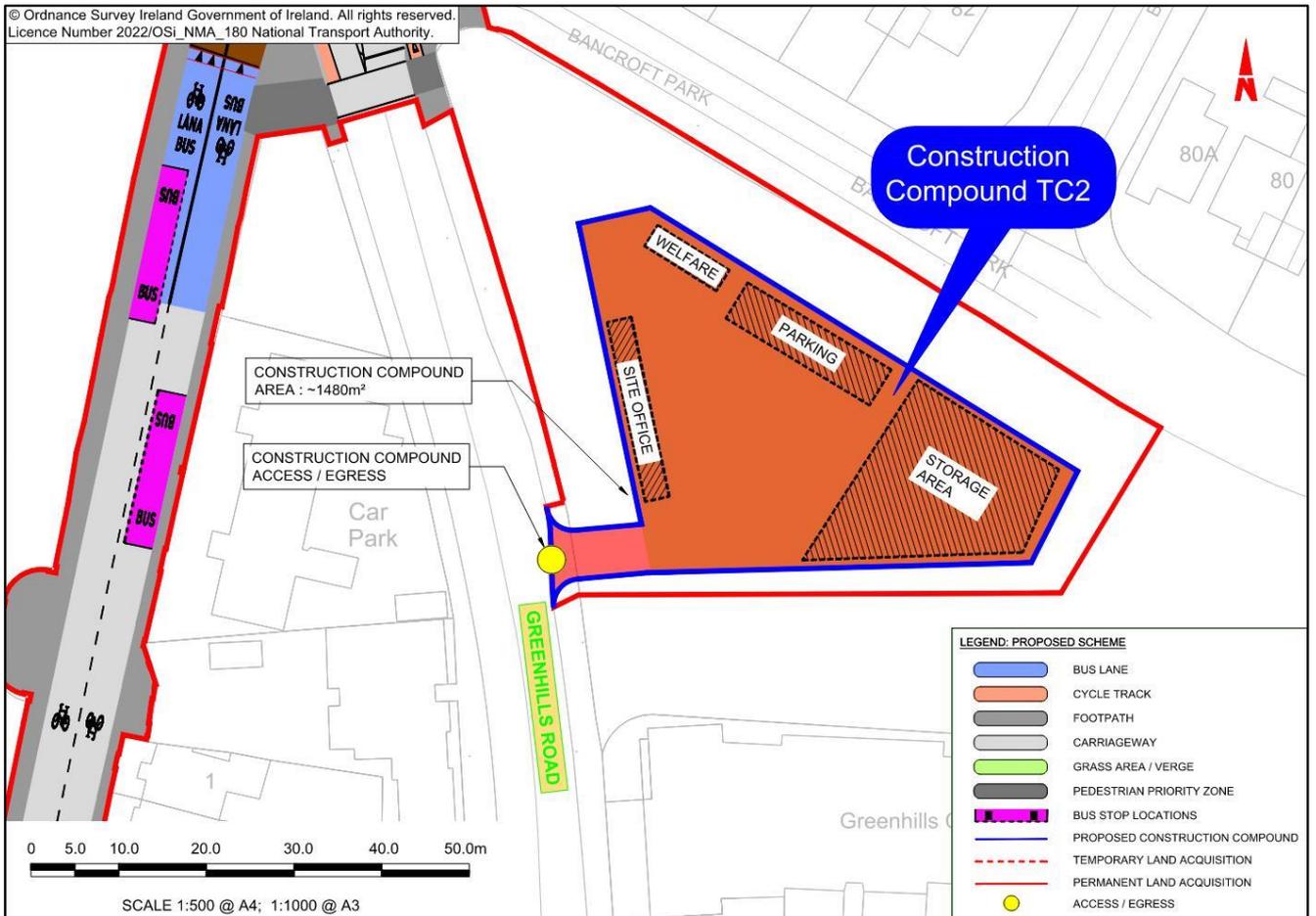


Image 12.2: Location and Extent of Construction Compound TC2

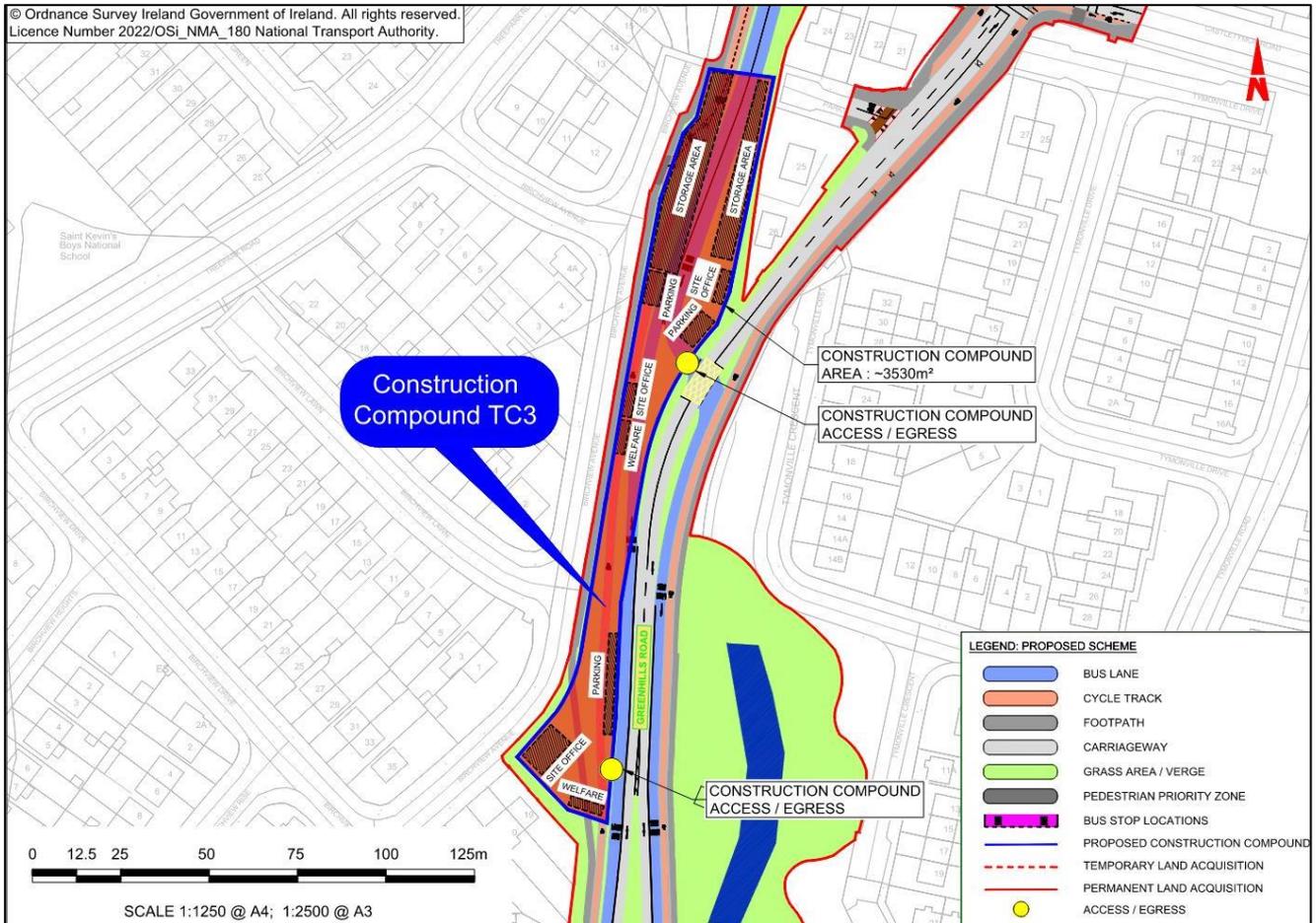


Image 12.3: Location and Extent of Construction Compound TC3

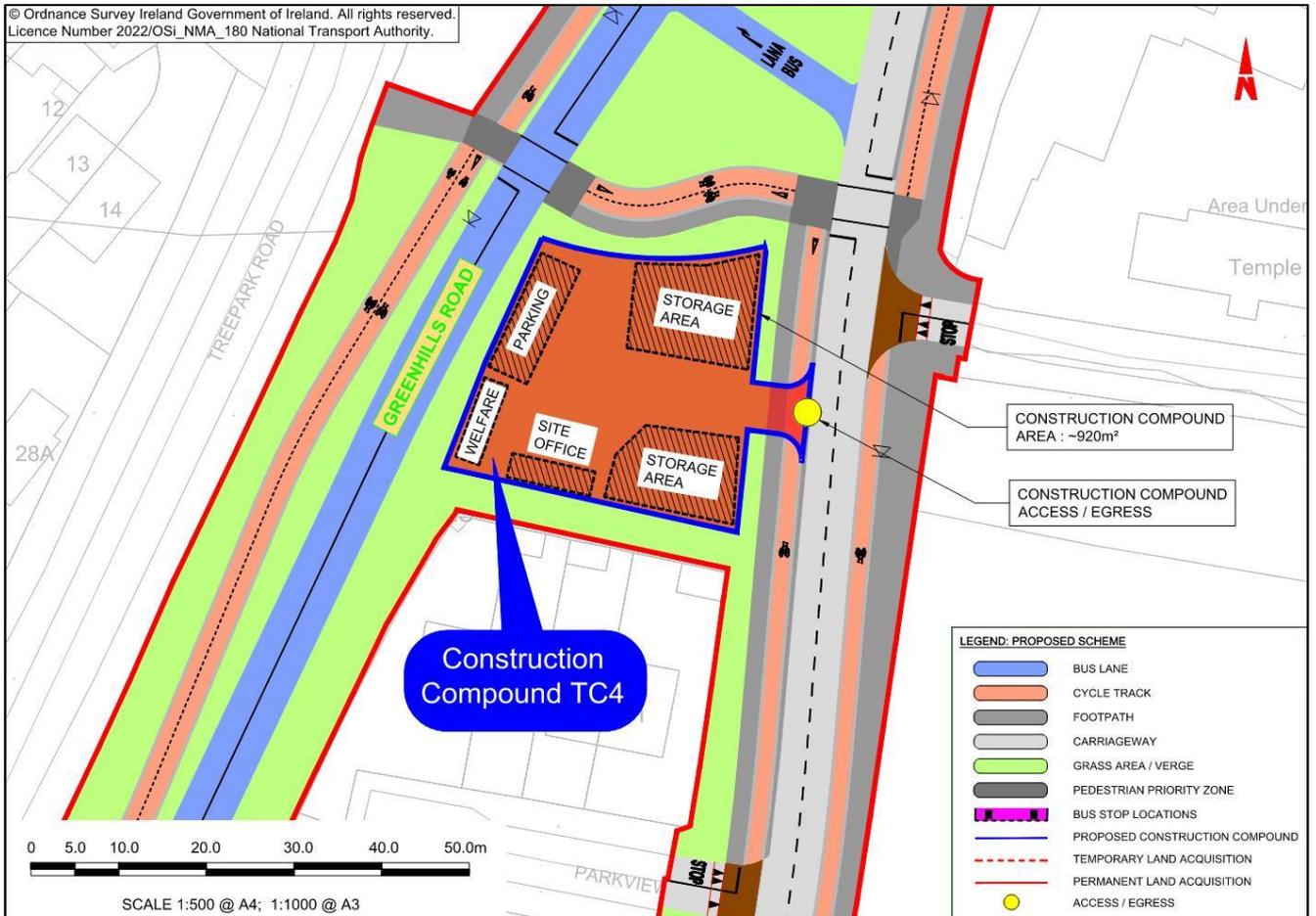


Image 12.4: Location and Extent of Construction Compound TC4

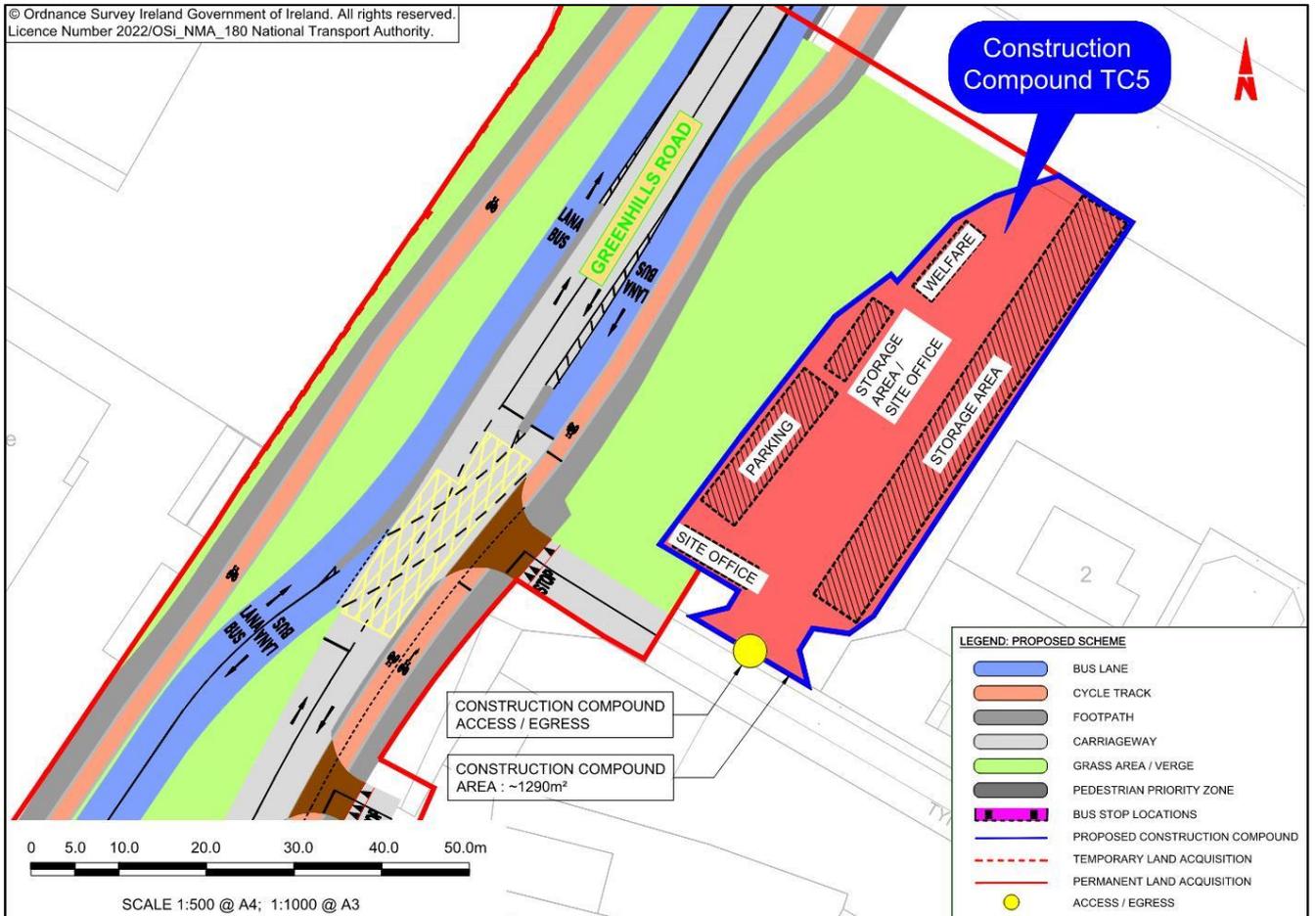


Image 12.5: Location and Extent of Construction Compound TC5

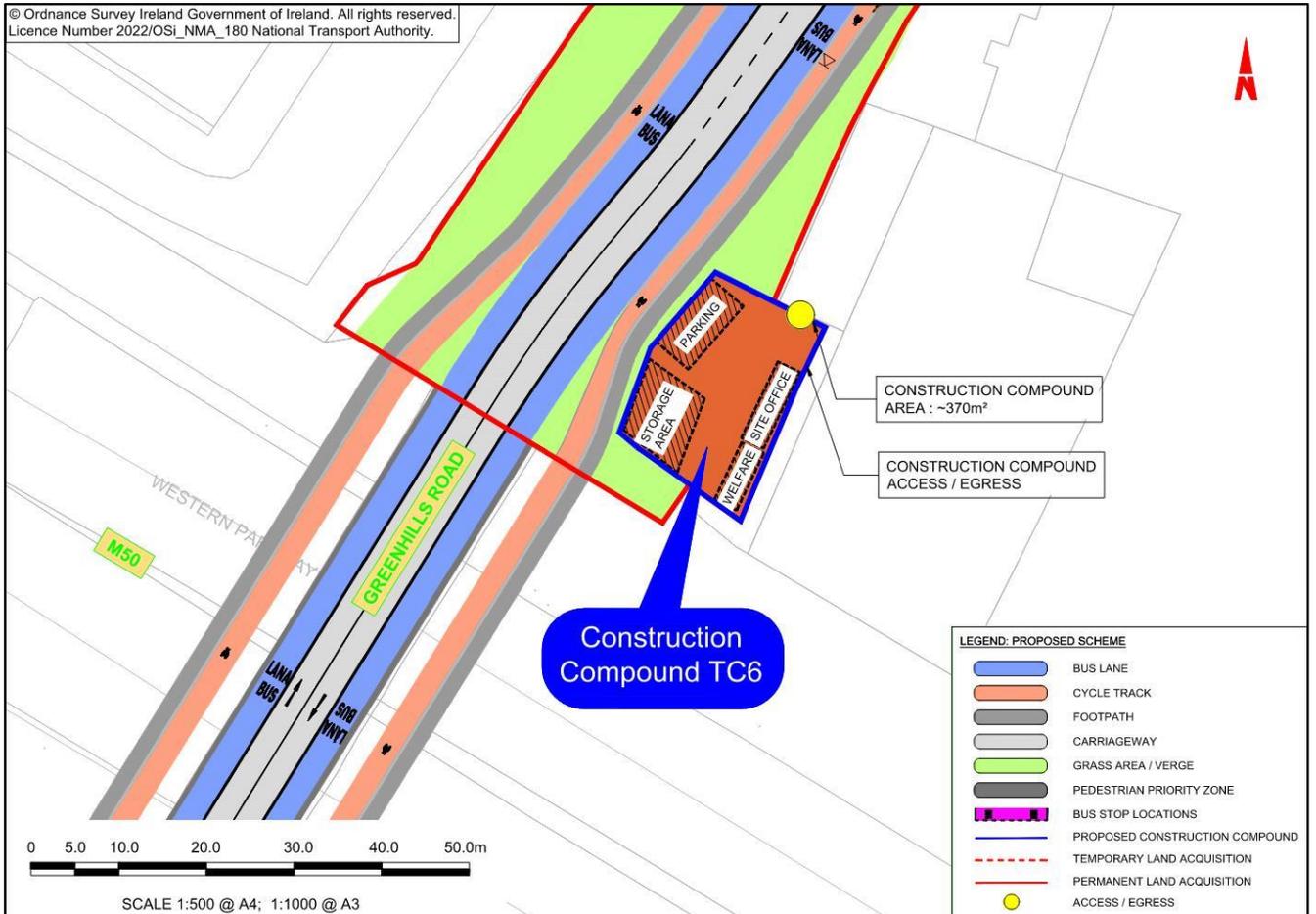


Image 12.6: Location and Extent of Construction Compound TC6

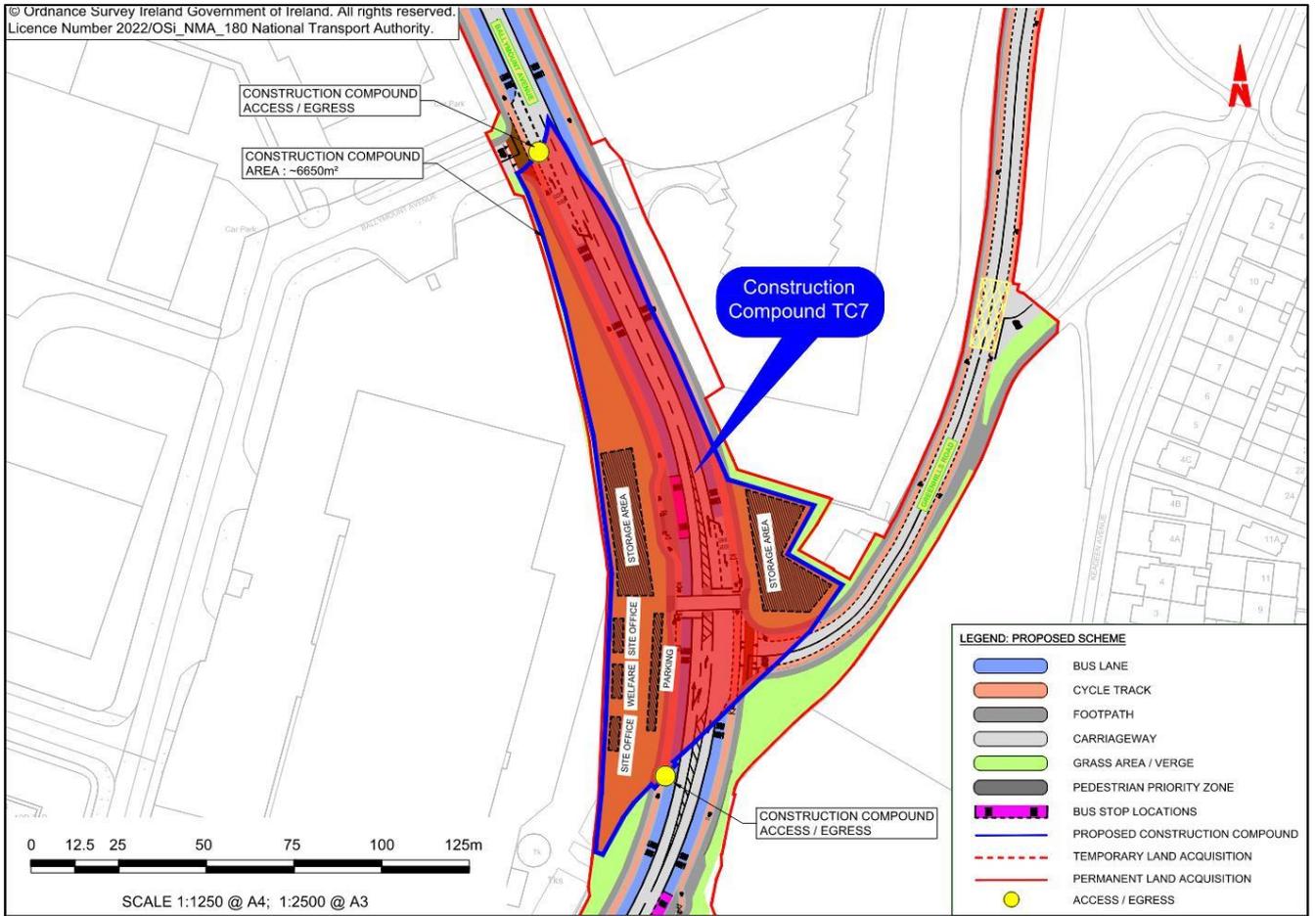


Image 12.7: Location and Extent of Construction Compound TC7

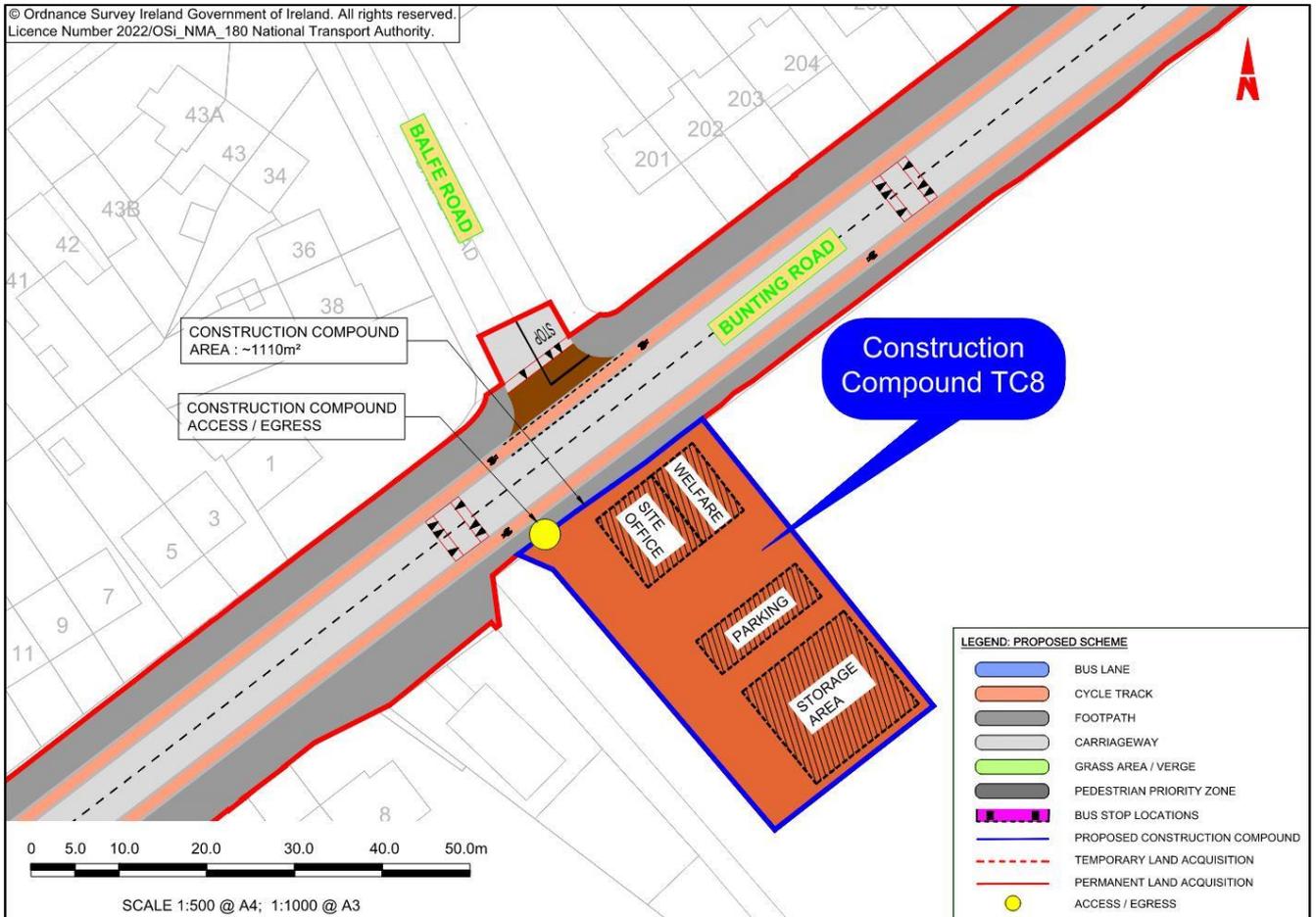


Image 12.8: Location and Extent of Construction Compound TC8

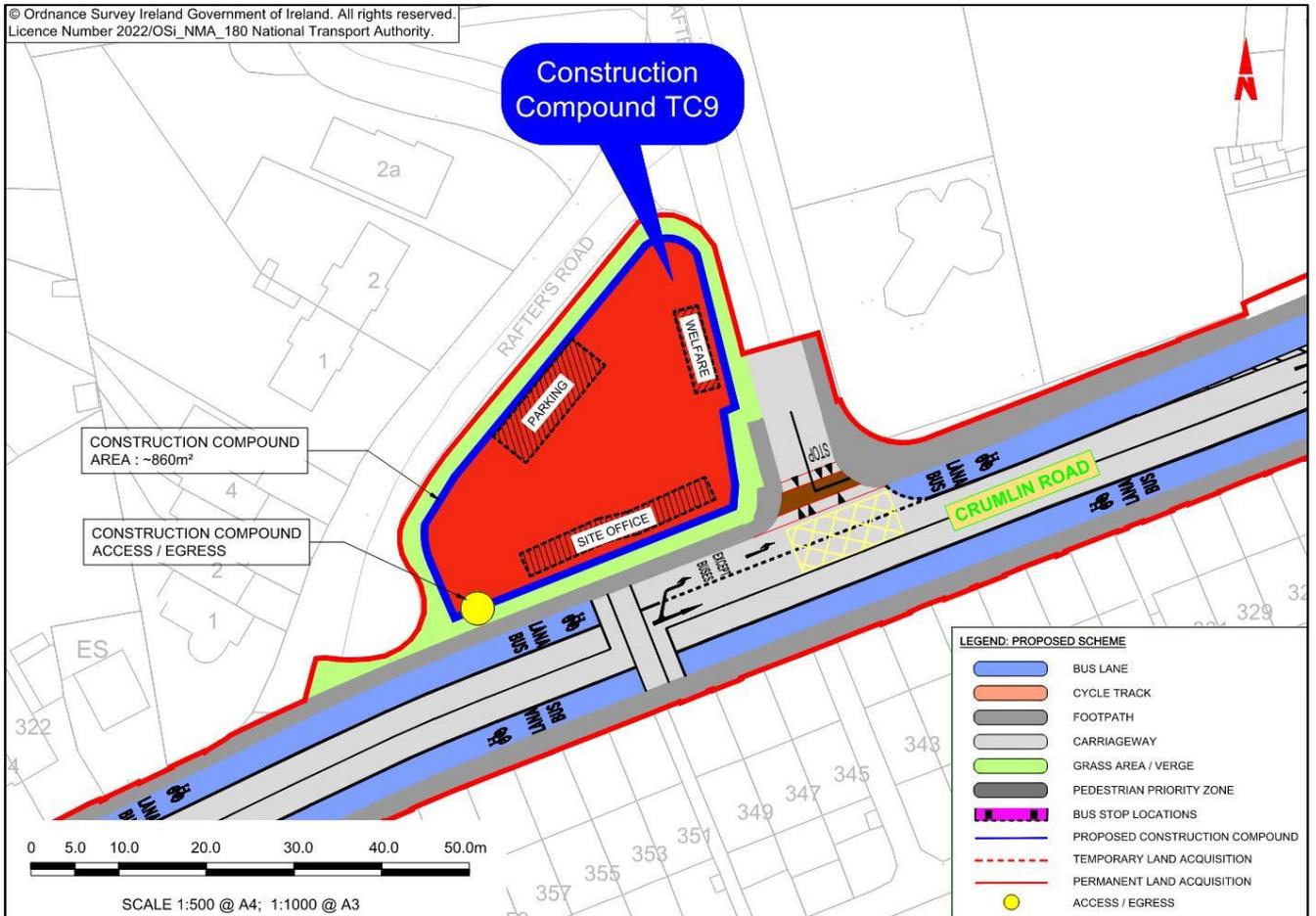


Image 12.9: Location and Extent of Construction Compound TC9

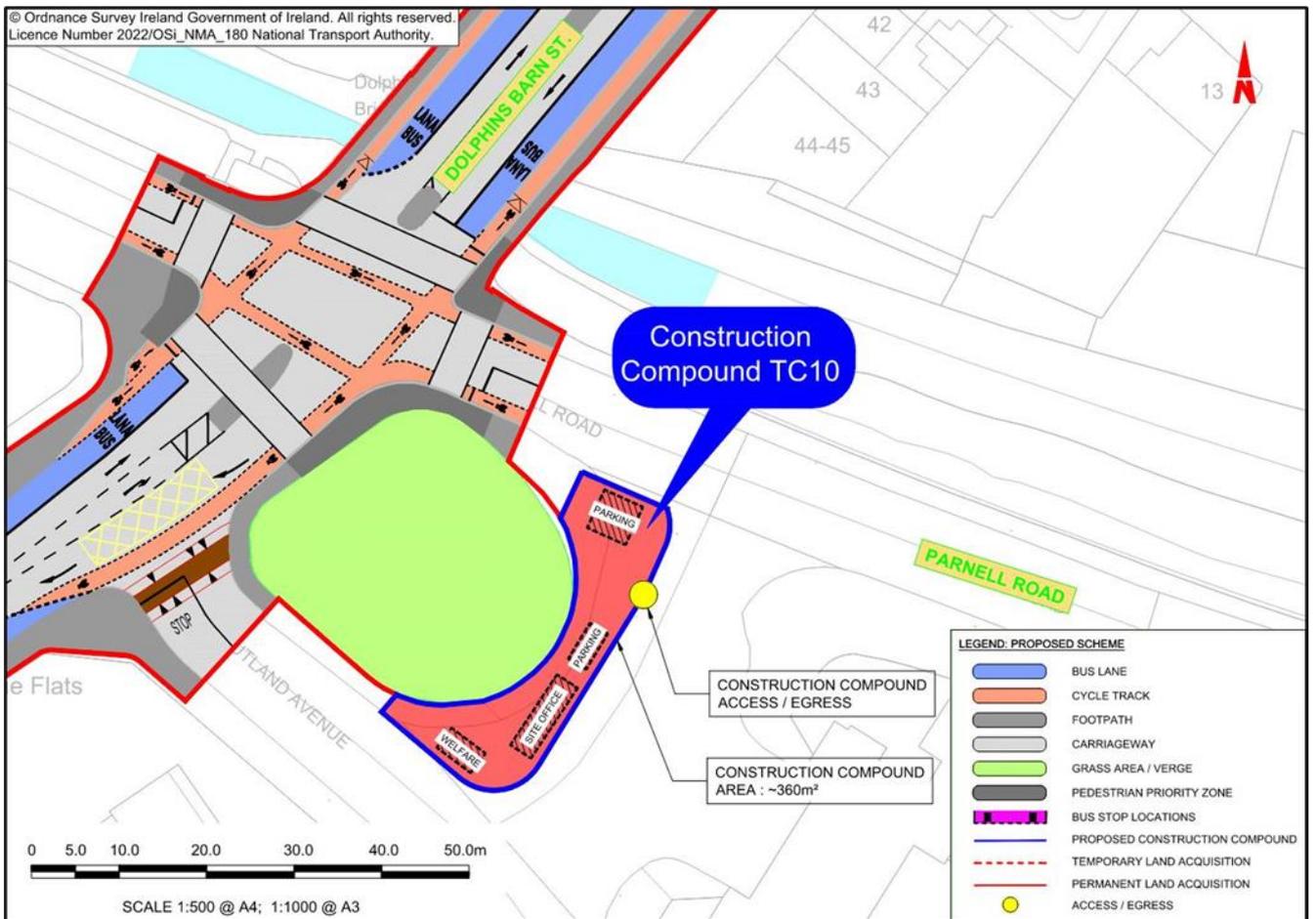


Image 12.10: Location and Extent of Construction Compound TC10

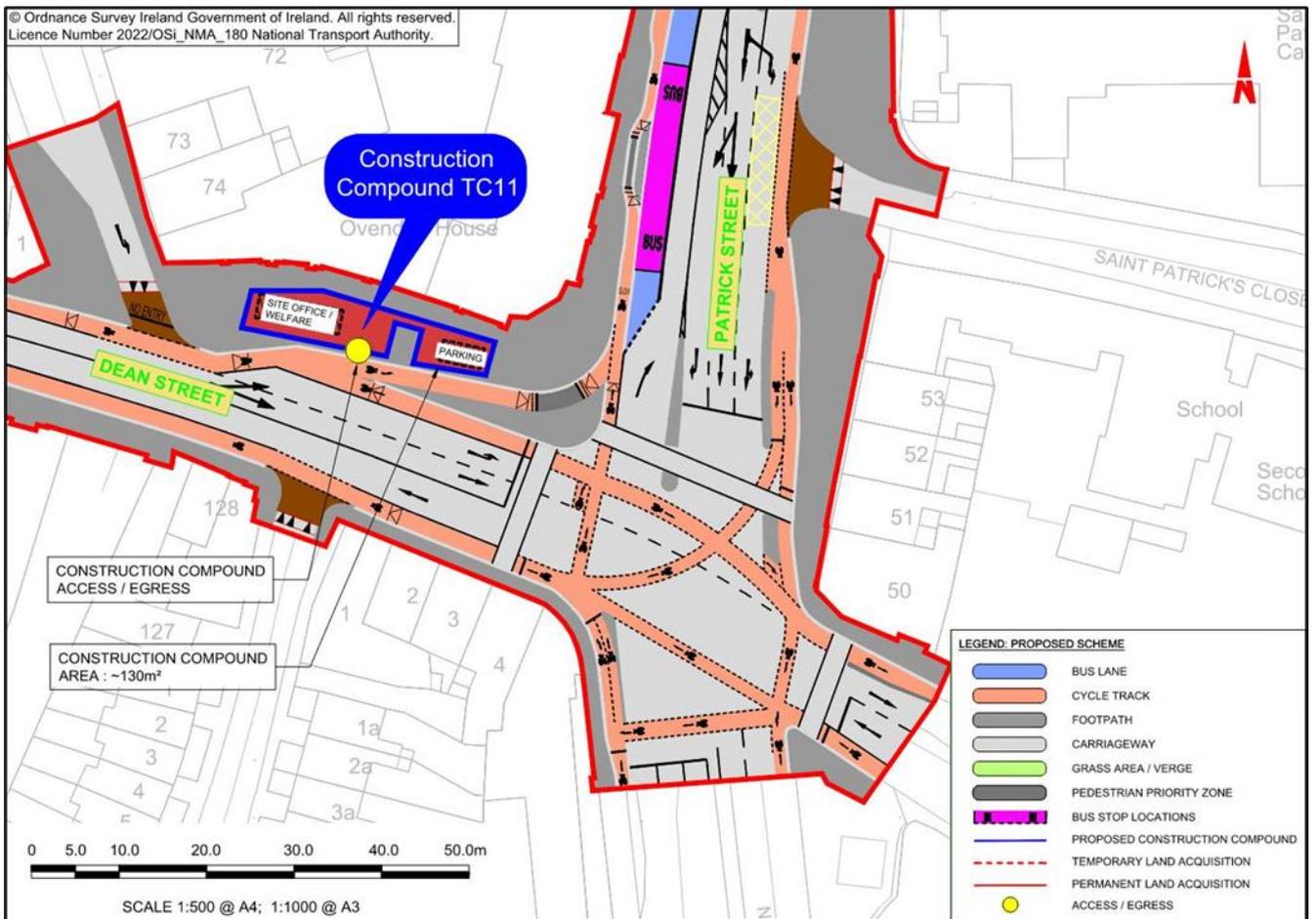


Image 12.11: Location and Extent of Construction Compound TC11

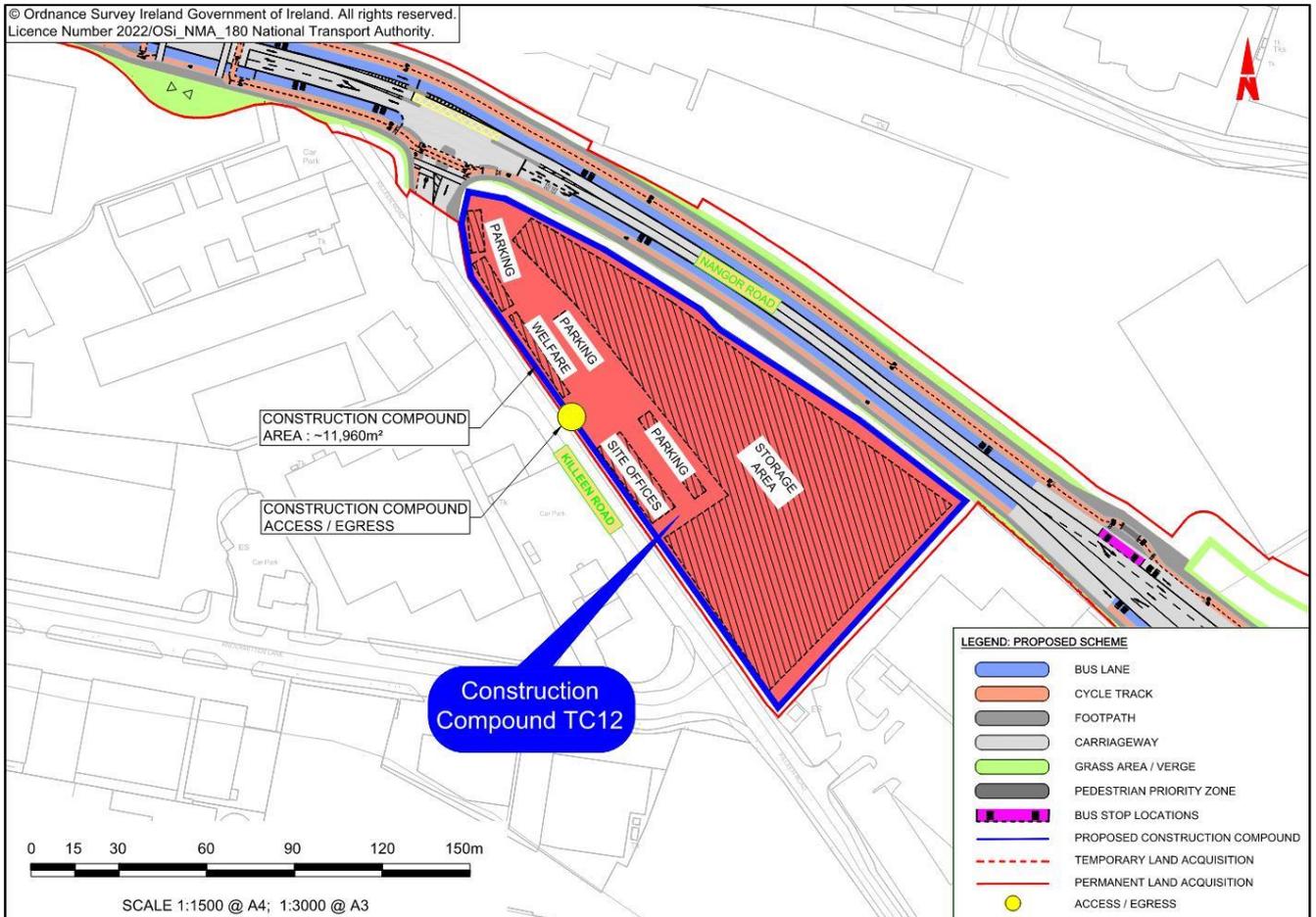


Image 12.12: Location and Extent of Construction Compound TC12

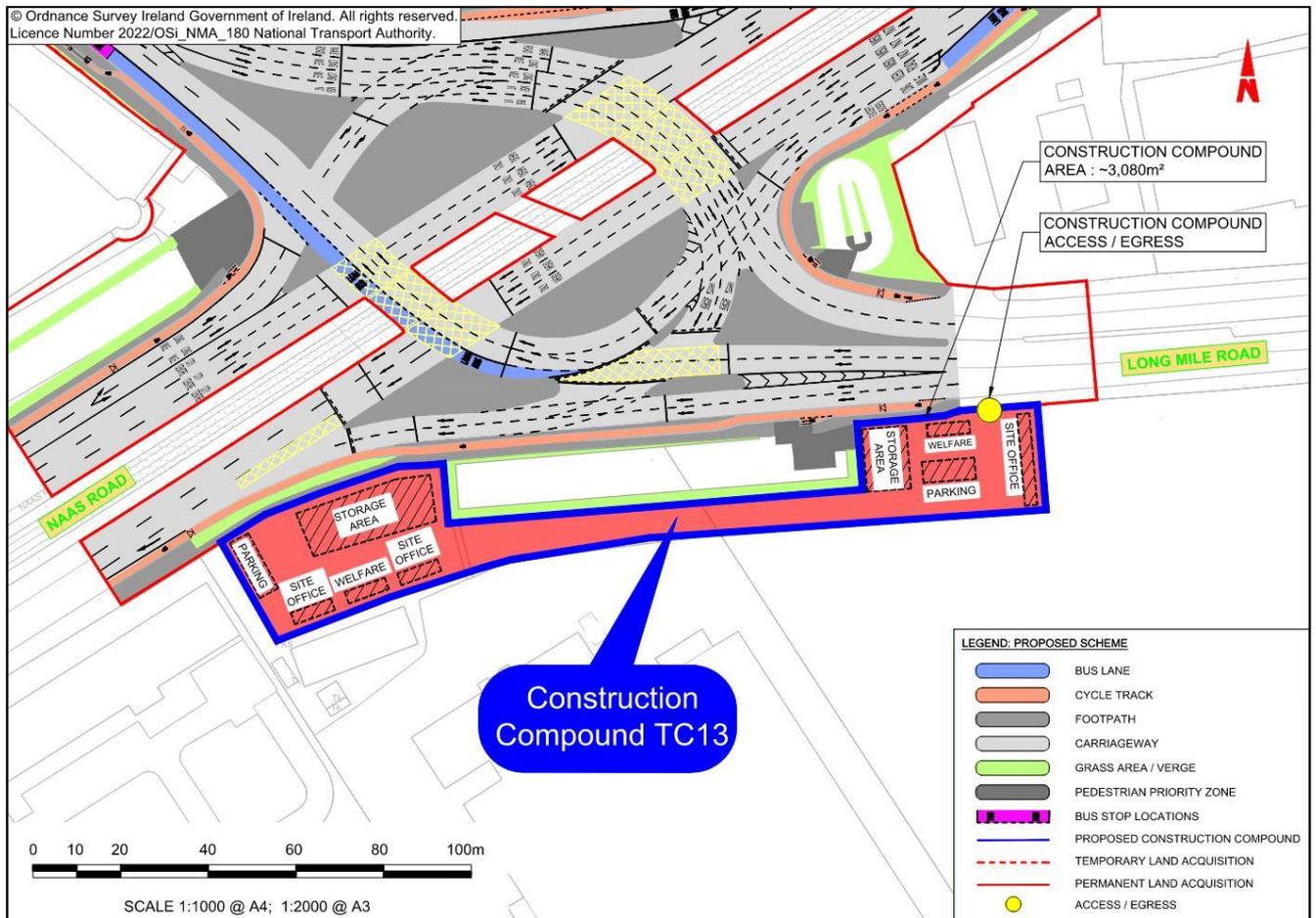


Image 12.13: Location and Extent of Construction Compound TC13

12.4.1.1.3 Estimated Project Duration

The duration of the Construction Phase is estimated to be 36 months.

12.4.1.2 Operational Phase

The main characteristics of the Operational Phase of the Proposed Scheme that have potential for ecological impact are:

- The presence and operation (traffic) of the road;
- The presence of additional lighting; and
- Routine maintenance.

12.4.2 'Do Nothing' Scenario

In the Do Nothing scenario, the Proposed Scheme would not be implemented (discussed further in Chapter 6 (Traffic & Transport)). Thus, the existing corridors would remain with no immediate significant changes in the terrestrial, aquatic and marine biodiversity (flora and fauna) of the area, as there would be no significant Construction Phase impacts from the Proposed Scheme beyond roadside management of existing habitats. The impact of no construction is neutral upon biodiversity along and adjacent to the Proposed Scheme.

The Baseline Environment (see Section 12.3) describes the existing land use surrounding the Proposed Scheme. The Greater Dublin Area is highly urbanised with existing trends resulting in added pressure to water resources and habitat losses to ongoing development. As the full extent of the Proposed Scheme passes through lands zoned under the South Dublin County Development Plan 2022-2028 (SDCC 2022) and Dublin City Development

Plan 2022-2028 (DCC 2022), the current land use zonings provide the best indication of what the future short to medium-term biodiversity trends might be, as they will influence and direct development in the surrounding area. Lands surrounding the Proposed Scheme are largely zoned for residential, commercial or industrial purposes. Current biodiversity trends are likely to continue in areas zoned for development, adding to pressures on water bodies and habitat fragmentation. It is also likely that traffic numbers will continue to remain high on a road network, with variable drainage control or pollution control measures, which may have effects on biodiversity receptors in the receiving environment.

However, any effects on biodiversity are likely to be moderated by the environmental protective policies in the South Dublin County Development Plan 2022-2028 (SDCC 2022) and Dublin City Development Plan 2022-2028 (DCC 2022) and overarching pollution control objectives in the River Basin Management Plan (RBMP) (DHPLG 2018).

The interaction between the existing trends, future trends and other plans or projects with the Proposed Scheme are considered and assessed further in Chapter 23 (Summary of Significant Residual Impacts).

12.4.3 Construction Phase

12.4.3.1 Designated Areas for Nature Conservation

This Section describes and assesses the potential for the Proposed Scheme to result in likely significant effects on designated areas for nature conservation at SACs, SPAs, NHAs or pNHAs. In the context of European sites this is focused on the habitats and species for which the sites are selected (i.e., QIs for SACs and SCI species for SPAs and the conservation objectives supporting their conservation status in each site). This assessment is directly related to the assessment methodology for European sites required under the Habitats Directive, which is presented in the NIS, a standalone document supporting the planning application for the Proposed Scheme.

In the case of NHAs and pNHAs, the assessment considers whether the integrity of any such site would be affected by the Proposed Scheme with reference to the Ecological features for which the site is designated or is proposed to be designated for.

12.4.3.1.1 European Sites

In the context of assessing whether the Proposed Scheme is likely to result in an impact on the integrity of any European sites, the NIS considers whether the Proposed Scheme will affect the conservation objectives supporting the favourable conservation condition of any European sites' QIs / SCIs and, as a result, presents an assessment of whether the integrity of any European sites would be affected – i.e. if the Proposed Scheme would adversely affect the integrity of a European site, this would constitute a likely significant effect in the context of the EIA Directive.

The nature and scale of the Proposed Scheme, the identified potential impacts and their relationship to European sites were considered in order to determine which European sites were located within the ZoI of the Proposed Scheme, in view of best scientific knowledge and in view of conservation objectives, and therefore potentially at risk of the Proposed Scheme affecting their conservation objectives. The potential impacts associated with the Proposed Scheme are discussed below in relation to those European sites within its ZoI (further information can also be found in Section 6 and Section 7 of the NIS which accompanies the Planning application).

The ZoI is a distance within which the Proposed Scheme could potentially affect the conservation condition of QI habitats or QI / SCI species of a European site.

The mechanism to define the ZoI is summarised as follows:

- Consider the nature, size and location of the Proposed Scheme;
- Consider the sensitivities of the ecological receptors;
- Identify impact sources and pathways; and
- Determine the ZoI based on the extent of the impact.

Considering the ZoI, in the absence of mitigation measures, the Proposed Scheme was assessed as having the potential to adversely affect the integrity of the following European sites (refer to the NIS which is included as a standalone document in this planning application):

- South Dublin Bay SAC [000210];
- North Dublin Bay SAC [000206];
- Rockabill to Dalkey Island SAC [003000];
- Lambay Island SAC [000204];
- Wicklow Mountains SAC [002122];
- South Dublin Bay and River Tolka Estuary SPA [004024];
- North Bull Island SPA [004006];
- Dalkey Island SPA [004172];
- Baldoyle Bay SPA [004016];
- Howth Head Coast SPA [004113];
- Rockabill SPA [004114];
- Ireland's Eye SPA [004117];
- Skerries Islands SPA [004122];
- Lambay Island SPA [004069];
- Malahide Estuary SPA [004025];
- Rogerstown Estuary SPA [004015]; and
- The Murrough SPA [004186].

The locations of these European sites relative to the Proposed Scheme are shown on Figure 12.3 in Volume 3 of this EIAR.

The following potential effects on European sites have been identified based on the existing ecological environment and the extent and characteristics of the Proposed Scheme (see information provided below for detailed description of each potential impact):

- Habitat loss and fragmentation;
- Habitat degradation / effects on QI / SCI species as a result of hydrological impacts;
- Habitat degradation as a result of hydrogeological impacts
- Habitat degradation as a result of introducing / spreading non-native invasive species
- Disturbance and displacement impacts; and
- Habitat degradation as a result of air quality impacts.

Habitat degradation as a result of hydrogeological impacts and air quality impacts were scoped out from further assessment at the Stage 1 AA Screening stage. The nearest European site with groundwater dependent QI habitats / species is the Glenasmole Valley SAC which is located approximately 2.9km south-west of the Proposed Scheme. It is therefore outside the ZoI of hydrogeological impacts. Likewise, all European sites within the vicinity of the Proposed Scheme lie beyond the ZoI for air quality impacts (50m from the Proposed Scheme boundary and 500m from Construction Compounds during the Construction Phase, and up to 200m from the Proposed Scheme boundary during the Operational Phase). Therefore, there is no potential for impacts on European sites as a result of effects on hydrogeology or air quality.

12.4.3.1.1.1 Habitat Loss and Fragmentation

The Proposed Scheme does not overlap with any European site. The nearest European site to the Proposed Scheme is Glenasmole Valley SAC which is located 2.9km away. The nearest European site with a hydrological connection to the Proposed Scheme is also Glenasmole Valley SAC, which lies approximately 3.9km upstream of the Proposed Scheme. The next nearest European sites are South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA, which are located approximately 6.5km downstream of the Proposed Scheme. Therefore, there is no potential for direct habitat loss and fragmentation to occur as a result of the Proposed

Scheme. Habitat loss may occur indirectly as a consequence of severe habitat degradation arising from a reduction in water quality and / or a change to the hydrological regime, as described in the Section below.

Special Conservation Interest (SCI) species for which SPAs in the vicinity of the Proposed Scheme have been designated are known to utilise *ex-situ* feeding sites in the Dublin area (i.e., Malahide Estuary SPA, Baldoyle Bay SPA, North Bull Island SPA, South Dublin Bay and River Tolka SPA, Rogerstown Estuary SPA, Skerries Islands SPA, Ireland's Eye SPA, Lambay Island SPA and The Murrough SPA).

Five potential inland feeding sites within the footprint of the Proposed Scheme were surveyed to inform this assessment: CBC0809WB001, CBC0809WB002, CBC0809WB003, CBC0809WB004 and CBC0809WB005. Sections of CBC0809WB001, composed of stretches of amenity grassland along R819 Greenhills Road, will be lost, as a result of the construction of the Proposed Scheme.

Construction Compound TC4 is proposed for an area of grassland between R819 Greenhills Road and Treepark Road. In addition, amenity grassland between R819 Greenhills Road and Birchview Avenue will be lost to facilitate the installation of a proposed cycle track and another area of grassland will be lost to accommodate proposed Sustainable Urban Drainage Systems (SuDs) features between R819 Greenhills Road and Tymonville Crescent, as well as the short-term loss of land on the opposite side of the road for Construction Compound TC3. Low numbers of herring gull, black-headed gull and a single heron were recorded during winter bird surveys at CBC0809WB001.

Construction Compound TC6 is proposed for an area within Tymon Park (CBC0809WB003), east of the M50. In addition, permanent land take at the edge of this site will also be required to accommodate proposed pedestrian and cyclist infrastructure. One black-headed gull and two oystercatchers were recorded flying over this site during wintering bird surveys undertaken. Low numbers of herring gull and lesser black-backed gull were also recorded at Calmount Road (CBC0809WB004). Construction Compound TC8 is proposed at Bunting Park (CBC0809WB005), where flocks of black-headed gull, herring gull and common gull were recorded during wintering bird surveys undertaken.

The provision of Construction Compounds TC3, TC4 and TC8 to facilitate nearby construction works will result in the short-term (36 months) loss of suitable wintering bird habitat for the duration of the construction of the Proposed Scheme. According to the data collected at these sites during wintering bird surveys undertaken during both the 2020-2021 and 2021-2022 wintering bird season, none of these sites are deemed to be significant inland foraging resources for wintering birds, given the low numbers, with respect to their national or international populations, of birds recorded here. Regardless, the Proposed Scheme will result (for the duration of the Construction Phase) in the loss of a suitable inland feeding site for these SCI bird species.

Therefore, there is potential for impacts on SCI species associated with SPAs to occur as a result of habitat loss / fragmentation. Therefore, there is potential for in combination effects to occur.

Regarding the two raptor species which are designated for the Wicklow Mountains SPA, according to the Scottish Natural Heritage Guidance (SNH 2016), during the breeding season, the core foraging range for peregrine is estimated at 2km from the nest site, with the maximum recorded distance of 18km in Britain. During the winter season, the mean foraging range reduces to 3km with the maximum range being 6.5km. Likewise, during the breeding season, merlin are known to forage within 5km of the nest site, while in winter this generally reduces to 500m but can extend to 1.5km. Wicklow Mountains SPA lies approximately 7.3km south-east of the Proposed Scheme, which is well outside the typical foraging ranges for both peregrine and merlin. Therefore, likely significant effects on these two SCI bird species, as a result of *ex-situ* habitat loss / fragmentation, can be excluded.

With the exception of otter, the location of the Proposed Scheme and its construction will not result in any direct loss or fragmentation of Annex I habitats or supporting habitats to Annex II species, for which European sites are designated for within the Zol of the Proposed Scheme. In terms of otter, while the Proposed Scheme does cross the River Camac at Oak Road Business Park, it does so at an existing crossing location within which the river is culverted. As such, the River Camac will not be subject to any instream works or alteration to the territory currently occupied by otter.

12.4.3.1.1.2 Habitat Degradation / Effects on QI / SCI Species as result of Hydrological Impacts

The Proposed Scheme has the potential to result in habitat degradation / effects on QI / SCI species as a consequence of hydrological impacts during both the Construction and Operational Phases. The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during construction, or operation, has the potential to affect water quality in the receiving aquatic environment, which in turn can affect any species which utilise this aquatic environment. Otter use riparian habitats for foraging and commuting purposes and therefore would be potentially at risk of hydrological impacts. Wicklow Mountains SAC, which is located approximately 5.3km south of the Proposed Scheme, is the closest European site for which otter is the QI species. Typically, otter territories are within the range of 7.5km for females and up to 21km for males (Ó'Neill *et al.*, 2009). The Proposed Scheme interacts with the following watercourses: River Poddle, River Camac, Grand Canal, River Dodder (through the construction of Construction Compound TC4 and associated potential contaminated run-off), Liffey Estuary Upper and Liffey Estuary Lower. Whilst these watercourses lie within the typical territorial ranges of otters, only the River Dodder (Dodder_040) shares a hydrological connection to the Wicklow Mountains SAC. The Tallaght to City Centre section of the Proposed Scheme also lies within the same sub-catchment as Wicklow Mountains SAC (Dodder_SC_010 subcatchment). Therefore, there is potential for otter associated with the Wicklow Mountains SAC to move downstream and to come within the ZoI of the Proposed Scheme. A reduction in water quality as a result of an accidental pollution event (either alone or in combination with other pressures on water quality), however, could result in the degradation of the local aquatic environment, which could in turn negatively affect the otter population through direct contact with pollutants or a decline in fish prey. Notwithstanding the limited interaction between Construction Compound TC4 and the River Dodder, habitat degradation / effects on the QI otter population for Wicklow Mountains SAC, as a result of hydrological impacts by the Proposed Scheme, cannot be discounted.

The remaining QIs for the SAC, namely Oligotrophic water containing very few minerals of sandy plains (Littorelletalia); Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and / or Isoetes-Nanojuncetea; Natural dystrophic lakes and ponds; Northern Atlantic wet heaths with *Erica tetralix*; European dry heaths; Alpine and Boreal heaths; Calaminarian grasslands of the Violetalia calaminariae; Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas in Continental Europe)*; Blanket Bogs (*if active bog); Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani); Calcareous rocky slopes with chasmophytic vegetation; and Old sessile oak Woods with *Ilex* and *Blechnum* in the British Isles, do not occur within the ZoI of the Proposed Scheme. These habitats are located upstream of the Proposed Scheme and will not be subject to any hydrological impacts as a result of the Proposed Scheme.

In addition, the Proposed Scheme is hydrologically connected to Dublin Bay via the River Camac (Camac_040), River Poddle (Poddle_010), Liffey Estuary Upper and Liffey Estuary Lower, as well as a network of established combined sewer / surface water pipes which discharge via Ringsend WwTP. The potential release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during construction, or operation, has the potential to affect water quality in the receiving aquatic environment. Such a potential pollution event may include: the release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and the accidental spillage and / or leaks of contaminants into receiving waters. This occurrence could happen at any time during construction but could potentially be exacerbated by the removal of vegetation. It should be noted that a highly substantial event / events would be required to generate such quantities, which is not deemed likely. In the absence of mitigation, the associated effects of a reduction of surface water quality could potentially extend for a considerable distance downstream of the discharge point or location of the accidental pollution event. Such an occurrence, of a sufficient magnitude, either alone or in combination with other pressures on water quality, could undermine the conservation objectives of the European sites downstream in Dublin Bay (i.e., North Dublin Bay SAC, South Dublin Bay SAC, Rockabill to Dalkey Island SAC, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA and Dalkey Islands SPA).

The QI habitats for which Howth Head SAC is designated (i.e., vegetated sea cliffs [1230] and European dry heaths [4030]) lie above the high water mark. Pollution is not regarded to be a threat or pressure which could potentially impact this SAC (NPWS 2021d) and is not regarded to be a significant threat / pressure to this habitat at a national level (Barron *et al.*, 2011) Therefore, the QI habitats of Howth Head SAC will be unaffected by a degradation in the surface water quality of the coastal waters of Dublin Bay and significant effects in that regard can be excluded.

In a potential worst case scenario, the release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during construction, or operation, also has the potential to affect SCI bird species and QI marine mammal species that commute, forage and loaf in Dublin Bay i.e. birds associated with Skerries Islands SPA, Rockabill SPA, Lambay Island SPA, Ireland's Eye SPA, North Dublin Bay SPA, South Dublin Bay and River Tolka Estuary SPA, Baldoyle Bay SPA, Malahide Estuary SPA, Rogerstown Estuary SPA, Dalkey Islands SPA, The Murrrough SPA, as well as marine mammals associated with Rockabill to Dalkey Island SAC and Lambay Island SAC. This reduction in water quality (either alone or in combination with other pressures on water quality) could result in the degradation of sensitive habitats present downstream, which in turn could negatively affect the SCI bird species that rely upon these habitats as foraging and / or roosting habitat. It could also negatively affect the quantity and quality of prey available to SCI and QI populations. In a worst-case scenario these potential impacts could occur to such a degree that the conservation objectives of the Skerries Islands SPA, Rockabill SPA, Lambay Island SPA, Ireland's Eye SPA, North Dublin Bay SPA, South Dublin Bay and River Tolka Estuary SPA, Baldoyle Bay SPA, Malahide Estuary SPA, Rogerstown Estuary SPA, Dalkey Islands SPA, The Murrrough SPA, Rockabill to Dalkey Island SAC and Lambay Island SAC are undermined. As the Proposed Scheme has the potential to result in habitat degradation and effects on SCI bird species and QI marine mammal species associated with European sites located in Dublin Bay, as the result of hydrological impacts, there is the potential for in combination effects to occur.

12.4.3.1.1.3 Habitat Degradation / Effects as result of Hydrogeological Impacts

Groundwater levels in groundwater dependent habitats may be impacted by the removal of a proportion of an aquifer or dewatering activities associated with excavations which can lead to a temporary change in groundwater levels and flow within the aquifer. Likewise, the mobilisation of contaminants into the aquifer either through accidental spillage or disturbance of contaminated ground during excavation may reduce the quality of the groundwater within the aquifer, also resulting in the degradation of groundwater dependent terrestrial ecosystem and any species that they may support.

The potential for hydrogeological impacts is highly variable depending on the nature of the proposed works at specific locations and the receiving environment ground conditions. The unmitigated hydrogeological ZoI of the Proposed Scheme is not considered to extend to any groundwater dependent terrestrial ecosystems linked to European sites. This ZoI follows the professional judgement of the hydrogeology specialists.

As the Proposed Scheme does not have the potential to result in habitat degradation of the Qualifying Interest species / Special Conservation Interest supporting habitat of a European site as the result of hydrogeological impacts, there is no potential for in combination effects to occur in that regard.

12.4.3.1.1.4 Habitat Degradation as a Result of Introducing / Spreading Non-Native Invasive Species

Six areas of Japanese knotweed, a species listed on the Third Schedule of the (Birds and Natural Habitats) Regulations 2011, are present within, or in close proximity to, the Proposed Scheme. Four of these areas of Japanese knotweed were recorded in an area of scrub and unmanaged grassland between the R134 New Nangor Road and Killeen Road. Construction Compound TC12 is proposed in this area. In the absence of mitigation, there is potential for this species to spread or be introduced, during construction and / or routine maintenance / management works, to terrestrial and habitat areas in European sites downstream in Dublin Bay (i.e., North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA). These in turn may result in the degradation of the existing habitats, in particular those habitats not permanently or regularly inundated by seawater, potentially outcompeting other native species and affecting species compositive and physical structure of the habitat. Therefore, it is possible that the spread / introduction of non-native invasive species could undermine the conservation objectives of these European sites.

It is not considered possible that the listed non-native invasive species could spread to European sites that are located a considerable distance from the outfall locations of the River Camac, Poddle River, Grand Canal, Liffey Estuary Upper and Liffey Estuary Lower and separated by a large marine waterbody (i.e. Howth Head SAC, Howth Head Coast SPA, Rockabill to Dalkey Island SAC, Lambay Island SAC, Ireland's Eye SPA, The Murrrough SPA and Dalkey Islands SPA).

As the Proposed Scheme has the potential to result in habitat degradation of the Qualifying / Special Conservation Interest species of European sites as the result of the spread of non-native invasive species, there is the potential for in combination effects to occur in association with other activities / plans / projects.

12.4.3.1.1.5 Habitat degradation as a result of air quality impacts

A reduction in air quality within the immediate vicinity of the construction works may occur as a consequence of dust deposition associated with these construction activities. This may lead to a reduction in photosynthesis due to smothering from dust on the plants and chemical changes such as acidity to soils. Furthermore, emissions from car exhausts, and the deposition of particulate matter and heavy metals produced by engine, brake and tyre wear, can contribute to increased deposition of pollutants such as oxides of nitrogen (NO_x, NO₂), volatile organic compounds (VOCs), particulate matter (PM), heavy metals (HM) and ammonia (NH₄) in the vicinity of a road carriageway. This can affect the ecosystems and vegetation present, influencing plant growth rates and species composition, diversity, and abundance.

The unmitigated Zol for air quality effects arising from the Proposed Scheme has the potential to extend 50m from the Proposed Scheme boundary, and 500m from Construction Compounds during the Construction Phase, and up to 200m from the Proposed Scheme boundary during the Operational Phase. There are no European sites present within these distances.

As such the Proposed Scheme does not have the potential to result in habitat degradation of the Qualifying / Special Conservation Interest species / habitats of any European sites, as a result of air quality impacts, during either the Construction or Operational Phase of the Proposed Scheme. There is, therefore, no potential for in combination effects to occur in that regard.

12.4.3.1.1.6 Disturbance and Displacement Impacts

A temporary and / or permanent increase in noise, vibration and / or human activity levels during the Construction Phase of the Proposed Scheme could result in the disturbance to and / or displacement of fauna species present within the vicinity of the Proposed Scheme. For mammal species such as otter, disturbance effects would not be expected to extend beyond 150m⁶. For wintering birds, disturbance effects would not be expected to extend beyond a distance of approximately 300m⁷, as noise levels associated with general construction activities would attenuate to close to background levels at that distance. There are no European sites within the disturbance Zol of the Proposed Scheme.

There are a number of coastal SPAs located in relatively close proximity to the Proposed Scheme which are designated for SCI species that are known to forage and / or roost at inland sites, such as amenity grassland playing pitches i.e. Malahide Estuary SPA, Baldoyle Bay SPA, South Dublin Bay and River Tolka Estuary SPA, North Bull Island SPA, Rogerstown Estuary SPA, Skerries Islands SPA, Ireland's Eye SPA and Lambay Island SPA, as well as The Murrough SPA (a distal site outside the typical 20km range but nonetheless supporting Brent Geese and a number of other SCI species that are recorded from Dublin Bay). Suitable inland foraging / roosting sites, which these bird species utilise, are located within the potential Zol of the Proposed Scheme (See Section 12.3). Therefore, there is potential for the Proposed Scheme to result in disturbance / displacement impacts on SCI populations associated with European sites.

Regarding the raptor species, for which Wicklow Mountains SPA are designated (e.g., merlin and peregrine), a study by Ruddock and Whitfield⁸, which included a review of previous studies in this area, offers no definitive

⁶ This is consistent with Transport Infrastructure Ireland (TII) guidance (Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (2006) and Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (2005)) documents. This is a precautionary distance, and likely to be moderated by the screening effect provided by surrounding vegetation and buildings, with the actual Zol of construction related disturbance likely to be much less in reality.

⁷ Current understanding of construction related noise disturbance to wintering waterbirds is based on the research presented in Cutts *et al.* (2009) and Wright *et al.* (2010). In terms of construction noise, levels below 50dB would not be expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect / level of response from birds, i.e., birds becoming alert and some behavioural changes (e.g., reduced feeding activity), but birds would be expected to habituate to noise levels within this range. Noise levels above 70dB would likely result in birds moving out of the affected zone, or leaving the site altogether. At approximately 300m, typical noise levels associated with construction activity (BS 5228) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

⁸ Ruddock, M. & Whitfield, D.P. (2007). *A Review of Disturbance Distances in Selected Bird Species*. A report from Natural Research Projects Ltd. to Scottish Natural Heritage. Available at: <https://www.nature.scot/sites/default/files/2018-05/A%20Review%20of%20Disturbance%20Distances%20in%20Selected%20Bird%20Species%20-%20Natural%20Research%20Ltd%20-%202007.pdf> [Accessed 24/07/2022]

distance after which disturbance to merlin is not significant but indicates that an upper limit of 300-500m may be sufficient in the case of breeding or nesting merlin. Likewise, a distance of 500-750m is likely to be sufficient for breeding peregrines. Adopting a precautionary approach, based on the available data regarding disturbance distances for merlin and peregrine, it can be concluded that disturbance to these bird species would be most likely to occur within 1km (i.e., the disturbance Zol is 1km). There are no European sites within the disturbance Zol; the next nearest European site to the Proposed Scheme is 4.3km away. There are also no habitat areas within the disturbance Zol of the Proposed Scheme that support populations of the SCI species for which Wicklow Mountains SPA is designated. Considering the above, there is no potential for the Proposed Scheme to result in disturbance / displacement impacts on the SCI species for which Wicklow Mountains SPA is designated⁹.

Although no signs of kingfisher were recorded during field surveys of the Proposed Scheme, kingfisher, an Annex I bird species, is known to be present in the wider study area, in particular, along the River Camac and the Grand Canal. Any kingfisher populations which are present in the vicinity of the Proposed Scheme are not considered to be associated with the SCI populations of any European site. Kingfisher territories can extend over approximately 3-5km of a river catchment (RSPB, Undated). The nearest SPA for which kingfisher has been designated is the River Boyne and Blackwater SPA, which is located approximately 40.3km away. Therefore, kingfisher present in the vicinity of the Proposed Scheme are not associated with an SPA population.

Although no signs of otter were recorded during multidisciplinary field surveys of the Proposed Scheme, the River Dodder, River Camac and the Grand Canal are known to support otter, an Annex II and IV mammal species. The nearest SAC to the Proposed Scheme for which otter has been designated is Wicklow Mountains SAC which is located approximately 5.3km south of the Proposed Scheme. Research carried out by Ó'Néill *et al.* (2009) on ranging behaviours of otter on river systems in Ireland found that female otter ranges averaged 7.5km while male otter home ranges varied up to 21km). The Proposed Scheme interacts with the following watercourses: River Poddle, River Camac, Grand Canal, River Dodder (through the construction of Construction Compound TC4 and associated contaminated run-off), Liffey Estuary Upper and Liffey Estuary Lower. Whilst these watercourses lie within the typical territorial ranges of otters, only the River Dodder (Dodder_040) shares a hydrological connection to the Wicklow Mountains SAC. The Tallaght to City Centre section of the Proposed Scheme also lies within the same subcatchment as Wicklow Mountains SAC (Dodder_SC_010 subcatchment). Notwithstanding the limited interaction between Construction Compound TC4 and the River Dodder, it cannot be excluded that the otter population in the vicinity of the Tallaght to City Centre section of Proposed Scheme is associated with the Wicklow Mountains SAC population. Therefore, disturbance and displacement impacts on the QI otter population for the Wicklow Mountains SAC, as a result of the Proposed Scheme, cannot be excluded.

Although marine mammals associated with European sites may commute and forage within the Liffey Estuary, it is not considered to be likely that there will be any impacts on these species as a result of the Proposed Scheme as it lies approximately 6.7km upstream of Dublin Bay, in a highly urbanised environment and where water levels can drop diurnally reducing the likelihood of marine mammals venturing this far up-river.

As the Proposed Scheme has the potential to result in the disturbance / displacement of the Qualifying / Special Conservation Interest species of any European site, there is the potential for in combination effects to occur in association with other activities / plans / projects.

There are no European sites within the immediate footprint of the Proposed Scheme or within the disturbance Zol. There are a number of QI species known to occur within the vicinity of the Proposed Scheme. Refer to Section 12.4.3.4 for more details with regards to potential construction impacts on QI mammals.

There are a number of SPAs located in relatively close proximity to the Proposed Scheme which are designated for SCI species that are known to forage and / or roost at inland sites, such as amenity grassland playing pitches (i.e., Malahide Estuary SPA, Baldoyle Bay SPA, North Bull Island SPA, South Dublin Bay and River Tolka SPA, Rogerstown Estuary SPA, Skerries Islands SPA, Ireland's Eye SPA, Lambay Island SPA, and the Murrough SPA). These species include light-bellied Brent goose, curlew, oystercatcher, black-tailed godwit, black-headed gull,

⁹ There is a need to consider use of habitat areas outside of an SPA by SCI bird species where they support the SCI populations and the site's conservation objectives. These habitat areas can comprise alternative roosting sites, foraging areas, staging grounds or migration routes and can, but not necessarily exclusively, be situated within the immediate hinterland of the SPA, or in areas ecologically connected to it.

herring gull and lesser black-backed gull. Suitable inland foraging / roosting sites, which these bird species utilise, are located within the potential Zol of the Proposed Scheme.

Refer to Section 12.4.3.5.2 for more details with regards to potential impacts on wintering bird species, which encompass all relevant SCI bird species.

12.4.3.1.2 Natural Heritage Areas and Proposed Natural Heritage Areas

In the case of NHAs and pNHAs, the assessment considers whether the integrity of any such site would be affected by the Proposed Scheme with reference to the ecological features for which the site is designated or is proposed for designation.

Considering the Zol of the Proposed Scheme, in the absence of mitigation measures the Proposed Scheme has the potential to have a likely significant effect upon the following one NHA and 15 pNHAs:

- Skerries Islands NHA [001218];
- Booterstown Marsh pNHA [001205];
- Grand Canal pNHA [002104];
- Dodder Valley pNHA [000991];
- North Dublin Bay pNHA [000206];
- South Dublin Bay pNHA [000210];
- Dolphins, Dublin Docks pNHA [000201];
- Dalkey Coastal Zone and Killiney Hill pNHA [001206];
- Howth Head pNHA [000202];
- Baldoyle Bay pNHA [000199];
- Ireland's Eye pNHA [000203];
- Malahide Estuary pNHA [000205];
- Portrane Shore pNHA [001215];
- Rogerstown Estuary pNHA [000208];
- Lambay Island pNHA [000204]; and
- The Murrough pNHA [000730].

The locations of these designated areas for nature conservation relative to the Proposed Scheme are shown on Figure 12.4 in Volume 3 of the EIAR.

The potential effects on European sites arising from the Proposed Scheme, described above in Section 12.4.3.1.1, may also negatively affect the pNHA and NHA sites located within the boundaries of these European sites. These pNHAs are primarily designated for similar reasons. The Proposed Scheme also has the potential to affect biodiversity in a broader sense than just the QIs / SCIs of those European sites. Where biodiversity receptors in these pNHAs or NHAs do not form part of the QIs / SCIs in the NIS assessment, they are considered under the other individual impact assessment headings for each KER below. Potential impacts arising from the Proposed Scheme on these pNHA sites would result in a likely significant negative effect at a national geographic scale.

The assessment of potential impacts arising from the Proposed Scheme directly on Grand Canal pNHA, and indirectly on the Dodder Valley pNHA (via potential drainage discharges) include habitat loss and fragmentation, habitat degradation as a result of surface water quality effects, habitat degradation as a result of air quality effects and the spread of non-native invasive species (see Section 12.4.3.2), effects on rare and protected plant species (see Section 12.4.3.3), and negative effects on the protected fauna species associated with these sites such as mammals, riparian birds and fish species (see Section 12.4.3.4, Section 12.4.3.5 and Section 12.4.3.8).

12.4.3.1.2.1 Habitat Loss and Fragmentation

The General Arrangement Drawings for the Proposed Scheme (BCDIA-ACM-GEO_GA-0809_XX_00-DR-CR-9001) indicate that the Proposed Scheme incurs into the boundary of the Grand Canal pNHA at the R134 New

Nangor Road / Woodford Walk intersection and continuing eastwards towards the M50 and a short distance beyond where the R134 New Nangor Road heads away from the Grand Canal. The extent of works within the pNHA is typically along existing paths and screening vegetation. Based on a review of aerial photography and the location of the Proposed Scheme largely alongside an existing transport corridor, the territory comprises roadside verge vegetation and built surface footpaths. There will be no works involved with the aquatic habitat. However, some temporary land take extends to the southern edge of the Grand Canal, while there will be some rearrangement of the public paths and screening vegetation at the R134 New Nangor Road / Woodford Walk intersection. As proposed, there is little vegetation removal required within the pNHA boundary as illustrated on the General Arrangement drawings (BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-9001). Thus, while the pNHA territory as a whole may be impacted by construction works, taking into consideration the extent of the works relative to the entirety of this extensive linear pNHA, the Proposed Scheme is not altering the integrity of the Grand Canal pNHA and in particular the aquatic and riparian unmanaged habitats for which it is proposed for designation. Therefore, no significant effects are predicted.

12.4.3.1.2.2 Habitat Degradation – Surface Water Quality

During the Construction Phase, contaminated surface water runoff and / or an accidental spillage or pollution event directly into the Grand Canal pNHA or indirectly to the Dodder Valley pNHA via the drainage network or any surface water feature, including existing drainage infrastructure, has the potential to have a significant negative effect on water quality and consequently affect aquatic and wetland habitats in the receiving environment, including the Grand Canal and Dodder Valley pNHAs. The effects of frequent and / or prolonged pollution events have the potential to be extensive and far-reaching and could potentially have significant long-term effects. In a worst-case scenario, the Grand Canal and Dodder Valley pNHAs, and habitats downstream in Dublin Bay (including other nationally designated sites therein) could also be affected. It is considered unlikely that a pollution event of such a magnitude would occur during construction, or if it did occur, it would be temporary in nature. Nevertheless, a precautionary approach has been adopted in the assessment of potential risk of impacts on water quality.

Consequently, detailed mitigation measures are required to further minimise the risk of contaminated surface water runoff and / or an accidental spillage or pollution events having any perceptible effect on water quality during construction of the Proposed Scheme.

12.4.3.1.2.3 Habitat Degradation – Groundwater

The potential for hydrogeological impacts is highly variable depending on the nature of the proposed works at specific locations and the receiving environment ground conditions. The Grand Canal pNHA is located adjacent to the Proposed Scheme, while the Dodder Valley pNHA is located approximately 200m away. There is no significant excavation required in the vicinity of this area, the key geological site being the Greenhills esker at the M50, which is not associated with the pNHA. Any drawdown from the excavation is expected to be limited, localised, not extending into the boundary of the pNHA site, and temporary. In the absence of mitigation, there is a risk of pollutants entering the groundwater as a result of spillages or accidents, and in such circumstances, while the pNHA would not be directly impacted, this might constitute a significant effect on the Dodder valley pNHA. Therefore, standard mitigation measures, as described in Section 12.5.1, will address this potential impact.

12.4.3.1.2.4 Habitat Degradation as a Result of Introducing / Spreading Non-Native Invasive Species

Six areas of Japanese knotweed, a species listed on the Third Schedule of the (Birds and Natural Habitats) Regulations, are present within, or in close proximity to, the Proposed Scheme. In the absence of mitigation, there is potential for this species to spread or be introduced, during construction and / or routine maintenance / management works, to terrestrial habitat areas in Nationally-designated sites, including the Grand Canal and Dodder Valley pNHAs, as well as pNHAs downstream in Dublin Bay (i.e. North Dublin Bay pNHA and South Dublin Bay pNHA). These in turn may result in the degradation of the existing habitats, in particular those habitats not permanently or regularly inundated by seawater, in the case of pNHAs located within Dublin Bay, potentially outcompeting other native species and affecting species compositive and physical structure of the habitat. Therefore, it is possible that the spread / introduction of non-native invasive species could affect the integrity of the Grand Canal and Dodder Valley pNHAs and pNHA sites in Dublin Bay.

It is not considered possible that the listed non-native invasive species could spread to pNHA sites that are located a considerable distance from the outfall locations of the River Camac, Grand Canal, River Liffey, Liffey Estuary Upper and Liffey Estuary Lower and separated by a large marine waterbody (i.e., Howth Head pNHA, Dalkey Coastal Zone and Killiney Hill pNHA, Ireland's Eye pNHA and Baldoyle Bay pNHA).

As the Proposed Scheme has the potential to result in habitat degradation in downstream pNHA sites as the result of the spread of non-native invasive species, there is the potential for in combination effects to occur in association with other activities / plans / projects.

Mitigation measures have been designed to avoid this potential impact (see Section 12.5).

12.4.3.1.2.5 Habitat Degradation – Air Quality

The only nationally designated sites identified within the ZoI of the Proposed Scheme (as per the topic criteria identified in Chapter 7 (Air Quality)) is the Grand Canal pNHA crossed and occurring alongside the Proposed Scheme.

Dust Emissions

Dust emissions associated with construction works could, in extreme circumstances, affect adjoining habitats, potentially burying sensitive habitats or plant species (e.g., riparian habitats in the Grand Canal pNHA or opposite-leaved pondweed known from the Grand Canal pNHA). Best practice construction methodologies and mitigation measures have been designed to minimise construction generated dust and to contain it within the Proposed Scheme boundary. Mitigation measures in respect of managing construction dust are provided in Section 7.5.1 of Chapter 7 (Air Quality).

Vehicle-derived Emissions

During the Construction Phase of the Proposed Scheme, emissions from car exhausts, and the deposition of particulate matter (PM) and heavy metals produced by engine, brake and tyre wear of construction vehicles, can contribute to increased deposition of pollutants such as oxides of nitrogen (NO_x, NO₂) and PM in the vicinity of a road carriageway. This can affect the ecosystems and vegetation present, influencing plant growth rates and species composition, diversity and abundance.

The current understanding of air quality impacts from roads and their interaction / effects on ecology are set out in the TII guidance document Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA 2011) and three UK reports: The Ecological Effects of Diffuse Air Pollution from Road Transport (Bignal *et al.*, 2004), The Ecological Effects of Air Pollution from Road Transport: An Updated Review (Natural England 2016), and Advice on Ecological Assessment of Air Quality Impacts (CIEEM 2021).

An assessment of the impact of the Proposed Scheme has been undertaken using the approach outlined in the Institute of Air Quality Management (IAQM) guidance document A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.1) (IAQM 2020). Vehicle-derived air emissions were modelled during the Construction Phase along the Proposed Scheme at the Grand Canal (at various locations along the Grand Canal, typically east and west of crossing points) (refer to Section 7.4.3.4 of Chapter 7 (Air Quality) for details). The worst-case predicted annual average NO_x concentrations at various distances from the proposed road edge exceed the 30µg / m³ limit value. In all cases where exceedances occur, the baseline environment is already in excess of this value. During the construction year of the Proposed Scheme, annual mean NO_x concentrations are predicted to increase slightly at Grand Canal pNHA (e.g., Oak Road western and eastern side) (41.3 + 45.5 / m³ to 41.6 + 45.39µg / m³). Further limited increases are expected at the Killeen Road eastern and western side, M50 Northbound and southbound and the R134 New Nangor Road eastern and western side. During the Construction Phase of the Proposed Scheme, the ecological impacts associated with the Construction Phase traffic emissions are overall negative, slight and short-term.

The contribution of the Construction Phase of the Proposed Scheme to the NO₂ dry deposition rate was modelled at various locations along the Grand Canal pNHA. Nitrogen deposition levels have been compared to the lower and higher critical loads for habitats associated with the Grand Canal pNHA, including canals (FW3), dry meadow / grassy verges (GS2), reed and large sedge swamps (FS1), tall-herb swamps (FS2). The Grand Canal pNHA

site is below the lower critical load of inland and surface water habitats of 5-10 Kg(N) / ha / yr (National Road Authority 2011), With the exception of the eastern side of the Grand Canal on the R134 New Nangor Road, where the monitoring site lies a little above the lower edge of the range 5.19kg / (N) / h / yr, all other sites are below the lower critical load for the designated habitat site. Therefore, harmful effects on vegetation within the Grand Canal pNHA from NO₂ are not likely, nor will there be any reduction in habitat area of the pNHA habitats, and mitigation is therefore not required.

The Proposed Scheme is located within a highly urbanised locality with significant development in the surrounding area. It is likely that barrier effects may therefore limit the geographical extent of deposition, Tong *et al.* (2016) identified the effectiveness of vegetative barriers as reducers of airborne Particulate Matter. They found that the most effective combination to reduce the pollutant escape is wide barriers with high leaf area density combined with solid barriers. The Proposed Scheme is unlikely to significantly change from existing urban environment in terms of the annual mean PM10 and PM2.5 concentrations at all modelled receptors (refer to Section 7.4.3.3.2 Chapter 7 (Air Quality) for details), therefore, impacts on vegetation within the Grand Canal pNHA from particulate matter or heavy metals are not likely.

12.4.3.2 Habitats

This Section assesses the potential effects of the Proposed Scheme on habitats. In terms of quantifying the magnitude of effects on habitats, the estimated percentage of the local habitat resource being affected is based upon the total area of a given habitat type that was recorded within the study area of the Proposed Scheme. This provides some local context as to the magnitude of the habitat loss and whether the impact is significant or not, and at what geographic scale.

12.4.3.2.1 Habitat Loss and Fragmentation

The total habitat loss across the Proposed Scheme (not hard standing areas) is approximately 15.72ha during the Construction Phase. This occurs in the form of permanent land take of edge habitats adjacent to the existing road network (10.419ha) or as temporary land take to facilitate construction activities including temporary land take (1.97ha) or erection of Construction Compounds (3.33ha). Habitats associated with temporary landtake and Construction Compounds will be reinstated, or in the case of tree loss, replanted, following the completion of the Construction Phase.

The habitat type depositing / lowland rivers (FW2) may be temporarily affected by the Proposed Scheme and is considered to be of Local Importance (Higher Value). Both the River Camac and River Poddle occur in close proximity to the Proposed Scheme. The River Poddle is crossed twice by the Proposed Scheme while the River Camac is crossed three times. Although it is proposed to construct a headwall associated with the River Camac, resulting in temporary loss of river base (approximately 0.01ha) during construction, the Proposed Scheme will not result in any permanent loss of semi-natural habitat type at this or other watercourses. Therefore, there is potential for significant effects at the local geographic scale.

The habitat type canals (FW3) may also be impacted by the Proposed Scheme and is considered to be of National Importance as it is contained within the boundaries of the Grand Canal pNHA. The Proposed Scheme crosses the Grand Canal at Dolphin's Barn. However, there will be a very small permanent loss of this habitat type. The total length of this habitat type which overlaps with the Proposed Scheme is approximately 22m.

Habitat types considered to be of Local Importance (Higher Value) will be lost as a result of the Proposed Scheme. These include relatively small areas of mixed broadleaf / conifer woodland (WD2), scattered trees and parklands (WD5), hedgerow (WL1) and treeline (WL2) habitats, areas of dry meadows and grassy verges (GS2), mixed broadleaved woodland (WD1), immature woodland (WS2) and reed and large sedge swamp (FS1). In addition, a small area of Depositing Lowland River (FW2) will be lost during the construction of the headwall on the River Camac (0.01ha), as well as the loss of areas of dry meadows and grassy verges (GS2), at least temporarily, to accommodate the provision of Construction Compounds at Tymon Lane, Tymon Park (east of M50), Tallaght Athletics Club and adjacent to Assumption Junior National School in Walkinstown. The overall total area of the habitat types which overlap with the Proposed Scheme boundary and will be directly lost as a result of the construction of the Proposed Scheme is approximately 1.885ha. The permanent loss of habitat types considered to be of Local Importance (Higher Value) has the potential to affect the conservation status of each of these habitat types and, therefore, result in a significant negative effect at the local geographic scale.

The remaining areas within the footprint of the Proposed Scheme comprise habitats considered to be of a Local Importance (Lower Value). These include improved amenity grasslands (GA2), planted flowers beds (BC4) and ornamental / non-native shrub (WS3), areas of disturbed ground (ED1, ED2 and ED3) and scrub (WS1), and hard standing (BL3), as well as mosaics which may include minor patches of some habitats listed above, such as GS2 or woodland edge mosaics with Habitat types considered to be of Local Importance (Lower Value). The overall total area of these habitat types which overlaps with the Proposed Scheme boundary and will potentially be lost as a direct impact during construction of the Proposed Scheme is approximately 54.41ha of permanent land take.

The various KER habitat types affected and corresponding total areas which overlap with the Proposed Scheme boundary are summarised in Table 12-13. These calculations include all KER habitat areas within the Proposed Scheme boundary, as the possibility of areas within the Proposed Scheme boundary but outside of the footprint of the Proposed Scheme itself being affected by construction activities cannot be ruled out. KERs highlighted in blue will be subject to direct habitat loss as a result of the Proposed Scheme.

Habitat loss may also lead to habitat fragmentation, i.e., creating new divisions of existing habitat blocks and / or contributing to an existing trend of fragmenting semi-natural habitat blocks. However, considering the habitat types to be lost, their extents and the surrounding habitats beyond the Proposed Scheme boundary, this potential impact will not result in a significant effect at any local geographic scale.

Table 12-13: Extent of Habitat Loss by Type

Habitat Type	Extent of Permanent Habitat Loss	Extent of Temporary Habitat Loss
National Importance		
Canal (FW3)	Approximately 0.0002ha	Approximately 0.00000244ha
Local Importance (Higher Value)		
Reed and large sedge swamp (FS1)	Approximately 0.0003ha	0ha
Depositing / lowland rivers (FW2)	0ha	Approximately 0.01ha
Dry meadows and grassy verges (GS2)	Approximately 0.83ha	Approximately 0.43ha
Mixed broadleaved woodland (WD1)	Approximately 0.06ha	Approximately 0.035ha
Mixed broadleaved / conifer woodland (WD2)	Approximately 0.008ha	0ha
Scattered trees and parkland (WD5)*	Approximately 0.2ha	Approximately 0.22ha
Hedgerows (WL1)	Approximately 0.45ha or 1160m	Approximately 0.21ha
Treelines (WL2)	Approximately 0.27ha or 6973m	Approximately 0.026ha
Immature woodland (WS2)	Approximately 0.07ha	Approximately 0.04ha

KERs highlighted in blue are KERs which will be subject to direct habitat loss as a result of the Proposed Scheme.
*Extent of habitat removal refers to parkland only. Tree loss is captured under Treeline (WL2) habitat code.

12.4.3.2.2 Habitat Degradation – Surface Water Quality

During the Construction Phase, possible contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water feature has the potential to have significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. The effects of frequent and / or prolonged pollution events have the potential to be extensive and far-reaching and could potentially have significant long-term effects. In a worst-case scenario, the downstream habitats of the Liffey Estuary Lower and Dublin Bay coastal water bodies could also be affected.

It is unlikely that a pollution event of such a magnitude would occur during construction or if it did occur, it would be temporary in nature. Nevertheless, a precautionary approach has been adopted in the assessment of potential risk of impacts on water quality. Consequently, for the purposes of this EIA to be conducted by An Bord Pleanála (but not the screening for Appropriate Assessment), detailed mitigation measures are proposed to further minimise the risk of contaminated surface water runoff and / or an accidental spillage or pollution event of the Proposed Scheme having any perceptible effect on water quality during construction.

During the Construction Phase, suspended solids, silt and other harmful materials generated as a result of proposed works could be released into the local drainage infrastructure and travel downstream. Cement-based products used in the Construction Phase of the Proposed Scheme (e.g., concrete and / or bentonite which are highly corrosive and alkaline materials), if released into the surface water network, may cause surface water

degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on water quality at a local geographic scale and consequently affect aquatic and wetland habitats e.g., FS1, FW2 and FW3 in the receiving environment. In a worst-case scenario, transitional and coastal habitats downstream in Dublin Bay could also be affected.

Construction works associated the proposed instream headwall / culvert extension at the River Camac or in close proximity to the River Camac, River Poddle and Grand Canal pNHA, or existing surface water drainage infrastructure hydrologically connected to these watercourses, could possibly result in generated silt / sediment being released into these surface water features and in a worst-case scenario, potentially being transferred downstream, including potentially into downstream transitional and coastal water bodies. Cement based products used in the Construction Phase of the Proposed Scheme (e.g., concrete and / or bentonite which are highly corrosive and alkaline materials), if released into the surface water network may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on water quality at a local geographical scale and consequently affect aquatic and wetland habitats in the receiving environment. In a worst-case scenario, transitional and coastal habitats downstream in the Liffey Estuary Lower and Dublin Bay could also be affected.

Habitat degradation as a consequence of construction effects on surface water quality has the potential to affect the conservation status of the Grand Canal pNHA. Similarly, Annex I habitats contained in European sites in and around Dublin Bay could also be affected and therefore, effects on surface water quality have the potential to result in a significant negative impact at a national scale, in the case of the aquatic / wetland Annex I habitats located within the Zol of the Proposed Scheme.

12.4.3.2.3 Habitat Degradation – Hydrological Regime

During the Construction Phase, the Proposed Scheme may have a temporary effect on the local flow and flooding regime from the following sources:

- Change in the natural hydrological regime due to an increase in discharge as a result of dewatering activities (where required). This may alter the groundwater regime and affect the baseflow to a surface water receptor;
- Potential for disrupting local drainage systems due to diversions required to accommodate the Construction Phase works e.g., installation of scour protection; and
- Potential for temporary increase in hard standing areas and / or soil compaction during construction works, which could result in temporary increased runoff rates to waterbodies.

Construction Phase works at the proposed headwall at the River Camac or in close proximity to the Grand Canal may have a temporary effect on the local flow and flooding regime. None of these are predicted to have any long-term effects that would give rise to a likely significant negative effect on any aquatic habitats or species through effects on the hydrological regime as the drainage design principles ensure that there will be no net increase in the surface water flow discharged to these receptors (for more detail refer to Chapter 13 (Water)).

12.4.3.2.4 Habitat Degradation – Groundwater

Any effects on the existing hydrogeological baseline supporting wetland habitats has the potential to negatively affect habitat extent and distribution, and vegetation structure and composition. The potential effects upon the existing hydrogeological regime are not necessarily limited to habitats within the Proposed Scheme boundary, but can be far-reaching, with significant negative long-term effects. As discussed in Chapter 14 (Land, Soils, Geology & Hydrogeology), the Proposed Scheme may involve the excavation of potentially contaminated ground, resulting in damage to the aquifer or changes to the existing groundwater regime.

Groundwater dependent habitats were not identified in close proximity to the Proposed Scheme. Therefore, any potential impacts as a result of the Proposed Scheme arise with the interaction between groundwater and surface water.

As discussed in Section 12.4.3.1.2.3, in the absence of mitigation, there is a risk of indirect impacts on the Grand Canal and Dodder Valley pNHA, via contamination of groundwater as a result of spillages or accidents.

In addition, it is predicted that while there may be no direct impact on the groundwater regime, there is potential for indirect impacts associated with the Proposed Scheme through surface water interaction (e.g., pumping). Given that pumping (if any) is expected to be limited and localised and temporary, the magnitude of this impact is considered negligible.

As detailed in the Construction Environmental Management Plan (CEMP) for the Proposed Scheme (Appendix A5.1 in Volume 4 of this EIAR), specific controls / mitigation measures have been prepared, i.e., a surface water management plan (SWMP), including pollution control measures which will be put in place to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase.

12.4.3.2.5 Habitat Degradation – Air Quality

As discussed in Chapter 7 (Air Quality), the Proposed Scheme has the potential to generate dust during construction works which could affect vegetation in habitat areas adjacent to the Proposed Scheme.

The mitigation measures to control dust emissions during the Construction Phase are outlined in Chapter 7 (Air Quality) and Appendix A5.1 – CEMP in Volume 3 of this EIAR. These include standard measures to control nuisance dust such as inspection and cleaning of public roads, measures for stockpiling of materials within construction compounds, water misting / spraying, vehicle coverings and hoarding around the Construction Compound.

Air quality modelling of NO_x concentrations, and deposition rates were modelled for the Construction Phase of the Proposed Scheme at distances up to 200m from the proposed road development (refer to Chapter 7 (Air Quality) for details). The results from the air quality modelling deem the ecological impacts of the Proposed Scheme, with regards air quality, to be overall negative, slight and short-term. As such, harmful effects on vegetation from these emissions are not likely.

12.4.3.2.6 Habitat Degradation – Non-native Invasive Plant Species

Planting, dispersing, or allowing / causing the dispersal, spread or growth of certain non-native invasive plant species (and / or vector material such as soil that is contaminated with these non-native invasive species) is controlled under Regulation 49 of the (Birds and Natural Habitats) Regulations and refers to plant or animal species listed on the Third Schedule of those regulations (see also Section 12.3.7).

The accidental spread of such non-native invasive plant species as a result of construction works has the potential to impact on terrestrial as well as riparian / aquatic habitats, potentially affecting plant community composition, species diversity and abundance over the long-term. This is not only confined to habitats immediately adjacent to the footprint of the Proposed Scheme but includes habitat areas along the network of proposed haul routes associated with the Proposed Scheme (Figure 12.6 in Volume 3 of this EIAR).

The effects of introducing such non-native invasive plant species to highly sensitive and ecologically important habitat areas (e.g., designated areas for nature conservation or areas of Annex I habitat) have the potential to result in a likely significant negative effect at geographic scales ranging from local to international. Six areas of non-native invasive plant species listed on the Third Schedule of the (Birds and Natural Habitats) Regulations were identified along the Proposed Scheme. The only species that was recorded was Japanese knotweed, five incidences of which are inside the footprint of the Proposed Scheme. The desk study (See Section 12.3.7) revealed records for additional species in close proximity to the Proposed Scheme.

During the interim between the original non-native invasive species surveys and the commencement of construction, it is possible that newly established Third Schedule non-native invasive species may become established within the footprint of the Proposed Scheme in a range of habitats.

Mitigation measures have been designed to avoid this potential impact (see Section 12.5.1).

12.4.3.3 Rare and Protected Plant Species

12.4.3.3.1 Habitat Loss

No protected plant species listed on the Flora Protection Order were recorded within or in close proximity to the Proposed Scheme. The desk study revealed records for a number of different species listed on the Flora Protection Order within 1km of the Proposed Scheme.

Of these, only one species, namely opposite leave pondweed, is documented from the Grand Canal, although it was not recorded during surveys in respect of the Proposed Scheme. This species was recorded within the habitats hydrologically connected to, but outside of the immediate footprint of the Proposed Scheme. As such, there will be no habitat loss in respect of this Flora Protection Order species.

Other species noted in Section 12.3.6 were recorded outside the footprint of the Proposed Scheme or occur in areas beyond the potential footprint of the Proposed Scheme. There is no potential for direct impacts on any of these species to occur as a consequence of the Proposed Scheme.

12.4.3.3.2 Habitat Degradation – Surface Water Quality

No protected plant species listed on the Flora Protection Order were recorded within the Proposed Scheme during field surveys. However, the desk study returned records of opposite-leaved pondweed from the Grand Canal.

Opposite-leaved pondweed may lie dormant in sediments for many years until conditions become suitable for regrowth. The construction of the Proposed Scheme, in the absence of mitigation, has the potential to result in impacts on the surface water quality of the Grand Canal, through contamination with construction related run-off or accidental spillages (i.e., runoff of sediment / accidental spillages of harmful substances such as hydrocarbons / cementitious materials etc.). Impacts on the quality of surface water within the Grand Canal could affect the possible establishment of populations of opposite-leaved pondweed or green figwort present in the vicinity of the Proposed Scheme.

In the absence of mitigation, habitat degradation of the Grand Canal as a consequence of Construction Phase impacts on surface water and the potential knock-on impacts this could have on the protected species opposite-leaved pondweed, is likely to be significant at the national level.

12.4.3.4 Mammals

12.4.3.4.1 Bats

12.4.3.4.1.1 Roost Loss

There are no confirmed bat roosts located within the footprint of the Proposed Scheme. Seven trees with Potential Roosting Features (PRFs) were identified within or adjacent to the footprint of the Proposed Scheme (see Figure 12.7.2 in Volume 3 of this EIAR). These are located along the R819 Greenhills Road between the Airton Road intersection and Junction 10 Ballymount M50 flyover. However, the Proposed Scheme will result in direct impacts to these trees as they are being removed. The construction of the Proposed Scheme will not result in the loss of breeding / resting sites for any bat species and, therefore, there is no potential for impacts on bat roosts as a result of the construction of the Proposed Scheme.

12.4.3.4.1.2 Habitat Loss as a result of Fragmentation of Foraging / Commuting Habitat and Commuting Routes

Bats rely on suitable semi-natural habitats which support the insect prey upon which they feed. The Proposed Scheme will result in the loss of such habitats used for feeding by all bat species recorded in the study area.

Suitable habitat for foraging and / or commuting bats within the footprint of the Proposed Scheme includes hedgerows and treelines, mixed broadleaved woodland, rivers, areas of parkland and open grassland. The area of the habitats which will be lost as a result of the Proposed Scheme is provided in Table 12-13 and shown in the Landscape General Arrangement drawings (BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001) in Volume 3 of this EIAR. This is not deemed significant, considering the extent of habitat loss, their location (adjacent to existing

artificially lit roads in a generally highly disturbed urban environment) and the presence and relative abundance of other similar habitats in the wider locality, which will not be impacted by the Proposed Scheme. The Proposed Scheme will not result in any loss along the water courses. In assessing the impacts of habitat loss as a result of fragmentation of foraging / commuting habitat on bat populations, consideration was given to a species Core Sustenance Zone (CSZ). A CSZ refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the 'resilience and conservation status' of the colony using the roost. Bat Conservation Trust Guidance (Bat Conservation Trust 2016) states that:

"With reference to planning and development the core sustenance zone is: The area surrounding the roost within which development work can be assumed to impact the commuting and foraging habitat of bats using the roost, in the absence of information on local foraging behaviour. This will highlight the need for species-specific survey techniques where necessary; and; The area within which mitigation measures should ensure no net reduction in the quality and availability of foraging habitat for the colony, in addition to mitigation measures shown to be necessary following ecological survey work."

Notwithstanding the fact that there is evidence of bats foraging and commuting within the study area of the Proposed Scheme, particularly at the Priory Institute and along the River Poddle in Bancroft Park (CBC0809BT004), a wooded area along R819 Greenhills Road (CBC0809BT003) and the R134 New Nangor Road near Diageo (CBC0809BT001), and that all parts of the Proposed Scheme which contain suitable habitat are likely to be within the CSZ of at least one bat roost, considering the type of works proposed (e.g., upgrading of existing infrastructure for the most part), there is limited potential for the Proposed Scheme to act as a barrier to flight paths for bat species.

The Proposed Scheme will result in loss and / or fragmentation of existing habitat used by commuting / foraging bats which could also result in impacts to local bats. Fragmentation of feeding habitat has the potential to disturb normal bat behavioural patterns, and thus adversely affect the ability of local bat populations to persist and reproduce, impacting on their local distribution and / or abundance. The barrier effect can manifest itself as soon as the site clearance phase commences and the barrier itself is in the form of the cleared lands. The Proposed Scheme will result in the removal / fragmentation of small areas / strips of woodland, scattered trees and parkland, treelines and hedgerows which could all be used by local bats. These habitats constitute a landscape feature which could be used by foraging / commuting bats and their loss will result in a reduction of foraging / commuting habitat for local bats in this area.

Removal of suitable habitat for foraging and / commuting bats within the footprint of the Proposed Scheme is calculated as 5.67ha (of all wooded and scrub habitat across the entire Proposed Scheme). This comprises 3.01ha of permanent habitat loss, 0.84ha of habitat temporarily lost and a further 1.82ha lost for 36months due to the presence of the Construction Compounds. Habitat removal is within a highly disturbed urban environment with low numbers of species records, and as such, is not deemed to provide significant contributions to core sustenance zones of roosts outside of the footprint of the Proposed Scheme. The effect of habitat fragmentation and barrier effect associated with the construction of the Proposed Scheme is therefore considered to be significant at the local level only.

12.4.3.4.1.3 Installation of Temporary Working and Construction Compound Lighting which may cause Direct / Indirect Disturbance of Flight Patterns

Construction Compounds are proposed in the following 13 locations (see Section 12.4.1.1.2 and the General Arrangement Drawings (BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-9001) in Volume 3 of this EIAR);

- Construction Compound TC1 located in an area of amenity grassland at the western end of Old Blessington Road, adjacent to the junction with the N81 Tallaght bypass;
- Construction Compound TC2 located in an area of amenity grassland along R819 Greenhills Road, immediately south of the junction of Bancroft Park and R819 Greenhills Road;
- Construction Compound TC3 located in an area of amenity grassland / scrub along R819 Greenhills Road, between Birchview Avenue and R819 Greenhills Road;
- Construction Compound TC4 located in an area of amenity grassland along R819 Greenhills Road, between Treepark Road and R819 Greenhills Road;
- Construction Compound TC5 located in an area of unmanaged grassland along R819 Greenhills Road, to the north of Tymon Lane, south-east of the M50 Motorway;

- Construction Compound TC6 located in an area of amenity grassland along R819 Greenhills Road, outside Tallaght Truck Dismantlers, north-east of the M50 Motorway;
- Construction Compound TC7 located in green space along R819 Greenhills Road, between Ballymount Avenue and R819 Greenhills Road;
- Construction Compound TC8 located in an area of amenity grassland at Bunting Park, along Bunting Road;
- Construction Compound TC9 located in an area of green space along R110 Crumlin Road, immediately west of the junction of Rafter's Road and the R110 Crumlin Road;
- Construction Compound TC10 located in an area of green space along R110 Crumlin Road, immediately east of the junction of Rutland Avenue and the R110 Crumlin Road;
- Construction Compound TC11 located in an area of hardstanding at Dean Street / R137 Patrick Street;
- Construction Compound TC12 in an area of scrub and unmanaged grassland between R134 New Nangor Road and Killeen Road; and
- Construction Compound TC13 located in an area of hardstanding along R110 Long Mile Road, south of the New Nangor Road / Naas Road / Long Mile Road junction.

Security lighting will be installed in these Construction Compounds and will be in operation (when on) for the duration of construction (i.e., 36 months), thereby temporarily increasing the level of artificial lighting in this area. Artificial lighting within suitable habitat may result in avoidance behaviour by bats and could prevent bats from accessing foraging areas or roosts and / or result in bats taking more circuitous routes to get to foraging areas and hence potentially depleting energy reserves and abandonment of nearby roosts. Given the urban setting of these proposed Construction Compounds, bats in the area would be habituated to some level of artificial lighting. Provided security lighting does not involve high intensity lighting (e.g., floodlighting), the impact of increased artificial lighting at Construction Compounds is considered to be significant at the local level only.

The bulk of the construction works along the Proposed Scheme will typically be undertaken during normal daylight working hours, although it is recognised that some elements of night-time work may be required given the transport importance of this existing corridor e.g., lane closures and resurfacing. The bulk of the existing corridor is largely illuminated by regularly spaced lighting columns for much of its length and therefore the requirement for lighting to accommodate construction works during night-time will be limited, in areas where existing light levels are low and of short duration. The effect of the additional lighting is therefore considered to be significant at a local level only and temporary.

12.4.3.4.2 Badger

During multidisciplinary surveys undertaken in respect of the Proposed Scheme, there was no evidence of badger from within the footprint of the Proposed Scheme and no badger setts were identified during these surveys. Based on the results of the desk study, badger are known to occur in the vicinity of the Proposed Scheme.

Although it cannot be predicted if badger will establish new setts within the Zol of the Proposed Scheme before construction works commence, it is a possibility, and therefore this scenario has been taken into account in the mitigation strategy (refer to Section 12.5.1).

12.4.3.4.2.1 Loss of Foraging Habitat and Breeding / Rest Sites

There were no badger setts located within the Zol of the Proposed Scheme as recorded during surveys of accessible lands. Therefore, there is no potential for the permanent loss of any badger sett to occur.

Construction may result in the permanent loss of approximately 10.774ha of suitable foraging / commuting habitat for badgers (e.g., amenity grassland, scattered trees and parkland, dry meadows and grassy verges, scrub, mixed broadleaved woodland and treelines / hedgerows) across the entire Proposed Scheme. In addition, the provision of Construction Compounds for the duration of the Construction Phase will result in the temporary loss of approximately 0.94ha of territory, while land temporarily lost to facilitate specific construction elements accounts for 1.37ha of amenity (GA2) and dry meadows and grassy verges (GS2) grassland habitat and scrub (WS2) across the entire Proposed Scheme, which could be used by commuting / foraging badgers. Given the

relative abundance of suitable habitat in the wider vicinity (e.g., open ground and parks including the Dodder valley and open land such as wintering bird sites elsewhere), the temporary loss of these habitats is not considered significant at any geographic scale.

Permanent habitat removal will be largely adjacent to pre-existing roads / paths and will be limited to 2m linear sections of amenity grassland, existing hard surfaces, scattered trees and parkland and roadside treelines / hedgerows, within a highly disturbed urban environment. These areas of habitat removal are not likely to provide significant foraging habitat for the local badger population. Therefore, the Proposed Scheme is unlikely to affect the conservation status of the local badger population and will not result in a likely significant negative effect, at any geographic scale.

12.4.3.4.2.2 Disturbance / Displacement

In conjunction with any displacement effects associated with habitat loss, increased human presence and / or noise and vibration associated with construction works, the Proposed Scheme has the potential to displace badgers from both breeding / resting places and from foraging habitat located beyond the footprint of the Proposed Scheme.

As construction works in areas of suitable foraging habitat will typically be undertaken during normal daylight working hours and badgers are nocturnal in habit, displacement of badgers from foraging areas (outside of areas where foraging habitat will be lost as a result of the Proposed Scheme) is extremely unlikely to affect the local badger population and will not result in a significant negative effect, at any geographic scale. In addition, badgers residing within the wider study area are likely to be habituated to disturbance within the urban environment and therefore would be less sensitive to very localised, temporary increases in disturbance.

Disturbance and displacement effects on badger may also be the result of increased artificial lighting during construction. Nocturnal mammals, such as badger, are likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich and Longcore 2005). Although the majority of the Proposed Scheme corridor is already lit artificially, the proposal may result in the introduction of artificial lighting to previously unlit areas if the proposed Construction Compounds require security lighting for the duration of construction. A number of the locations proposed for Construction Compounds (e.g., TC2, TC3, TC4, TC5, TC6, TC7, TC8 and TC12 to a lesser degree owing to its location) are composed of suitable foraging or commuting habitat for badger (amenity grassland and scrub). If high-intensity, non-directional security lighting (e.g., floodlighting) is installed in these proposed Construction Compounds, light spill into adjacent areas could render these areas unsuitable for foraging badger. Therefore, lighting associated with the Construction Phase of the Proposed Scheme could result in a negative effect on badgers, albeit temporary in nature and significant at the local geographic level only.

12.4.3.4.2.3 Mortality Risk

Site clearance works have the potential to result in the mortality of badger species. The potential for this impact to occur would be expected to be greater during the breeding season (December to June) when juveniles venture out of maternal setts or indeed when males leave the sett earlier on. Furthermore, the potential for direct mortality to badger would be greater in more vegetated areas, as opposed to disturbed ground / urban habitats, as these areas would offer more in terms of breeding / resting / foraging habitat for badger. Although no setts were located during the surveys and the potential for the establishment of new setts is limited by virtue of the existing transport corridors, there remains the risk that commuting / foraging badger might become entrapped in deep excavations, particularly in open areas and wooded territory bordering / adjacent to the Proposed Scheme, including areas where historical sightings have been recorded e.g., Landsdowne Valley, Drimnagh, Bancroft Park, Tallaght. Given the relatively low numbers that might be expected to be affected, and that these species are highly mobile, the risk of mortality due to site clearance and or excavation is unlikely to result in a level of mortality that would affect the species' conservation status, and result in a significant negative effect, even at a local geographic scale.

12.4.3.4.3 Otter

Multidisciplinary surveys did not originally confirm any otter holts or evidence of otter activity within the footprint of the Proposed Scheme and the majority of the watercourses in the vicinity of the Proposed Scheme are culverted, or of such condition that they would provide unfavourable otter territory. However, a potential otter slide

was noted in 2022 on the Grand Canal outside the Proposed Scheme boundary and two otter spraints were recorded during the aquatic survey (See Appendix A12.2) on the southern culvert on instream trash / debris.

Although it cannot be predicted if otter will establish new holt or couch sites within the Zol of the Proposed Scheme before construction works commence, it is a possibility, and this scenario has been taken into account in the mitigation strategy (refer to Section 12.5.1.4.3).

12.4.3.4.3.1 Loss of Breeding / Resting Sites

Based on the findings of the field surveys carried out, there were no otter breeding or resting places, holt or couch sites present within the Proposed Scheme boundary. Therefore, there will not be any loss of holt or couch sites as a result of construction works. There was no suitable habitat for breeding / resting sites identified during the multidisciplinary surveys. Therefore, the Proposed Scheme will not have a significant effect on the conservation status of otter, as there will be no loss of breeding / resting sites, and will not have a likely significant negative effect, at any geographic scale.

12.4.3.4.3.2 Loss / Fragmentation of Foraging / Commuting Habitat

Evidence of otter was not recorded within or in close proximity to the Proposed Scheme during the multidisciplinary field surveys undertaken for the Proposed Scheme, although a single potential otter slide was recorded in 2022 outside the Proposed Scheme boundary on the northern bank of the Grand Canal and two otter spraints containing crayfish remains were recorded during the aquatic survey (See Appendix A12.2) on the southern culvert on instream trash / debris.

Based on the results of the desk study, otter are known to utilise the River Liffey (which is downstream of both the River Camac and River Poddle), Grand Canal and River Camac. In addition, otter frequently use the Lower Liffey Estuary, to which the Scheme is hydrologically connected, for commuting and foraging purposes, with holts identified at Dublin Port (Macklin *et al.*, 2019).

The provision of Construction Compounds for the duration of the Construction Phase is not expected to result in the temporary loss of any habitat used by otter, owing to the fact that the majority of the Construction Compound locations are removed from waterbodies and do not consist of suitable habitat for otter. However, Construction Compound TC2 is on the north bank of the Poddle, but otter are not likely to be present, given the conditions of the watercourse here and the paucity of typical aquatic prey.

Furthermore, the Proposed Scheme is not expected to result in any significant loss / fragmentation to habitats used by otter during construction. This is because the only instream works proposed are in relation to the upgrading of a headwall along the River Camac at the R134 New Nangor Road / Oak Road roundabout culvert, which will result in the length of the corrugated culvert being extended approximately 4 metres and a new precast concrete headwall being installed.

The Proposed Scheme boundary (temporary land take) is shown at one location extending to the margins of the Grand Canal pNHA. This would result in a temporary loss of the riparian bank along a discrete section of the southern bank for the duration of the construction in this area. The scale of temporary habitat loss, through fragmentation, is relatively small when compared to the availability of other suitable riparian habitats and the fact that most works will be undertaken during daylight hours. Therefore, there is potential for the Proposed Scheme to result in the loss / fragmentation of foraging / commuting habitat for otter.

Otter are known to routinely use highly modified habitat within culverts and beneath bridges. Any habitat loss arising from the Proposed Scheme would not constitute a significant decline in the extent of available otter habitat and will not affect the local otter population's ability to maintain itself, even in the short-term. While there will be some permanent loss of managed habitat set back from the River Camac during construction works and lengthening of the culvert, there will be no loss of watercourse habitat associated with the construction of the Proposed Scheme. There will be a localised reduction in the extent of width of semi natural riparian foraging activity (approximately 4 metres on each side of the narrow modified riverbank), but no long term impediment or barrier to movement. Thus, habitat loss and fragmentation associated with the construction of the Proposed Scheme will not have a likely significant effect on the conservation status of otter and will not have a likely significant negative effect, at any geographic scale.

Thus, temporary habitat loss associated with the construction of the Proposed Scheme at the River Camac culvert extension will not have a significant effect on the conservation status of otter and will not have a significant negative effect, at any geographic scale.

12.4.3.4.3.3 Habitat Severance / Barrier Effect

As discussed in Section 12.4.3.4.3.2, there are discrete works proposed on the River Camac. There was some evidence of otter recorded from this modified section of the river. There will be temporary disruption of the River Camac commuting territory at the proposed culvert extension at the R134 New Nangor Road / Oak Road for a period estimated to be approximately 6.5 weeks. Temporary bunding of the upper part of the watercourse will be required to enable instream works associated with the extension of the culvert and installation of the new pre-cast headwalls.

There will be temporary loss of riparian territory along the Grand Canal. The scale of temporary habitat loss, resulting in barrier effect, is relatively small when compared to the availability of other suitable riparian habitats and the fact that most works will be undertaken during daylight hours. Therefore, there is potential for the Proposed Scheme to result in the loss / fragmentation of foraging / commuting habitat for otter.

Long culverts, such as the one on the Nagor Road / Oak Road intersection are not ordinarily favored by otters without the inclusion of ledges or similar, although the survey and desktop evidence suggest that otter are utilizing the upper section of the River Camac. The extension of the existing culvert (approximately 67m) on the River Camac by approximately 4m is not predicted to affect the conservation status of local otter population.

Habitat severance / barrier effect associated with the with the construction of the Proposed Scheme will have a temporary effect (approximately 6.5 weeks) but will not have a significant effect on the conservation status of otter and will not have a significant negative effect, at any geographic scale.

Mitigation measures have been designed to ensure that no significant barrier to otter movement will occur during the Construction Phase (See Section 12.5.1.4.3.4)

12.4.3.4.3.4 Habitat and Food Source Degradation – Water Quality

During construction, a potential contaminated surface water runoff and / or an accidental spillage or a pollution event into any surface water feature / existing drainage infrastructure has the potential to have a significant negative impact on water quality and consequently an impact on otter; either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats). The effects of frequent and / or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects.

However, it is considered unlikely that a pollution event of such a magnitude would occur during construction or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction.

Construction works in close proximity to the River Camac and the Grand Canal, or any existing surface water drainage infrastructure (including drainage into the River Dodder, for which otter activity is well documented) could result in generated silt / sediment being released into these surface water features and potentially being transferred downstream, including potentially into the estuarine waters of the Liffey Estuary Upper, the Liffey Estuary Lower and the coastal waters of Dublin Bay. In the absence of mitigation, the potential increase in water turbidity, as a result of increased sedimentation in receiving watercourses, could affect the visibility of prey species for foraging otter. Cement based products used in the Construction Phase of the Proposed Scheme (e.g., concrete and / or bentonite which are highly corrosive and alkaline materials), if released into the surface water network, may cause surface water degradation and damage to aquatic fauna. This has the potential to result in significant negative effects on food supply for otter.

Habitat degradation as a result of effects on surface water quality during Construction Phase has the potential to affect the species' conservation status and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable

habitat for otter in the wider vicinity and the relative abundance of otter across the study area, as revealed in the results of the desk study.

Proposed mitigation measures have been designed to protect water quality during construction (see Section 12.5).

12.4.3.4.3.5 Disturbance / Displacement

The results of the desk study did not reveal the location of any otter holts in close proximity to the Proposed Scheme, and the field surveys undertaken did not record any otter holts within the boundary of the Proposed Scheme. However, given that the suitable habitat is present, it is reasonable to assume that active otter holts are present along stretches of the Grand Canal in particular and other suitable watercourses within the vicinity of the Proposed Scheme such as the River Dodder (which is not intersected by the Proposed Scheme but for which a hydrological connection exist via the current road drainage network), as well as sections the River Camac for which evidence of otter activity was noted. Increased human presence and / or noise and vibration associated with construction works within the footprint of the Proposed Scheme is unlikely to affect these holts. However, construction works associated with the Proposed Scheme have the potential to (at least temporarily) displace commuting or foraging otter (see Section 12.4.3.4.3.4).

Construction activities in the vicinity of watercourses near the Proposed Scheme will include footway renewal and carriageway resurfacing nearby the Camac River and Grand Canal, and headwall construction (Camac River). Noise and vibration associated with these works will have the potential to create disturbance and displacement within the vicinity of the works. Noise levels produced by these construction works will be 81dB at 10m from the Proposed Scheme boundary, see Chapter 9 (Noise & Vibration). As such, disturbance for mammals is estimated to reach 150m from the Proposed Scheme (See Section 12.3.1 for description of Zol). Active otter holts are outside of this Zol. Disturbance effects from the Proposed Scheme are not deemed to cause displacement affects leading to abandonment of holts.

Otter are known to tolerate human disturbance under certain circumstances (Bailey and Rochford 2006, The Environment Agency 2010; Irish Wildlife Trust 2012). There are numerous records of otter within the urban Dublin area, which suggests a relatively high level of habituation to human disturbance and noise by otter (Macklin *et al.* 2019). As construction works will typically be undertaken during normal daylight working hours and otter are generally nocturnal in habit, and otter can (in many circumstances) tolerate high levels of human presence and disturbance, displacement of otter from their habitat is extremely unlikely to affect the local otter population. Therefore, disturbance during construction is not likely to have a significant effect on the species' conservation status and will not result in a significant negative effect, at any geographic scale.

Disturbance and displacement effects on otter may also be the result of increased artificial lighting during construction. Nocturnal mammals, such as otter, are likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich and Longcore 2005). Although the majority of the Proposed Scheme corridor is already lit artificially, the proposal may result in the introduction of artificial lighting to previously unlit areas, if Construction Compounds require security lighting for the duration of the Construction Phase. Given that the locations of proposed Construction Compounds are remote from any watercourses, lighting during the Construction Phase is not considered likely to result in any significant effect to otters in the vicinity.

12.4.3.4.4 Marine Mammals

12.4.3.4.4.1 Habitat and Food Resource Degradation – Water Quality

As discussed in Section 12.4.3.2.2, the Construction Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on marine mammals either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

However, it is considered unlikely that a pollution event of such a magnitude would occur during construction or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during the Construction Phase.

Habitat degradation due to effects on surface water quality during Construction Phase has the potential to affect the species' conservation status and result in a likely significant negative effect, at a local geographic scale only. This is in consideration of the temporary nature and scale of the proposed effect, the availability of suitable habitat in Dublin Bay.

Mitigation measures have been designed to protect water quality during construction (see Section 12.5).

12.4.3.4.5 Other Mammals

No other protected mammal species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme. However, based on the results of desk study several mammal species, protected under the Wildlife Acts, are known to occur in the wider environment, including pine marten, red squirrel and hedgehog.

12.4.3.4.5.1 Habitat Loss

The construction of the Proposed Scheme will result in the temporary loss of suitable habitat for small mammals located within the boundary of the Proposed Scheme. Given the relatively low numbers of individuals of each species that are likely to be affected (i.e., pine marten, red squirrel, hedgehog, and pygmy shrew) and the abundance of alternative suitable habitat available locally, the effects of habitat loss associated with construction works are unlikely to affect the long-term viability of their local populations. Therefore, habitat loss is unlikely to affect the species' conservation status or result in a significant negative effect, at any geographic scale.

12.4.3.4.5.2 Mortality Risk

Site clearance works have the potential to result in the mortality of small mammal species. The potential for this impact to occur would be expected to be greater during the breeding season (February to October inclusive depending on species) when juveniles would be present in nests, or in the case of hedgehog impacts may be greater during their hibernation period. Furthermore, the potential for direct mortality to small mammals would be greater in more vegetated areas, as opposed to disturbed ground / urban habitats, as these areas would offer more in terms of breeding / resting habitat for small mammal species. Given the relatively low numbers of individuals of each species that are likely to be affected, and that these species are highly mobile, site clearance is unlikely to result in a level of mortality that would affect the species' conservation status, and result in a significant negative effect, even at a local geographic scale.

12.4.3.4.5.3 Disturbance / Displacement

In conjunction with any displacement effects associated with habitat loss, increased human presence and / or noise and vibration associated with construction works, has the potential to displace mammals from both breeding / resting places and from foraging habitat. Mammals residing within the wider study area are likely to be habituated to disturbance within the urban environment.

As the construction works in areas of suitable foraging habitat will typically be undertaken during normal daylight working hours and the relevant mammal species are nocturnal in habit, displacement of mammal species from foraging areas (outside of areas where foraging habitat will be lost as a result of the Proposed Scheme) is extremely unlikely to affect the local mammal population and will not result in a significant negative effect, at any geographic scale.

12.4.3.5 Birds

12.4.3.5.1 Breeding Birds

The assessment carried out in the NIS for the Proposed Scheme (which is a standalone document provided within the planning application to enable the Board, as competent authority to carry out an AA for the purposes of Article 6(3) of the Habitats Directive) considered the potential for the Proposed Scheme to affect the bird species listed as SCIs of European sites. That assessment concluded that the Proposed Scheme would not affect their breeding colonies or have any long-term effects on the local breeding populations. Therefore, for these species, the Proposed Scheme will not affect the conservation status of the breeding populations and will not have any adverse effects on the integrity of European sites.

12.4.3.5.1.1 Habitat Loss and Loss of Breeding / Resting Sites

The Proposed Scheme will result in the permanent loss of breeding bird nesting and foraging habitat within the footprint of the Proposed Scheme. The areas of habitat loss within the Proposed Scheme boundary are provided in Section 12.4.3.2 and tabulated in Table 12-13 for all KER habitat types. These areas comprise a total area of approximately 0.72ha of hedgerows and treelines (also KERs), 0.6ha of mixed broadleaved woodland habitats (KER), 0.008ha of mixed broadleaved / conifer woodland (WD2), 0.003ha of reed and large sedge swamp habitat (KER) and approximately 0.2ha of scattered trees and parkland habitats. In addition, there are areas of scrub, ornamental / non-native shrub and amenity grassland within the footprint of the Proposed Scheme, which are not KERs in their own right due to their limited botanical value. However, these habitats may provide nesting and / or foraging habitat for birds. These areas will be removed during construction of the Proposed Scheme resulting in an additional loss of breeding bird nesting and / or foraging habitat. In summary, the habitats that may be lost comprise:

- Loss of scrub and hardstanding habitats at Calmount Road / R819 Greenhills Road to facilitate construction of retaining wall RW01;
- Temporary loss of scrub and hardstanding at Calmount Road / R189 Greenhills Road to facilitate construction of retaining wall RW02;
- Car park and amenity grassland at Belgard Square West between Belgard Square South and Old Blessington Road to facilitate the construction of Tallaght Bus Interchange;
- Amenity grassland between R819 Greenhills Road and Tymonville Crescent to facilitate the provision of SUDs features;
- Amenity grassland areas and treelines between Birchview Avenue / Treepark Road and Parkview west of R819 Greenhills Road to facilitate new bus only route works and provision of cycling and pedestrian infrastructure;
- Scrub, spoil and bare ground, dry meadows and grassy verges, hedgerows and amenity grassland habitat between R819 Greenhills Road and Ballymount Avenue to accommodate the extension of Ballymount Avenue and the new junction between the two roads;
- A range of discrete managed habitats to accommodate section of cycle lane only in both directions along Greenhills Road between Ballymount Avenue and Calmount Avenue and between Calmount Avenue and Calmount Road
- Street planting (treelines) along Calmount Road to facilitate the provision of cycling infrastructure;
- Scrub habitat west of R819 Greenhills Road to facilitate new Calmount Avenue link road and roundabout connection to R819 Greenhills Road;
- Scrub habitat east of Calmount Road to facilitate extension of Calmount Road and new junction between Calmount Road and R819 Greenhills Road;
- Scrub habitat located between L4004 Calmount Road and R819 Greenhills Road;
- Hedgerow and scrub habitat located along R819 Greenhills Road;
- Hedgerow and dry meadows and grassy verges habitat at Tymon Lane to accommodate a proposed Construction Compound;
- Dry meadows and grassy verges at Tymon Park and adjacent to Assumption Junior National School, to accommodate proposed Construction Compounds;
- Areas of immature woodland and mixed broadleaved woodland located along R819 Greenhills Road, either side of the M50 motorway;
- Treeline habitat located along R819 Greenhills Road between Birchview Avenue and Tymonville Crescent;
- Scattered trees and parkland and scrub habitat types located at the junction of R819 Greenhills Road and Broomhill Road;
- Mixed broadleaved woodland located outside TUD Tallaght;
- Hedgerow habitat located along Blessington Road;
- Hedgerow habitat located at Belgard Square North;
- Dry meadows and grassy verges habitat at Bancroft Park which will be lost at least temporarily to accommodate a proposed Construction Compound;
- Scrub and dry meadows and grassy verges habitat types located along the R134; and

- Treeline, hedgerow, scattered trees and parkland and mixed broadleaved woodland habitat types located along the R134 New Nangor Road.

The primary consequence of habitat loss will be increased competition for resources (e.g., nesting habitat and / or prey / food source) both between and amongst breeding bird species. The magnitude of this effect will be largely defined by whether the local habitat resource has currently reached its carrying capacity or not in terms of breeding bird species. For species with larger home ranges during the breeding season, habitat loss at the scale of the Proposed Scheme is not likely to have any perceptible effects on breeding success or population dynamics. As the Proposed Scheme will be constructed within an already busy transport corridor, habitats suitable to support breeding birds are limited. Treelines and hedgerows are highly disturbed, and largely within the road median, and therefore do not offer significant shelter for breeding bird species.

The habitat areas that will be lost as a result of the Proposed Scheme form a relatively small part of larger expanses of similar habitat types and mosaics in the wider locality. Parks and greenspaces form a vital resource for breeding birds within an urban setting. These areas of suitable breeding bird nesting and / or foraging habitat available in the wider locality of the Proposed Scheme (i.e., from approximately 0.3 to 2km from these existing sites located within the footprint of the Proposed Scheme) include:

- Parks and greenspaces with hedgerow, treeline and / or scrub boundaries such as Corkagh Park, Walkinstown United Football Club pitches, Lansdowne Valley Pitch and Putt, Pearse Park Crumlin, Templeogue Synge Street GAA Club, St. Patrick's Park, Eamonn Ceannt Park, Bunting Park, Beechfield Park, Tymon Park, Bancroft Park, the Priory Institute and playing pitches associated with TUD Tallaght;
- Woodland such as that present in Dodder Valley pNHA and beyond;
- Wildfowl and waterbird habitat within the Upper Liffey Estuary, Lower Liffey Estuary and wider Dublin Bay area; and
- Sections of the Grand Canal, River Camac and River Poddle, both upstream and downstream of the Proposed Scheme.

None of the habitat areas to be lost are unique to the locality and, either individually or collectively, are not likely to support a significant proportion, or the only population, of any given breeding bird species locally. Although a temporary decline in overall breeding bird abundance could potentially occur at a very local level (i.e., the footprint of the Proposed Scheme), this is unlikely to affect the local range of the breeding bird species present nor is it likely to affect the ability of these breeding bird populations to maintain their local populations in the long-term.

Mitigation measures will be implemented to reduce the effects of habitat loss on breeding bird species locally (see Section 12.5).

12.4.3.5.1.2 Mortality Risk

If site clearance works were to be undertaken during the bird breeding season (i.e., March to August, inclusive) it is likely that nest sites holding eggs or chicks will be destroyed and birds killed.

Mortality of birds at the scale of the Proposed Scheme, over what is likely to be a single breeding bird season in terms of completing site clearance works, will likely have a short-term effect on local breeding bird population abundance.

However, in the longer-term, this would be unlikely to affect the ranges of the breeding bird species recorded in the study area nor would it be likely to affect the long-term viability of the local populations. Mortality of birds during site clearance works is not predicted to significantly affect the conservation status of any of the breeding bird species present within the study area at any geographic scale.

In any event, mitigation measures will be implemented to reduce the potential mortality risk presented by any clearance works (see Section 12.5).

12.4.3.5.1.3 Disturbance / Displacement

The noise, vibration, increased human presence and the visual deterrent of construction traffic, associated with site clearance and construction will temporarily disturb breeding bird species and is likely to displace breeding birds from habitat areas adjacent to the footprint of the Proposed Scheme. Construction activities will largely involve carriageway and pavement resurfacing / reconstruction, as required, readjustment of kerbs and new road construction. However, as an important transport corridor in a heavily urbanized landscape, there is an existing relatively high level of human disturbance within the immediate environment of the Proposed Scheme (e.g., R819 Greenhills Road, R134 New Nangor Road and City Centre area) and as such, it is likely that breeding species present are habituated to a certain degree of disturbance. The magnitude of the impact will be dependent on the type of construction works and their duration. General construction activities will have a less pronounced affect than blasting, in terms of its Zol, but will be on-going from periods of up to 36 months and multiple breeding seasons across the entirety of the Construction Phase. However, phasing of the construction works in scheme sections will reduce the temporary nature of this impact to approximately one to 12 month disturbances in each section of the Proposed Scheme. With regards to the proposed Construction Compounds, disturbance impacts will be short-term in nature as they will be ongoing for the duration of the Construction Phase (e.g., 36 months) and the activities inside the Construction Compounds will be screened off from surrounding retained territory.

Table 12.14 provides a summary of the indicative construction noise calculations at varying distances, which have been modelled in the Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR. The magnitude of the impact will be dependent on the type of construction works and their duration. General construction activities will have a less pronounced affect than drilling or piling, for example. Areas within the Proposed Scheme which will be subject to construction activities which generate noise levels greater than 50dB (e.g., piling, drilling, and road planning etc.) include the majority of the Proposed Scheme in respect of general road works construction, and in particular the Tallaght to Ballymount section of the Proposed Scheme, sections of the R819 Greenhills Road, and the Crumlin to Grand Canal section of the Proposed Scheme. These activities will result in a greater magnitude of effect on the baseline environment. As a result, noise and vibration from these activities will have the potential to result in the reduced breeding success of breeding bird species in the vicinity of the works. Breeding pairs will be temporarily displaced during the construction works. The area over which disturbance / displacement effects will occur forms a relatively small part of larger expanses of similar habitat types in the wider locality. As such, given the availability of suitable habitat in the wider locality of the Proposed Scheme, the construction works are therefore not likely to affect the conservation status of breeding birds and will not result in a likely significant negative effect, above the local geographic scale.

Table 12.14: Indicative Construction Noise Calculations at Varying Distances

Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m Distance (dB L _{Aeq,12hr} or L _{Aeq,4hr})	% Plant On-Time	Predicted CNL at Stated Distance from Edge of Works Based on % Plant On-Time (dB L _{Aeq,12hr} or L _{Aeq,4hr})						
			10m	15m	20m	30m	50m	100m	150m
Lorry (Table C2.34)	80	40	76	72	70	66	62	56	52
Backhoe Mounted Hydraulic Breaker (Table C5.1)	88	20	81	77	75	71	67	61	57
Tracked Excavator 8t (Table C4.17)	71	100	71	67	65	61	57	51	47
Wheeled Excavator 14t (Table C4.56)	83	40	79	75	73	69	65	59	55
Wheeled Excavator 17t (Table C5.11)	73	40	69	65	63	59	55	49	45
Dumper (Table D3.98)	77	50	74	70	68	64	60	54	50
Road Planer (Table C5.7)	82	10	72	68	66	62	58	52	48
Road Sweeper (Table C4.90)	76	15	67	63	61	57	53	47	43
Asphalt Paver (Table C5.33)	75	15	66	62	60	56	52	46	42
Asphalt Roller (Table C5.20)	75	20	68	64	62	58	54	48	44
Roller 3t (Table C5.27)	67	50	64	60	58	54	50	44	40
Vacuum Excavator (FHWA Table 9.1)	85	10	75	71	69	65	61	55	51
Piling Rig (Table C3.22)	80	50	77	73	71	67	63	57	53

Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m Distance (dB L _{Aeq,12hr} or L _{Aeq,4hr})	% Plant On-Time	Predicted CNL at Stated Distance from Edge of Works Based on % Plant On-Time (dB L _{Aeq,12hr} or L _{Aeq,4hr})						
			10m	15m	20m	30m	50m	100m	150m
Mobile Telescopic 55t Crane (Table C4.45)	82	10	72	68	66	62	58	52	48

Although it is not possible to quantify the magnitude of this potential impact (or the potential effect zone) with precision, it could potentially extend for several hundred metres from the Proposed Scheme. The results of noise modelling carried out for the Proposed Scheme confirmed that at 150m, noise levels for all construction activities will be below 60dB (see Chapter 9 (Noise & Vibration)). Given the temporary to short-term nature of the construction works, coupled with the existing levels of disturbance within these urban areas, disturbance or displacement effects associated with the Construction Phase of the Proposed Scheme will also be over the short-term. Therefore, these impacts will not affect the conservation status of breeding bird species and will not result in a negative effect, above the local geographic scale.

12.4.3.5.1.4 Habitat Degradation – Surface Water Quality

As discussed in Section 12.4.3.2.2, the Construction Phase of the Proposed Scheme could potentially result in contamination of receiving water bodies, with a consequent effect on breeding birds either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

However, it is considered unlikely that a pollution event of such a magnitude would occur during the Construction Phase or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a significant negative effect, at a local geographic scale.

12.4.3.5.2 Wintering Birds

This Section of the impact assessment deals with wintering bird species, i.e., those bird species which are SCIs of SPAs for their wintering populations or are listed on either the BoCCI Red or Amber lists for their wintering populations. The assessment carried out in the NIS for the Proposed Scheme considered the potential for the Proposed Scheme to affect the bird species listed as SCIs of European sites for their wintering populations. As set out in the NIS, that assessment concluded that Proposed Scheme would not affect their wintering bird colonies or have any long-term effects on the local wintering populations. Therefore, for these species, the Proposed Scheme will not affect the conservation status of the wintering bird populations and will not result in an adverse effect on the integrity of any European sites.

12.4.3.5.2.1 Habitat Loss and / or Disturbance / Displacement

Stretches of amenity grassland along R819 Greenhills Road will be lost as a result of the construction of the Proposed Scheme. Construction Compound TC3 is proposed for an area of grassland along R819 Greenhills Road, between Birchview Avenue and R819 Greenhills Road. In addition, amenity grassland between R819 Greenhills Road and Birchview Avenue will be lost to facilitate the installation of a proposed cycle track. A further area of grassland will be lost to accommodate proposed SuDS features between R819 Greenhills Road and Tymonville Crescent. Construction Compound TC6 is proposed for an area within Tymon Park (CBC0809WB003), east of the M50. In addition, permanent land take at the edge of this Tymon Park overlapping with wintering bird survey site CBC0809WB003 will also be required to accommodate proposed pedestrian and cyclist infrastructure. The provision of Construction Compounds TC3, TC4 and TC8 to facilitate nearby construction works will result in the temporary loss of suitable wintering bird habitat for the duration of construction of the Proposed Scheme. Wintering bird surveys (extensive transect in open territory at Birchview Avenue (referred to as CBC0809WB003)) correspond to the proposed Construction Compounds TC3 and TC4. Wintering bird surveys at Bunting Park (referred to as CBC0809WB005) correspond to the proposed Construction Compound TC8. A single light-bellied Brent goose dropping was observed during the field surveys at this location which will be subject to habitat loss

for the duration of the Construction Phase. However, as only a single dropping was observed, this is unlikely to be a core foraging ground for light-bellied Brent geese due to this singular occurrence and due to the presence of mature trees inhibiting take-off and landing and the location of Construction Compound alongside trees. Although not ruled out in its capacity to support light-bellied Brent geese populations, it is considered more likely that this dropping was as a result of the species flying over the site while commuting to and from more favourable sites. Therefore, this is also discussed under disturbance and displacement impacts below.

The short-term loss of suitable habitat at the proposed Construction Compounds TC3, TC4 and TC8 is not deemed to have a significant impact on the wintering bird population at any geographical scale due to the following reasons:

- Relatively low frequency of occurrence of these bird species recorded during surveys;
- Relatively low peak flocks recorded on lands located within the footprint of the Proposed Scheme, especially when compared to 1% of both their international flyway and national populations (see Table 12.10), signifying that these sites are not significantly important to the overall population of each respective bird species, and are likely to use other suitable sites available in the wider area on a similar or more regular basis; and
- The availability of large areas of suitable foraging and / or roosting habitat for these SCI bird species in the wider locality of the Proposed Scheme, including those in closer proximity to nearby SPAs. These include other similar public amenity grassland parks and sports pitches, such as those discussed below. It is very likely that bird species currently utilise these and other suitable lands in the wider area to a similar and / or greater intensity during the 36 months in which the proposed Construction Compounds listed above will be in use.

The Proposed Scheme will also require the removal of a number of trees and loss / reduction of open ground. Much of this territory is not considered suitable for wintering birds, who have preference for inland feeding sites in typically larger open green fields, as suggested in field surveys around Dublin (Scott Cawley Ltd. 2017).

Current understanding of construction related noise disturbance to wintering waterbirds is based on the research presented in Cutts *et al.* (2009) and Wright *et al.* (2010). In terms of construction noise, levels below 50dB would not be expected to result in any response from foraging or roosting birds. Noise levels between 50dB and 70dB would provoke a moderate effect / level of response from birds, i.e., birds becoming alert and some behavioural changes (e.g., reduced feeding activity), but birds would be expected to habituate to noise levels within this range. Noise levels above 70dB would likely result in birds moving out of the affected zone or leaving the site altogether. At approximately 300m, typical noise levels associated with construction activity (BS 5228) are generally below 60dB or, in most cases, are approaching the 50dB threshold (see Chapter 9 (Noise & Vibration)). As such, disturbance effects for general construction activities across the majority of the Proposed Scheme would not be expected to extend beyond a distance of approximately 300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance and beyond.

None of the construction activities would be expected to result in any more than a moderate level of disturbance effect on wintering birds at distances beyond 150m. At 150m, noise levels are below 60dB or, in most cases, are approaching the 50dB threshold. Imperceptible, or no effects would be expected for those noise levels. Any landscape features, vegetation cover or buildings between the Proposed Scheme boundary and identified winter bird sites would contribute to further reducing the ambient noise at any given distance. Therefore, 300m is considered to be a precautionary buffer in defining the Zol of disturbance effects.

As the majority of works will be carried out during normal working daylight hours, the potential for construction to disturb wintering birds at night, will not arise. Impacts associated with increased levels of disturbance will likely result in the temporary displacement of these wintering bird species to other suitable available lands in the locality. These impacts will be associated with general construction activities (e.g., visual impact of construction workers and machinery and the associated vibration and more constant / continuous noise levels).

Following the completion of construction (i.e., during the Operational Phase), disturbance levels will likely return to baseline conditions and as a result, these lands will become available again as foraging and / or roosting habitat for these wintering bird species. The majority of wintering birds identified in the desk study are typically found in coastal, estuarine and intertidal habitats including the Liffey Estuary and Dublin Bay, and therefore, will not be

impacted directly during the Construction Phase. Certain species, such as light-bellied Brent geese, often forage on inland sites in the Greater Dublin Area. Suitable sites are usually composed of open parkland / playing pitches. A number of confirmed inland wintering bird feeding sites are known to occur within approximately 300m of the Proposed Scheme, the distance within which birds would be expected to be displaced. Most notably, this includes Tymon Park, where a flock of 45 light-bellied Brent geese were observed foraging during the field surveys on one occasion.

The following known inland wintering bird feeding sites are known to occur within approximately 300m of the Proposed Scheme, and birds here could be displaced during construction works:

- Crumlin / Brickfields Park (high importance);
- R110 / Crumlin Road / Synge St. GAA Pitches (major importance);
- Crumlin / Clonmacnoise Roundabout (major importance);
- Pearse Memorial Park Crumlin (high importance);
- Beechfield Road Sports Grounds Walkinstown (high importance); and
- Tymon Park (major importance).

Wintering birds which might be disturbed during the Construction Phase will likely be displaced to suitable sites in the surrounding environment, such as those listed above, and therefore, impacts are not considered to be significant beyond the local level. Therefore, in consideration of these factors, the loss of suitable foraging and / or roosting habitat within the Proposed Scheme boundary that is utilised by wintering birds, and an increase in short-term disturbance or displacement effects, will not affect the conservation status of any wintering bird species and will not result in a significant negative effect, above the local geographic scale due to the following reasons:

- Relatively low frequency of occurrence of wintering bird species on these lands and suggests these species do not regularly use or rely upon these lands as foraging and/or roosting habitat. The peak flocks of each respective wintering bird species recorded at these sites are also relatively low in particular, when compared to 1% of their international flyway and national populations (see Table 12.10);
- There are also large areas of suitable foraging and / or roosting habitat available for these wintering bird species both adjacent to, and in the wider locality of the Proposed Scheme (i.e., beyond the 300m study area, from approximately 300m from existing sites located within the footprint of the Proposed Scheme) including those in closer proximity to nearby SPAs. These include other similar public amenity grassland parks and sports pitches such as Templeogue College, Ballyfermot / Le Fanu Park, Blackrock College, Palmerstown / Glenaulin Park, Shelbourne Park Dog Track, DCC Brent Field Ringsend and Fairview Park; and
- The short-term nature of any disturbance related impacts associated with the construction of the Proposed Scheme, which is expected to last for 36 months. Following the completion of construction, disturbance levels will over time return to baseline conditions and as a result suitable lands will become available again as foraging and / or roosting habitat for these SCI species.

12.4.3.5.2.2 Habitat Degradation – Surface Water Quality

As discussed in Section 12.4.3.2.2, the Construction Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in potentially significant negative impacts on wintering birds either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

However, it is considered unlikely that a pollution event of such a magnitude would occur during construction or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction.

Habitat degradation as a result of effects on surface water quality during construction has the potential to result in a significant negative effect, at a local geographic scale. Mitigation measures have been designed to protect water quality during construction (see Chapter 13 (Water), and the CEMP (Appendix A5.1 in Volume 4 of this EIAR).

12.4.3.6 Reptiles

There were no reptile species recorded during the multidisciplinary surveys and no suitable habitat confirmed within the footprint of the Proposed Scheme. The desk study did not return records for reptile species protected under the Wildlife Acts within the footprint of the Proposed Scheme or wider surrounding area. However, it cannot be ruled out that these species are not in the wider area due to the presence of suitable habitat.

12.4.3.6.1 Disturbance and Mortality Risk

Site clearance works have the potential to result in disturbance to, and the direct mortality of, common lizard. Given relatively low area of potentially suitable habitat for common lizard in the wider study area, the number of individuals that would potentially be at risk is low and would be unlikely to affect the local populations in the long-term. Therefore, disturbance or mortality risk are not likely to affect the species' conservation status or result in a significant negative effect, at any geographic scale.

12.4.3.6.2 Habitat Severance / Barrier Effect

There is no potential for habitat severance / barrier effect as a result of the Proposed Scheme as there is relatively few areas of potentially suitable habitat for reptile species within the footprint of the Proposed Scheme.

12.4.3.7 Amphibians

No amphibian species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme, despite the presence of suitable habitat within the footprint of the Proposed Scheme (e.g., vegetated riverbanks particularly the Grand Canal). The desk study returned records for common frog and smooth newt within 1km of the Proposed Scheme, and therefore, it cannot be ruled out that these species occur in the vicinity of the Proposed Scheme.

12.4.3.7.1 Disturbance / Mortality Risk

Site clearance works have the potential to result in disturbance to and the direct mortality of amphibians. Given the relatively low area of potentially suitable habitat for amphibians in the wider study area, the number of individuals that would potentially be at risk is low and would be unlikely to affect the local populations in the long-term. Therefore, disturbance or mortality risk are not likely to affect the species' conservation status or result in a significant negative effect, at any geographic scale.

12.4.3.7.2 Habitat Severance / Barrier Effect

The temporary to short-term physical disruption of the existing landscape during site clearance and construction will fragment habitat used by amphibians. As a temporary to short-term impact, this is unlikely to present a significant barrier to the movement of the species such that it would affect the local amphibian population in the long-term. Therefore, habitat severance during construction and any associated barrier effect are not likely to affect the species' conservation status and are not predicted to result in a significant negative effect to amphibians, at any geographic scale.

12.4.3.7.3 Habitat Degradation – Surface Water Quality

As discussed in Section 12.4.3.2.2, the Construction Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on amphibians either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

However, it is considered unlikely that a pollution event of such a magnitude would occur during construction or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a likely significant negative effect, at a local geographic scale.

12.4.3.8 Fish

12.4.3.8.1 Habitat Loss / Severance and Barrier Effect / disturbance and displacement / Mortality

By virtue of the design of the Proposed Scheme and / or the nature of watercourses intersected by it, the Proposed Scheme will result in negligible direct permanent loss of aquatic habitat (0.000154ha). The loss of habitat corresponds to an area of the River Camac that has been historically straightened and heavily modified. The proposed instream work area is characterised by man-made bank, approximately 4m in length, with shallow accumulations of silt over riverbed on instream vegetation, and the concrete modified substrate. The riparian vegetation is dominated by linear belts of reed canary grass and nettle.

Downstream sections of the River Camac are highly modified or culverted and as such act as barriers to migrations. The results of the aquatic surveys and IFI data note that the site provided high quality fish habitat - in particular brown trout).

The proposed instream works associated with the installation of the culvert extension and new headwall will result in a temporary barrier effect in respect of aquatic biodiversity (estimated at approximately 6.5 weeks). The severance and barrier effect, as a result of the proposed construction works, has the potential to result in a likely significant effect at the County level on salmonid species (brown trout), given the moderate quality spawning and nursery value and the excellent holding habitat (e.g., adult fish) (R. Macklin, Triturus Environmental Ltd pers. comm.)

There is potential for mortality of fish during instream works, which given the importance of brown trout could result in potential to result in a likely significant effect at the County level.

Mitigation Measures have been designed to protect against habitat severance, disturbance /displacement and Mortality during construction (See Section 12.5.1.8).

12.4.3.8.2 Habitat Degradation – Surface Water Quality

As discussed in Section 12.4.3.2.2, under Habitat Degradation – Surface Water Quality, the Construction Phase of the Proposed Scheme could potentially result in contamination of receiving water bodies, in particular but not wholly associated with the proposed extension of the culvert on the Rive Camac, with a consequent effect on fish species either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats). The effects of frequent and / or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects. It is considered unlikely that a pollution event of such a magnitude would occur during construction or if such an event did occur, it would be temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the conservation status of affected fish species in particular the known brown trout population and result in a significant negative effect, at a local to County geographic scale, as described below.

River lamprey are known to occur in the River Camac, as outlined in the desk study. Suitable lamprey habitat also occurs in upstream sections of the River Camac. Habitat degradation, as a result of effects on surface water quality during construction, has the potential to result in a significant effect at the County geographic scale on lamprey species, given the habitat value present and their protection under the Habitats Directive.

Desk study records, as presented in Section 12.3.12, revealed that the River Camac is known to support populations of brown trout. The River Camac is important in that it is an urban system, much of which is culverted, for which the overground sections continue to support a self-sustaining population of brown trout. This, coupled with the fact that salmonid species are protected under both national and international legislation, means that habitat degradation, as a result of effects on surface water quality on the River Camac or River Liffey during construction, has the potential to result in a significant effect at the County geographic scale on salmonid species.

With regards all other fish species, the effects of habitat degradation as a result of effects on surface water quality during construction has the potential to result in a significant effect at the local geographic scale given the fact that the other fish species in question are common in Irish waters and not of conservation concern.

For the River Camac, potential impacts from the Construction Compounds at R134 New Nangor Road / Killeen Road, Harris Industrial Complex, R134 New Nangor Road, and R810 Naas Road / R110 Long Mile Road may pose a risk to water quality deterioration due to sediment and contaminant delivery. While the River Camac is culverted at this point, there are potential pathways through road gullies and surface water drainage systems.

For the River Poddle, the Construction Compound on R819 Greenhills Road could result in Moderate magnitude impacts on water quality as a result of silty water runoff from stripped soil leading to increased sediment loading to the water body. The operation of the Construction Compound has the potential to result in anthropogenic contaminants being discharged to the water body.

For the River Dodder, the Construction Compounds at Belgard Square West and construction work at the Tallaght Bus Interchange, could result in impacts on water quality as a result of silty water runoff from stripped soil leading to increased sediment delivery.

For the Grand Canal Mainline, the Construction Compounds on R819 Greenhills Road, Calmount Road, R110 Crumlin Road and Bunting Road are those which are nearest and pose the highest risk of sediment and contaminant delivery to the water body. Also, road widening on the R134 New Nangor Road has the potential to result in increased surface water runoff with increased sediment loading possible, which could impact water quality.

It is considered unlikely that a pollution event of such a magnitude would occur during construction or if such an event did occur, it would be temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction.

Mitigation Measures have been designed to protect water quality during construction (See Section 12.5.1.2.2).

12.4.3.9 Aquatic Invertebrates and Freshwater Molluscs

12.4.3.9.1 Habitat Loss / Mortality Risk

As revealed in the desk study, healthy, white-clawed crayfish populations are known in the River Camac and selected tributaries upstream of the Proposed Scheme (Triturus Environmental Ltd. 2022; Sweeney Consultancy 2018). The proposed headwall at the R134 Nangor Road will require instream works on the River Camac. Given that white-clawed crayfish were recorded from the River Camac, there is potential for significant effects on this species in terms of mortality as a result of the construction of the Proposed Scheme.

The desk study also revealed records for two Red listed freshwater molluscs from the Grand Canal. Although hydrologically linked to the Proposed Scheme and with some works proposed for adjacent to the Grand Canal, there is no potential for significant effects on this species in terms of mortality as a result of the construction of the Proposed Scheme, as there are no instream works proposed for the Grand Canal.

By virtue of the design of the Proposed Scheme and / or the nature of watercourses intersected by it, the Proposed Scheme will not result in the any significant direct permanent loss of aquatic habitat along the majority of the Proposed Scheme. However, the construction of the proposed culvert and installation of the headwall at the River Camac will result in some negligible habitat loss. The construction will result in a temporary short term barrier effect in respect of aquatic invertebrates. Thus, it has the potential to affect the white-clawed crayfish conservation status and result in a significant negative effect, at a local geographic scale.

12.4.3.9.2 Habitat Degradation – Surface Water Quality

As discussed in Section 12.4.3.2.2, the Construction Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on white-clawed crayfish and freshwater

molluscs either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

However, it is considered unlikely that a pollution event of such a magnitude would occur during the Construction Phase or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Scheme having any perceptible effect on water quality during construction.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a significant negative effect, at a local geographic scale.

Mitigation Measures have been designed to protect water quality during construction (See Section 12.5.1.2.2).

12.4.3.10 Summary of Predicted Construction Phase Impacts (Pre-Mitigation)

Table 12.15: Summary of Potential Construction Phase Impacts (Pre-Mitigation)

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Designated Areas for Nature Conservation			
North Dublin Bay SAC; North Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA North Dublin Bay pNHA Boosterstown March pNHA	International Importance National Importance National Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Wicklow Mountains SAC Wicklow Mountains PNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Rockabill SPA Rockabill pNHA	International Importance National Importance	Habitat Degradation (hydrology)	Likely significant effect at the international geographic scale
Grand Canal pNHA	National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the national geographic scale
Dodder Valley pNHA	National Importance	Habitat degradation (hydrology, non-native invasive plant species)	Likely significant effect at the national geographic scale
Habitats (outside of designated areas for nature conservation)			
Canals (FW3)	See Grand Canal pNHA	See Grand Canal pNHA	See Grand Canal pNHA
Reed and large sedge swamps (FS1)	Local Importance (Higher Value)	Habitat loss; habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Depositing/ lowland rivers (FW2)	Local Importance (Higher Value)	Habitat loss; habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Drainage ditches (FW4)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Dry meadows and grassy verges (GS2)	Local Importance (Higher Value)	Habitat loss; habitat degradation (non-native invasive plant species)	Likely significant effect at the local geographic scale
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale
Mixed broadleaf/conifer woodland (WD2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale
Hedgerows (WL1)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale
Treelines (WL2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale
Immature woodland (WS2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale
Rare / Protected Plant Species			
Flora Species listed on the Flora Protection Order (opposite-leaved pondweed)	National Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale
Flora Species on Irelands Red Lists (Vulnerable or of higher concern)	National Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Non-native Invasive Plant Species	N/A	Spread at expense of other habitats; habitat degradation (hydrology)	Likely significant effect at the local to international geographic scale
Fauna Species			
Bats	Local Importance (Higher Value)	Habitat loss / fragmentation; disturbance / displacement	Likely significant effect at the local geographic scale
Badger	Local Importance (Higher Value)	Disturbance / displacement	Likely significant effect at the local geographic scale
Otter	County Importance	Habitat loss / fragmentation; Barrier Effect habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Marine mammals	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Other mammal species protected under the Wildlife Acts	Local Importance (Higher Value)	Habitat Loss; Mortality risk; Disturbance / displacement	Not Likely to be significant at any geographic scale
SCI bird species	International Importance	See SPAs above	See SPAs above
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Habitat loss; mortality risk; disturbance / displacement; habitat degradation (hydrology)	Likely significant effect at the local geographic scale
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat loss; mortality risk; disturbance / displacement; Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Amphibians	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Fish Species – Brown Trout	County Importance	Habitat loss / fragmentation; disturbance / displacement Habitat degradation (hydrology)	Likely significant effect at the County scale
Non-Annex fish species	Local Importance (Higher Value) – County Importance (Brown Trout)	Habitat loss / fragmentation; disturbance / displacement Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Invertebrates – white-clawed crayfish and freshwater molluscs	County Importance	Habitat loss / fragmentation; disturbance / displacement Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Local Biodiversity Areas			
South Dublin County Green Infrastructure	County	See River Poddle under habitats	Likely significant effect at the local geographic scale
Dublin City's Green Infrastructure Network	County	River Camac and Grand Canal captured under habitats, Wintering birds sites captured under Birds and habitats	Likely significant effect at the local geographic scale

12.4.4 Operational Phase

12.4.4.1 Designated Areas for Nature Conservation

12.4.4.1.1 European Sites

12.4.4.1.1.1 Habitat Loss and Fragmentation

The potential for impacts on SCI bird populations for which SPAs are designated has been provided in the NIS (which is included as a standalone document in this planning application).

Refer to Section 12.4.3.5.2 with regards to potential operational impacts on wintering bird species, which encompass all relevant SCI bird species.

12.4.4.1.1.2 Habitat Degradation / Effects on QI / SCI Species as a result of Hydrological Impacts

The Proposed Scheme is hydrologically connected to Dublin Bay via a number of watercourses and existing drainage pipe network which will drain directly to Dublin Bay. The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during operation, has the potential to affect water quality in the receiving aquatic environment. Such a pollution event may include:

- Release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and,
- Accidental spillage and / or leaks of contaminants into receiving waters.

The associated effects of a reduction of surface water quality could potentially extend for a considerable distance downstream of the location of the accidental pollution event or the discharge point and therefore impact the downstream, i.e., Dublin Bay, within which a number of European sites are located: North Dublin Bay SAC, South Dublin Bay SAC, Rockabill to Dalkey Island SAC, North Bull Island SPA, South Dublin Bay, River Tolka Estuary SPA and Dalkey Islands SPA. This reduction in water quality (either alone or in combination with other pressures on water quality) could result in the degradation of sensitive habitats present within these European sites, which in turn would negatively affect the SCI bird species that rely upon these habitats as foraging and / or roosting habitat. It could also negatively affect the quantity and quality of prey available to SCI bird species. These potential impacts could occur to such a degree that the conservation objectives of the North Dublin Bay SAC, South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC, Lambay Island SAC, North Bull Island SPA, South Dublin Bay, River Tolka Estuary SPA, Dalkey Islands SPA, Baldoyle Bay SPA and the Murrough SPA may be undermined.

In a worst case scenario, the release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during the Operational Phase, also has the potential to affect mobile SCI bird species and QI mammal species that commute, forage and loaf in the Lower Liffey Estuary Upper / Lower and areas of Dublin Bay and Baldoyle Bay i.e. birds associated with Skerries Islands SPA, Rockabill SPA and Lambay Island SPA, Ireland's Eye SPA, North Dublin Bay SPA, South Dublin Bay and River Tolka Estuary SPA, Baldoyle SPA, Malahide Estuary SPA, Rogerstown SPA, Dalkey Islands SPA, Murrough SPA and marine mammals associated with Rockabill to Dalkey Island SAC and Lambay Island SAC. This potential reduction in water quality could result in the degradation of sensitive habitats present downstream European sites, which in turn could negatively affect the SCI bird species that rely upon these habitats as foraging and / or roosting habitat. It could also negatively affect the quantity and quality of prey available to SCI and QI populations.

12.4.4.1.1.3 Habitat Degradation as a result of Introducing / Spreading Non-Native Invasive Species

There are six areas of Japanese knotweed, a species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended), present within, or in close proximity to, the Proposed Scheme. In addition, records of non-native invasive species in the vicinity of the Proposed Scheme were returned from the desk study. Therefore, there is potential for non-native invasive species to spread or be introduced, during routine maintenance / management works, to terrestrial habitat areas in European sites downstream in Dublin Bay (i.e., North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA). The introduction and / or spread of these non-native invasive species to downstream European sites could potentially result in the degradation of existing habitats present, in particular coastal habitats not permanently or regularly inundated by seawater. These species may outcompete other native species present, negatively impacting the species composition, diversity and abundance and the physical structural integrity of the habitat. This in turn may result in the degradation of the existing habitats and therefore undermine the conservation objectives of these European sites.

It is considered unlikely that non-native invasive species could spread to European sites which are located a significant distance from the outfall locations of the River Camac, Poddle River the Grand Canal, the River Liffey, the Liffey Estuary Upper and the Liffey Estuary Lower (i.e., Howth Head SAC, Howth Head Coast SPA, Rockabill to Dalkey Island SAC, Dalkey Islands SPA, Ireland's Eye SAC, Ireland's Eye SPA, Lambay Island SAC, Lambay Island SPA and the Murrough SPA) by virtue of the habitat conditions in which the species normally occur and

subject to the full implementation of the non-native Invasive Species Management Plan (ISMP) (refer to Appendix A5.1 (CEMP) in Volume 4 of the EIAR. In addition, the maintenance of the Proposed Scheme will not have the potential to result in habitat degradation of the QI / SCI species of any European site as the result of operational impacts.

12.4.4.1.1.4 Habitat Degradation as a result of Air Quality Impacts

A reduction in air quality within the immediate vicinity of the road, involving emissions from car exhausts, and the deposition of particulate matter and heavy metals produced by engine, brake and tyre wear during the Operational Phase, can contribute to increased deposition of pollutants such as oxides of nitrogen (NO_x, NOs), volatile organic compounds (VOCs), particulate matter (PM), heavy metals (HM) and ammonia (NH₄) in the vicinity of a road carriageway. This can affect the ecosystems and vegetation present, influencing plant growth rates and species composition, diversity and abundance.

The unmitigated Zol for air quality effects arising from the Proposed Scheme has the potential to extend up to 200m the Proposed Scheme boundary during the Operational Phase. There are no European sites present within this distance.

12.4.4.1.1.5 Disturbance and Displacement Impacts

There are no European sites within the disturbance Zol of the Proposed Scheme. However, several QI species are known to occur within the vicinity of the Proposed Scheme. Refer to Section 12.4.3.4 and Section 12.4.3.8 for more details with regards to potential construction impacts on QI mammals and fish, respectively.

The potential for impacts on SCI bird populations for which SPAs are designated has been provided in the NIS. Refer to Section 12.4.3.5.2 of this EIAR chapter with regards to potential impacts on wintering bird species, which encompass all relevant SCI bird species.

12.4.4.1.2 Natural Heritage Areas and Proposed Natural Heritage Areas

The potential impacts on European sites arising from the Proposed Scheme, outlined above in Section 12.4.4.1.1, may also negatively affect the following pNHA and NHA sites, which are located within the boundaries of European sites and designated for similar reasons: Skerries Islands NHA, Lambay Island pNHA, Portrairie Shore pNHA, Ireland's Eye pNHA, Howth Head pNHA, Malahide Estuary pNHA, Dalkey Coastal Zone and Killiney Hill pNHA, Baldoyle Bay pNHA, North Dublin Bay pNHA, Booterstown Marsh pNHA, Dolphins, Dublin Docks pNHA, Rogerstown Estuary pNHA and South Dublin Bay pNHA. The respective European sites are provided in Table 12.4. The Proposed Scheme also has the potential to affect biodiversity in a broader sense than only the QIs / SCIs of those European sites. Where biodiversity receptors in these pNHAs do not form part of the QIs / SCIs in the NIS assessment, they are considered under the other individual impact assessment headings for each KER below. Potential impacts arising from the Proposed Scheme on these pNHA sites would result in a likely significant negative effect at a national geographic scale.

The assessment of potential impacts arising from the Proposed Scheme on the Grand Canal pNHA include habitat degradation as a result of surface water quality and the spread of invasive species (see Section 12.4.4.2.4), effects on rare and protected plant species (see Section 12.4.4.3) and negative effects on the protected fauna species associated with the canal such as bats, otter and riparian birds (see Section 12.4.4.4 and Section 12.4.4.5). The Proposed Scheme will not result in any direct impacts to the Dodder Valley pNHA.

12.4.4.1.2.1 Habitat Degradation – Air Quality

Air quality modelling of NO_x concentrations, and deposition rates were modelled for the Operational Phase of the Proposed Scheme at distances up to 200m from the Proposed Scheme or where significant changes to AADT flows occur. The assessment methodology for air quality impacts from roads and their interaction / effects on ecology are discussed in Section 12.4.3.1.2.5 and also within Chapter 7 (Air Quality).

Vehicle-derived air emissions were modelled during the Construction Phase along the Proposed Scheme road crossings along the Grand Canal pNHA (refer to Section 7.4. 3.4 of Chapter 7 (Air Quality) for details). The worst-case predicted annual average NO_x concentrations at various distances from the Proposed Scheme road edge

exceed the $30\mu\text{g} / \text{m}^3$ limit value. In all cases where exceedances occur, the baseline environment is already in excess of this value. During the operational year (2028) of the Proposed Scheme, annual mean NO_x concentrations are predicted to increase at a small number of locations along the Grand Canal pNHA (M50 northbound) ($82.0\mu\text{g} / \text{m}^3$ to $83.0\mu\text{g} / \text{m}^3$). The majority of modelling locations are expected to see decreases of between 1 and 33%. During the Operational Phase of the Proposed Scheme, the ecological impacts associated with the Operational Phase traffic emissions are overall positive, slight and long-term. As such, no mitigation measures are required.

The contribution of the Operational Phase of the Proposed Scheme to the NO₂ dry deposition rate was modelled at a number of sites along the Grand Canal. Nitrogen deposition levels have been compared to the lower and higher critical loads for habitats associated with the Grand Canal pNHA. These include canals (FW3), dry meadow / grassy verges (GS2), reed and large sedge swamps (FS1), tall-herb swamps (FS2) and mixed broadleaved / conifer woodland (WD2). All sites are below the lower critical load for the designated habitat site, with the exception of the Grand Canal pNHA at the M50 southbound, the eastern side of R134 New Nangor Road and the western side of the Ninth Lock Bridge, in both the Do Minimum and the Do Something scenarios. However N deposition levels decrease at these sites due to the Proposed Scheme. Therefore, significant or harmful effects on vegetation within the Grand Canal pNHA from NO₂ are not predicted likely, nor will there be any reduction in habitat area of the pNHA habitats, and mitigation is therefore not required.

12.4.4.2 Habitats

12.4.4.2.1 Habitat Degradation – Surface Water Quality

There will be drainage outfalls during the Operational Phase of the Proposed Scheme. Surface water runoff from the Proposed Scheme could contain harmful compounds such as hydrocarbons, heavy metals and particulate matter, which would be derived from the internal combustion engines of vehicles using the route. These harmful compounds could affect the water quality of the waterbodies within the Zol of the Proposed Scheme, as well as affecting aquatic flora and fauna located therein.

Where there is an increase in impermeable surface area, the drainage design principles ensure that there will be no net increase in the surface water flow discharged to these receptors (see Chapter 4 (Proposed Scheme Description) for more detail on drainage design).

For the Proposed Scheme, there will be a net increase of $59,368\text{m}^2$ in the overall impermeable area ultimately discharging to Dublin Bay. This increase in impermeable area will be being managed for the Proposed Scheme through a combination of attenuation tanks (and ponds), swales and oversized pipes and filter drains. Additional permeable areas will also be provided by the softening of public realm along the routes. Where no new paved areas are proposed, the existing drainage network will be retained and utilised (see Chapter 4 (Proposed Scheme Description) for more detail on drainage design).

The inclusion of sustainable drainage systems (SuDS) will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water). The Proposed Scheme will not exacerbate the existing surface water quality conditions in any of the receiving surface waters or larger waterbodies. These SuDS measures allow a level of treatment and / or attenuation to be provided before discharge to the network, reducing the impact on water quality as well as preventing an increase in runoff rates. It will, in fact, result in a beneficial, albeit imperceptible, impact on the local surface water quality due to the implementation of SuDS, where appropriate.

Without the incorporation of the above design mitigation (see Section 12.5.2.1.3.2 for mitigation measures to maintain SuDS), then during operation, contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water feature has the potential to have significant negative effects on water quality and consequently affect aquatic and wetland habitats in the receiving environment. The effects of frequent and / or prolonged pollution events have the potential to be extensive and far-reaching and could potentially have significant long-term effects. In a worst-case scenario, the downstream habitats of the Liffey Estuary Lower and other transitional water bodies, and Dublin Bay coastal water body could also be affected. This is deemed to be significant at a local scale.

In respect of the traffic modelling, for most cases, any increases in traffic on the local road network would not lead to AADTs being above 10,000. Where increases to above 10,000 AADT were predicted for side roads, these roads drain to the same catchment as the route of the Proposed Scheme as per Section 13.4.5.4 of Chapter 13 (Water).

Therefore, no significant impacts on receptors are considered likely. These road sections can therefore be screened out from further assessment.

In respect of the WFD assessment, taking into consideration the anticipated impacts of the Proposed Scheme on the biological, physico-chemical and hydromorphological quality elements, following the implementation of design and mitigation measures, it is concluded that it will not compromise progress towards achieving Good Ecological Status (GES) or cause a deterioration of the overall Good Ecological Potential (GEP) of any of the water bodies that are in scope as per Section 13.6.3 in Chapter 13 (Water). Therefore, the Proposed Scheme does not require assessment under Article 4.7 of the WFD.

During operation, water runoff from the Proposed Scheme will discharge to the existing surface water drainage network. SuDS, including oversized pipes, tree pits, bioretention areas, soakaways, green roofs and filter drains are proposed in suitable locations along the Proposed Scheme (e.g., in the central median and along road verges). The inclusion of these SuDS systems will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water).

The effects of habitat degradation as a result of impacts to surface water quality are not considered to be significant at any geographic scale. The Proposed Scheme will not exacerbate the existing surface water quality conditions. It will, in fact, result in a beneficial imperceptible impact on surface water quality in receiving water bodies due to the inclusion of SuDS, where appropriate. SuDS measures will reduce the volume of surface water runoff and concentrations of harmful compounds, such as hydrocarbons, heavy metals and particulate matter that would be derived from the internal combustion engines of vehicles using the route, being discharged into receiving waterbodies. Furthermore, it is anticipated that there will be a small beneficial impact on discharges to receptors due to the traffic reduction and treatment of runoff. This impact will be permanent. However, the predicted reduction in car use is small (less than 1.0% modal shift). As such, the impact would be beneficial, long-term and imperceptible (see Chapter 13 (Water) for more details). Habitat degradation, as a consequence of operational effects on surface water quality, is therefore not likely to be significant at any geographic scale.

12.4.4.2.2 Habitat Degradation – Hydrological Regime

Changes in the flow regime due to increased surface water runoff or discharges, in new locations, could result in changes to sedimentation processes and the structure of riverbanks. None of these are predicted to have any long-term effects that would give rise to a likely significant negative impact on any aquatic habitats or species through effects on the hydrological regime as the drainage design principles ensure that there will be no net increase in the surface water flow discharged to these receptors (for more detail refer to Chapter 13 (Water)).

12.4.4.2.3 Habitat Degradation – Groundwater

The Operational Phase has the potential to result in occasional accidental leakage of oil, petrol or diesel, allowing contamination of the surrounding environment. This is similar as the Do Nothing scenario as there is still the potential for accidental spillages, although the magnitude of the impact is negligible. However, in respect of habitats, the significance of the potential impact is considered imperceptible.

12.4.4.2.4 Habitat Degradation – Non-Native Invasive Plant Species

One non-native invasive plant species, Japanese knotweed, listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011, was identified within the Proposed Scheme during the field surveys (See Table 12.6). This species was recorded at six locations, five of which were inside the Proposed Scheme. In the absence of mitigation, there is potential for routine maintenance works to inadvertently spread contaminated vegetation cuttings both within the Proposed Scheme boundary, and within the immediate vicinity.

The effects of introducing such non-native invasive plant species to highly sensitive and ecologically important habitat areas (e.g., designated areas for nature conservation or areas of Annex I habitat) has the potential to result in a significant negative effect, at geographic scales ranging from local to international.

Mitigation Measures have been designed to avoid this potential impact (See Section 12.5.1.2.5).

12.4.4.2.5 Habitat Degradation – Air Quality

As discussed above in Section 12.4.4.1.2.1, air quality modelling of NO_x concentrations and deposition rates were modelled for the Operational Phase of the Proposed Scheme at distances up to 200m from the Proposed Scheme (refer to Chapter 7 (Air Quality) for details). The results from the Air Quality modelling deem the Proposed Scheme overall positive during the Operational Phase of the Proposed Scheme. As such harmful effects on vegetation from these emissions are not likely.

12.4.4.3 Rare and Protected Plant Species

12.4.4.3.1 Habitat Degradation – Surface Water Quality

No protected plant species listed on the Flora (Protection) Order were recorded within the Proposed Scheme during field surveys. However, the desk study returned records a number of species listed on the Flora Protection Order from within 1km of the Proposed Scheme, specifically opposite leaved pondweed. None of these species lie within the footprint of the Proposed Scheme. Some are terrestrial in nature whilst others are aquatic or riparian species.

Opposite-leaved pondweed may lie dormant in sediments for many years until conditions become suitable for regrowth. Surface water runoff containing harmful compounds from the Proposed Scheme could affect the water quality of the Grand Canal and affect populations of opposite-leaved pondweed which are present in the vicinity of the Proposed Scheme. With regards other rare / protected terrestrial species, for which records exist in the vicinity of the Proposed Scheme, as these species do not lie within the footprint of the Proposed Scheme, and are not aquatic in nature, there is no potential for the operation of the Proposed Scheme to result in direct or indirect impacts on populations of these species.

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on rare and protected plant species either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their supporting habitats).

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of protected plant species and result in a likely significant negative effect, at a National scale.

Mitigation measures to maintain SuDS are provided in Section 12.5.2.1.3.2

12.4.4.4 Mammals

12.4.4.4.1 Bats

12.4.4.4.1.1 Habitat Severance / Barrier Effect

There is provision for new or relocated infrastructure across a number of sections of the Proposed Scheme. However, as they are largely associated with the existing road corridors and are in areas already artificially lit, they will not result in any barrier effect to local bats. This is because it is unlikely that bats would currently commute / forage over this highly disturbed and well-lit road. Therefore, the provision of such infrastructure at any location will not result in any significant effects on populations of local bats.

12.4.4.4.1.2 Indirect Disturbance of Light Patterns Due to Operational Lighting

Additional permanent lighting features within suitable habitat may result in avoidance behaviour by bats. Such displacement (which would be a matter of metres) could prevent bats from accessing foraging areas or roosts

and / or result in bats taking more circuitous routes to get to foraging areas and hence potentially depleting energy reserves and abandonment of nearby roosts. Given the urban environment of the Proposed Scheme, and the fact that artificial lighting is already present along the footprint of the Proposed Scheme, the effects of displacement as a result of increased artificial lighting along existing road networks are not considered to be significant at any geographic scale. This is because the lighting strategy involves the use and upgrade of existing lighting infrastructure and given that artificial lighting is already in place along the Proposed Scheme, bat species who utilise the area would already be habituated to some level of artificial lighting. In respect of the areas of new road development (e.g., Parkview / New Ballymount Avenue connection, new Calmount Road connection and the new Calmount Avenue connection), the areas are limited in extent and are typically characterised by an absence of trees, being primarily scrub and open territory. Bats are considered to be light-sensitive species, and increased illumination of a site can affect how bats may utilise a site (ILP, 2018). For roosting bats, increased light levels can affect predation, as avian predators tend to rely on vision to catch their prey, and increased light levels at night-time may increase bats vulnerability to predation. Illumination of foraging and commuting habitat can result in abandonment of habitat. The response to lighting in Ireland by foraging bats varies by species, with Leisler's bat, a high-flying species, as well as common pipistrelle bat and soprano pipistrelle bat appearing to be least affected by lighting (Roche *et al.*, 2014). In respect of the Proposed Scheme, there was little bat activity recorded in these areas. Bat activity was mostly recorded nearby in more densely wooded areas e.g., north of the Parkview / Ballymount Avenue connection and south-west of the New Calmount Road connection. Notwithstanding this, the bat species occasionally recorded commuting in the surrounding territory were Leisler's Bats. Unlike many other bat species, this species will opportunistically feed on insect gatherings that are attracted to artificial light sources (BCI 2010). The effect of operational artificial lighting on bat species is therefore not considered to be significant at any geographic scale.

12.4.4.4.1.3 Disturbance / Displacement – Increased Human Activity

The Operational Phase of the Proposed Scheme will not contribute to significant changes in increased human activity by virtue of it being along an existing transport corridor. Populations of bats associated with the Proposed Scheme are likely to be habituated to a certain degree of human disturbance. No likely significant effect as a consequence of increased human activity to bats are predicted.

12.4.4.4.1.4 Collision Risk

For similar reasons to those discussed in Section 12.4.4.4.1.1 in respect of habitat severance, the installation of structures such as sign gantries and pedestrian walkways over the existing road, is not considered to have the potential to result in a collision risk to local bat populations. This is because it is unlikely that bats would currently commute / forage over this highly disturbed and well-lit road. Therefore, the provision of such infrastructure at any location will not result in any significant effects on populations of local bats and is therefore not likely to be significant at any geographic scale.

12.4.4.4.2 Badger

No evidence of badger was recorded along the Proposed Scheme during surveys undertaken. However, based on the results of the desktop study, badger are known to occur within the wider vicinity of the Proposed Scheme and therefore, potential impacts on this species cannot be excluded.

12.4.4.4.2.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure may affect foraging behaviour and dispersal corridors, e.g., the movement of species between breeding, foraging and hibernation sites, meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, consists of upgrading existing infrastructure, the effect of habitat severance / barrier effect on badger is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to badger movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

12.4.4.4.2.2 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to badger during Operational Phase. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to badger, as a result of the Proposed Scheme is not regarded to be significant at any geographic scale.

12.4.4.4.2.3 Light Spill

Nocturnal mammals, such as badger, are likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich and Longcore 2005).

Although the majority of the Proposed Scheme corridor is already lit artificially, there is some need for additional new lighting or relocation of existing lighting to be installed as part of the Proposed Scheme. The lighting design of the Proposed Scheme controls light emissions such that along the majority of the alignment light spill does not extend beyond the Proposed Scheme boundary and where it does, this is typically at tie-ins with the existing road network or at residential properties. No badger setts were located within the Proposed Scheme Boundary.

Therefore, lighting associated with the Proposed Scheme will not disturb or displace badgers from habitat areas located beyond the Proposed Scheme boundary, will not affect the species conservation status in that regard and will not result in a significant negative effect, at any geographic scale.

12.4.4.4.3 Otter

Evidence of otter activity (sprainting) only along upper sections of the River Camac in surveys carried out in 2022. Given the nature of the watercourse, it is considered that there is little potential for holt establishment. However, based on the results of the desk study, otter are known to occur within the wider vicinity of the Proposed Scheme, particularly along the River Liffey, River Camac and Grand Canal. Therefore, potential impacts on this species cannot be excluded and are discussed below.

12.4.4.4.3.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure may affect foraging behaviour and dispersal corridors, e.g., the movement of species between breeding, foraging and resting sites, meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, consists of upgrading existing infrastructure, the effect of habitat severance / barrier effect on otter is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to otter movement (outside of the aquatic areas) across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

Although survey and desktop evidence suggests otter are utilizing the upper section of the River Camac, long culverts allowing free, naturalistic passage, such as the one on the R134 New Nangor Road / Oak Road intersection, are not ordinarily favoured by otters (NRA2006b) (without the inclusion of ledges or similar structures to facilitate passage). The extension of the existing culvert (approximately 67m) on the River Camac by approximately 4m is not predicted to affect the conservation status of local otter population. Therefore, the impact of habitat severance / barrier effect on otter, as a result of the Proposed Scheme, is not considered to be significant at any geographic scale.

12.4.4.4.3.2 Disturbance / Displacement

Nocturnal mammals, such as the otter, would be likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich and Longcore 2005). Additional new lighting or relocation of existing lighting is proposed along sections of the Proposed Scheme footprint however, it should be noted that the majority of the Proposed Scheme corridor is already lit artificially, and so otter in the area would be habituated to some degree of artificial lighting. No significant displacement effects on otter are predicted.

Disturbance or displacement associated with the operation of the Proposed Scheme is not likely to affect the conservation status of otter and therefore, will not result in a long-term significant negative effect, at any geographic scale.

12.4.4.4.3.3 Habitat Degradation – Surface Water Quality

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could potentially result in contamination of receiving water bodies. This could result in significant negative impacts on otter either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of otter and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for otter in the wider vicinity and the relative abundance of otter across the wider environment, as demonstrated in the results of the desk study.

12.4.4.4.3.4 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to otter during the Operational Phase. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to otter, as a result of the Proposed Scheme is not considered to be significant at any geographic scale.

12.4.4.4.4 Marine Mammals

12.4.4.4.4.1 Surface Water Quality and Prey Abundance

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on marine mammals either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

Therefore, without mitigation, there is a risk that discharges from the Proposed Scheme, including harmful compounds such as hydrocarbons, heavy metals and particulate matter, could affect water quality in the receiving, potentially over the long-term. This could result in a direct impact to marine mammals who utilise the Liffey Estuary Lower, the Tolka Estuary and Dublin Bay should these contaminants result in the degradation of water quality. In addition, a reduction in surface water quality could consequently impact upon the aquatic habitats and fish species / abundances in the estuarine environment. In a worst-case-scenario, this could result in a long-term decline in fish species abundance and distribution, which in turn would impact on the marine mammals who prey upon these fish species.

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of marine mammals and result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the availability of suitable habitat for marine mammals in the wider vicinity and the relative abundance of marine mammals across the wider environment, as demonstrated in the results of the desk study.

12.4.4.4.5 Other Mammals

No evidence of other protected terrestrial mammals was recorded along the Proposed Scheme during the surveys undertaken. However, based on the results of the desktop study, other protected terrestrial mammals (see Section 12.3.8.5) are known to occur within the wider vicinity and therefore, impacts on this species cannot be excluded.

12.4.4.4.5.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure can affect foraging behaviour and dispersal corridors, (e.g. the movement of species between breeding, foraging and hibernation sites), meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, consists of upgrading existing infrastructure, the effect of habitat severance / barrier effect on mammals is not considered to be significant at any geographic scale. The existing infrastructure itself already acts as a barrier to mammal movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

12.4.4.4.5.2 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to mammals during operation. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to mammals, as a result of the Proposed Scheme, is not regarded to be significant at any geographic scale.

12.4.4.4.5.3 Light Spill

Nocturnal mammals are likely to be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich and Longcore 2005). Permanent lighting is proposed along the Proposed Scheme. However, it should be noted that the majority of the Proposed Scheme corridor is already lit artificially, and so other small mammals in the area would be habituated to some degree of artificial lighting. Furthermore, the Proposed Scheme will not result in the introduction of artificial lighting into previously unlit areas, but rather the lighting strategy involves the installation of some new lighting columns and the upgrade / slight relocation of some existing lighting columns. In respect of the proposed new road developments, e.g., new link road construction at Parkview / New Ballymount Avenue connection, new Calmount Road connection and the new Calmount Avenue connection, the lands are characterised primarily by scrub and open territory, largely isolated from the existing road network and industrial estates. Thus, while other mammals may utilise the area, their populations would not be large and lighting associated with the operation of the Proposed Scheme is not likely to affect the conservation status of other mammal species in the vicinity. Therefore, light spill will not result in a long-term significant negative effect, at any geographic scale.

12.4.4.5 Birds

12.4.4.5.1 Breeding Birds

12.4.4.5.1.1 Disturbance / Displacement

Increases in noise levels, associated with the increased frequency of bus traffic, as well as increased human presence, owing to the provision of the proposed cycle tracks, and may also have a negative effect on bird abundance and occurrence in the locality. Increased noise levels, as well as causing disturbance to birds in the locality, may also affect the breeding success of local bird populations as bird calls would become drowned out by traffic noise.

It is important to note that the majority of the Proposed Scheme is located within a highly urbanised environment, and so traffic noise is an existing source of disturbance for breeding birds in the vicinity. Owing to this, the population of breeding birds which occur here is likely to already be habituated to some level of noise disturbance and the effect of increased noise is not likely to be significant at any geographic scale.

Localised disturbance effects on breeding birds will most likely be of greater impact at areas where larger areas of suitable vegetation have been cleared. Overall, the displacement of breeding birds from the Proposed Scheme boundary is likely to result in an increase in competition for resources (e.g., nesting habitat or prey / food sources) both between and amongst breeding bird species, which in turn would have negative impacts on local breeding bird populations in the long-term.

Although the Proposed Scheme is predicted to have a long-term effect on local breeding bird populations, even at a local level this is not predicted to affect the ability of local breeding bird species to persist within their current ranges or to maintain their populations long-term. Therefore, the Proposed Scheme is not likely to affect the conservation status of breeding bird species and will not result in a significant negative effect, at any geographic scale.

12.4.4.5.1.2 Habitat Degradation – Surface Water

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. In the absence of mitigation, this could potentially result in significant negative impacts on breeding birds either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

Habitat degradation as a result of effects on surface water during the Operational Phase is not predicted to affect the conservation status of aquatic or wetland bird species and will, therefore, not result in a significant negative effect, at any geographic scale.

12.4.4.5.1.3 Collision Risk

During the Operational Phase, there is the potential for collision risk for local populations of breeding passerine birds, as a result of the installation of structures (pedestrian / cycle bridges and sign gantries) associated with the Proposed Scheme. However, these will be constructed over existing transport corridors and as such typical passerine birds that overfly roads would likely be habituated to similar structures. Thus, they readily avoid such structures when flying and indeed could, often, in the absence of human disturbance perch on them, if only temporarily. Therefore, the Proposed Scheme is not likely to result in collision risk for birds nor affect the conservation status of breeding bird species and will not result in a significant negative effect, at any geographic scale.

12.4.4.5.2 Wintering Birds

This Section of the impact assessment deals with wintering bird species, i.e., those bird species which are SCIs of SPAs for their wintering populations or are listed on either the BoCCI Red or Amber lists for their wintering populations.

12.4.4.5.2.1 Disturbance / Displacement

During operation, the Proposed Scheme has the potential to disturb and displace wintering bird species from habitats near the Proposed Scheme boundary due to an increase in noise, human activity and visual disturbance associated with increased human presence and increased traffic flow. Although the operational disturbance / displacement effect cannot be quantified with precision, it is expected to be much less than the 300m ZoI associated with construction works because operational disturbance will be limited to vehicular traffic and periodic maintenance works, which is also present within the existing environment. Most species of wintering birds are likely to habituate to the increased traffic flows and human presence along cycle tracks etc. Any operational noise increases are not likely to alter the existing baseline effect on wintering birds using the habitats locally.

Although there is still likely to be some level of displacement effect, a perceptible effect would be expected to be limited to inland feeding site habitats immediately adjacent to the Proposed Scheme. A number of wintering bird sites occur in the vicinity of the Proposed Scheme with one immediately adjacent. They include amenity grassland sections along Greenhills Road to the west of the M50, referred to as CBC0809WB001; at a grassland area adjacent to Templewoods residential area off Greenhills Road, referred to as CBC0809WB002; Tymon Park along Greenhills Road, referred to as CBC0809WB003; at amenity grassland along Calmount Road, referred to as CBC0809WB004; and amenity grassland at Bunting Park, referred to as CBC0809WB005.

Survey evidence revealed low usage of the surveyed sites, i.e., there were no droppings associated with light-bellied Brent goose and overall they were used by a small number of SCI or wintering bird species. Although there is still likely to be some level of displacement effect, a perceptible effect would be expected to be limited to inland feeding sites immediately adjacent to the Proposed Scheme. As any operational noise increases are not likely to

alter the existing baseline noise effect on wintering birds in the locality, effects of noise disturbance can also be excluded.

Therefore, any displacement of wintering birds from habitat areas during the Operational Phase of the Proposed Scheme is not likely to affect the conservation status of wintering bird species and will not result in a significant negative effect, at any geographic scale.

12.4.4.5.2.2 Habitat Degradation – Surface Water

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on wintering birds either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

The drainage design for the Proposed Scheme incorporates pollution control measures in areas where the impermeable surface area is being increased (e.g., oversized pipes, bioretention areas and tree pits). The inclusion of these SuDS will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water). The Proposed Scheme will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, or larger waterbodies such as Liffey Estuary Lower. It will, in fact, result in a beneficial, albeit imperceptible, impact on the local surface water quality due to the implementation of SuDS, where appropriate.

Sections of the Proposed Scheme that do not increase impermeable surface area will continue to discharge, directly to the receiving surface water network, i.e., the Camac_040, Poddle 010, Dodder_040 Grand Canal, Liffey Estuary Upper and Liffey Estuary Lower, as well as existing combined sewers which ultimately discharge to the Liffey Estuary Lower via Ringsend WwTP.

Habitat degradation as a result of effects on surface water during the Operational Phase is not predicted to affect the conservation status of wintering bird species and will therefore, not result in a significant negative effect, at any geographic scale.

12.4.4.6 Reptiles

No evidence of any protected reptile species, such as common lizard, was identified along the Proposed Scheme during surveys undertaken. No suitable habitat for common lizard was recorded during the surveys undertaken either. The desktop review revealed recent records for common lizard in the wider vicinity. Nonetheless, a precautionary approach has been adopted which has not excluded the possibility of common lizard being present in the vicinity of the Proposed Scheme.

12.4.4.6.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure may affect foraging behaviour and dispersal corridors, e.g., the movement of species between breeding and hibernation sites, meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, consists of upgrading existing infrastructure, the effect of habitat severance / barrier effect on common lizard is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to amphibian movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

12.4.4.6.2 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to common lizard during operation. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to common lizard, as a result of the Proposed Scheme is not considered to be significant at any geographic scale.

12.4.4.7 Amphibians

No evidence of any protected amphibian species, such as common frog or smooth newt, were identified along the Proposed Scheme during surveys undertaken. However, suitable amphibian habitat such as vegetated riverbanks were recorded within the Proposed Scheme. The desk study returned records of amphibians in the wider vicinity of the Proposed Scheme and therefore impacts on these species cannot be excluded.

12.4.4.7.1 Habitat Severance / Barrier Effect

Barriers such as road infrastructure may affect foraging behaviour and dispersal corridors, e.g., the movement of species between breeding and hibernation sites, meaning that local populations can become isolated, having long-term effects on genetic diversity and gene flow, at a local geographic scale.

As the Proposed Scheme, for the most part, consists of upgrading existing infrastructure, the effect of habitat severance / barrier effect on amphibian species is not considered to be significant at any geographic scale. The existing infrastructure itself acts as a barrier to amphibian movement across the landscape and the Proposed Scheme will neither exacerbate nor improve the barrier effect already in existence.

12.4.4.7.2 Mortality Risk

The Proposed Scheme will not result in any increase in terms of mortality risk to amphibians during the Operational Phase. This is because the Proposed Scheme is largely focused on upgrading existing infrastructure, the mortality risk of which already exists. The Proposed Scheme will neither exacerbate nor improve the level of mortality risk associated with this infrastructure. Therefore, the impact of mortality risk to amphibians, as a result of the Proposed Scheme is not considered to be significant at any geographic scale.

12.4.4.7.3 Habitat Degradation – Surface Water

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could result in contamination of receiving water bodies. This could result in significant negative impacts on amphibians either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

The drainage design for the Proposed Scheme incorporates pollution control measures in areas where the impermeable surface area is being increased (e.g., oversized pipes, bioretention areas and tree pits). The inclusion of these SuDS will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water). The Proposed Scheme will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, or larger waterbodies such as Liffey Estuary Lower. It will, in fact, result in a beneficial, albeit imperceptible, impact on the local surface water quality due to the implementation of SuDS, where appropriate.

Sections of the Proposed Scheme that do not increase impermeable surface area will continue to discharge, directly to the receiving surface water network, i.e., the Camac_040, Poddle 010, Dodder_040 Grand Canal, Liffey Estuary Upper and Liffey Estuary Lower, as well as existing combined sewers which ultimately discharge to the Liffey Estuary Lower via Ringsend WwTP.

Habitat degradation as a result of effects on surface water during operation is not predicted to affect the conservation status of amphibian species and will therefore, not result in a significant negative effect, at any geographic scale.

12.4.4.8 Fish

12.4.4.8.1 Habitat Degradation – Surface Water

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could potentially result in contamination of receiving water bodies. This could result in significant negative impacts on European eel and other fish species either

directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g., affecting their food supply or supporting habitats).

The drainage design for the Proposed Scheme incorporates pollution control measures in areas where the impermeable surface area is being increased (e.g., oversized pipes, bioretention areas and tree pits). The inclusion of these SuDS will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water). The Proposed Scheme will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, or larger waterbodies such as Liffey Estuary Lower. It will, in fact, result in a beneficial, albeit imperceptible, impact on the local surface water quality due to the implementation of SuDS, where appropriate.

Sections of the Proposed Scheme that do not increase impermeable surface area will continue to discharge, directly to the receiving surface water network, i.e., the Camac_040, Poddle 010, Dodder_040 Grand Canal, Liffey Estuary Upper and Liffey Estuary Lower, as well as existing combined sewers which ultimately discharge to the Liffey Estuary Lower via Ringsend WwTP.

Habitat degradation as a result of effects on surface water during operation is not predicted to affect the conservation status of fish species and will therefore, not result in a significant negative effect, at any geographic scale.

12.4.4.9 Invertebrates

12.4.4.9.1 Habitat Degradation – Surface Water

As discussed in Section 12.4.4.2.1, without the design mitigation incorporated into the design of the Proposed Scheme, the Operational Phase of the Proposed Scheme could potentially result in contamination of receiving water bodies. This could result in significant negative impacts on white-clawed crayfish (an isolated population known from the River Camac) or freshwater molluscs (that have been documented from the Grand Canal) either directly (e.g., acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

The drainage design for the Proposed Scheme incorporates pollution control measures in areas where the impermeable surface area is being increased (e.g., oversized pipes, bioretention areas and tree pits). The inclusion of these SuDS will reduce the volume of surface water runoff discharging to the existing drainage network. The functioning and effectiveness of both elements of the road drainage network are discussed in more detail in Chapter 13 (Water). The Proposed Scheme will not exacerbate the existing surface water quality conditions in any of the receiving surface waters, or larger waterbodies such as Liffey Estuary Lower. It will, in fact, result in a beneficial, albeit imperceptible, impact on the local surface water quality due to the implementation of SuDS, where appropriate.

Sections of the Proposed Scheme that do not increase impermeable surface area will continue to discharge, directly to the receiving surface water network, i.e., the Camac_040, Poddle_010, Dodder_040 Grand Canal, Liffey Estuary Upper and Liffey Estuary Lower, as well as existing combined sewers which ultimately discharge to the Liffey Estuary Lower via Ringsend WwTP.

Habitat degradation as a result of effects on surface water during operation is not predicted to affect the conservation status of freshwater molluscs and will therefore, not result in a significant negative effect, at any geographic scale.

12.4.4.10 Summary of Predicted Operational Phase Impacts (Pre-Mitigation)

Table 12.16: Summary of Potential Operational Phase Impacts (Pre-Mitigation)

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
Designated Areas for Nature Conservation			
North Dublin Bay SAC; North Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale
Howth Head SAC Howth Head pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Wicklow Mountains SAC Wicklow Mountains pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA North Dublin Bay pNHA Boosterstown Marsh pNHA	International Importance National Importance National Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international geographic scale
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international geographic scale
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale

Ecological Receptor	Ecological Valuation	Potential Impacts	Potential Significance
The Murrrough SPA The Murrrough pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale
Grand Canal pNHA	National Importance	Habitat degradation (hydrology; non-native invasive plant species,)	Likely significant effect at the national geographic scale
Habitats (outside of designated areas for nature conservation)			
Canals (FW3)	National Importance	See Grand Canal pNHA	Likely significant effect at the national geographic scale
Reed and large sedge swamps (FS1)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Depositing/ lowland rivers (FW2)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale
Rare / Protected Plant Species			
Flora Species listed on the Flora Protection Order (opposite-leaved pondweed)	National Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale
Flora Species on Irelands Red Lists (Vulnerable or of higher concern concern)	National Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale
Non-native Invasive Plant Species	N/A	Spread at expense of other habitats	Likely significant effect at the local to International scale geographic scale
Fauna Species			
Otter	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Marine mammals	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale
SCI bird species	International Importance	See SPAs above	See SPAs above
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Habitat degradation (hydrology);	Likely significant effect at the local geographic scale
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Amphibians	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Fish Species	County	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Non-Annex fish species	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale
Invertebrates- White clawed crayfish and Freshwater molluscs	County Importance	Habitat degradation (hydrology)	Likely significant effect at the County scale
Local Biodiversity Areas			
South Dublin County Green Infrastructure	County Importance	See River Camac under habitats	Likely significant effect at the local geographic scale
Dublin City's Green Infrastructure Network	County Importance	See River Camac and Grand Canal captured under habitats, Wintering birds sites captured under Birds and habitats	No likely significant effect at any geographic scale

12.5 Mitigation and Monitoring Measures

12.5.1 Construction Phase

Where deemed necessary a suitably experienced and qualified ecologist will be employed by the appointed contractor. The ecologist will advise the appointed contractor on ecological matters during construction, communicate all findings in a timely manner to the NTA and statutory authorities, acquire any licenses / consents required to conduct the work, and supervise and direct the ecological measures associated with the Proposed Scheme.

12.5.1.1 Designated Areas for Nature Conservation

12.5.1.1.1 European Sites

The mitigation measures that are required to ensure that the Proposed Scheme will not adversely affect the integrity of the European sites within the Zol are presented in the NIS. Following a consideration and assessment of the Proposed Scheme on the identified relevant European sites, the following mitigation measures were developed to address potential impacts that were identified:

- Measures to protect surface water quality during construction; and
- Measures to prevent the spread of non-native invasive species to downstream European sites.

12.5.1.1.2 National Sites

The mitigation measures in relation to potential impacts arising from the Proposed Scheme on NHA and pNHAs within the Zol are as per those for European sites as the boundaries coincide with the SACs and SPAs. Therefore, the mitigation measures outlined above in Section 12.5.1.1.1, and as detailed in the NIS, will prevent the Proposed Scheme resulting in a significant negative effect on these NHA and pNHAs at the national geographic scale.

It should be noted that the full suite of mitigation measures proposed to protect surface water during the Construction Phase and to prevent the spread of invasive species to downstream European and national sites are set out in full in Appendix A5.1 CEMP in Volume 4 of this EIAR.

The mitigation measures in relation to potential impacts arising from the Proposed Scheme on the Grand Canal pNHA, which is not aligned with any European site, includes habitat degradation as a result of surface water and groundwater quality effects and the spread of non-native invasive species (see Sections 12.5.1.2.2 and 12.5.1.2.5), air quality (see Section 12.5.1.2.4) and negative effects on the protected fauna species associated with the sites such as mammals, riparian birds, and fish species (see Sections 12.5.1.4, 12.5.1.5 and 12.5.1.8).

12.5.1.2 Habitats

12.5.1.2.1 Habitat Loss and Fragmentation

Where practicable, areas of vegetation including habitats of Local Importance (Higher Value) (i.e., mixed broadleaved woodland, mixed broadleaved conifer woodland, scattered trees and parkland, treeline and hedgerow habitat types), which lie within the footprint of, or along the boundary of the Proposed Scheme, will be retained. Proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor, is listed below and displayed on the Landscaping General Arrangement drawings (BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001) in Volume 3 of this EIAR. These areas will be protected by the appointed contractor for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown in further detail on the Landscape General Arrangement Drawings (BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

To mitigate loss of habitat, proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor, as listed below and displayed on the Landscaping General Arrangement drawings (BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001) in Volume 3 of this EIAR:

- 1055 no. trees planted;

- 590m of proposed hedgerow;
- 20,560m² of proposed species rich grassland;
- 3,450m² of proposed ornamental planting;
- 5,525m² of proposed native planting; and,
- 43,140m² of proposed amenity grassland planting.

12.5.1.2.2 Habitat Degradation – Surface Water Quality

In terms of mitigation a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP) in Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.

It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to:

- Construction Compound management including the storage of fuels and materials;
- Control of Sediment;
- Use of Concrete;
- Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and
- Monitoring.

Following implementation of the mitigation measures outlined in the SWMP, the majority of impacts will be not significant. There are a few activities, however that require additional measures to ensure that impacts are not significant. The appointed contractor will implement scheme specific measures in relation to surface water quality at the following locations: the Construction Compounds, the widening of the R134 (and diversion of ESB oil filled cables, undertaken separately, as necessary by ESB Networks) and modifications to the Camac headwall under the R134 / Oak Road roundabout.

Construction Compounds

Site fencing at Construction Compounds will include a silt fence at the perimeter of the site to prevent over land flows. Surface water drains at access points will be covered.

Construction Compound TC10 is located on a pedestrian island approximately 30m from the Grand Canal Mainline. Fuel and other material will be stored as far from the water body as is reasonably practicable. Foul water from welfare facilities will be contained and removed from site via a licensed contractor as required. Spill kits will be permanently on land.

Works Close to ESB Oil-Filled Cables

The appointed contractor in consultation with the NTA will engage with ESB Networks to locate their oil-filled cable in the context of the Proposed Scheme. A ground investigation, where construction works are to take place near the ESB oil-filled cable, will be carried out prior to construction commencing and, following this, an appropriate suite of mitigation measures will be confirmed and deployed, which could for example result in the removal of all contaminated material from site as outlined in Chapter 14 (Land, Soils, Geology & Hydrogeology) in Volume 2 of this EIAR. Any hazardous material to be removed from site will be removed in accordance with measures outlined in Chapter 18 (Waste & Resources) in Volume 2 of this EIAR.

Widening of the R134 New Nangor Road

No significant or intrusive works will be carried out within 10m of adjacent waterbody (Camac _040). Silt fences will be installed along the length of the top of the bank where works are taking place. These will be monitored on

a daily basis by the appointed contractor to ensure they remain intact. There will be no in-stream works and no works on the bank itself, only along the top of the bank. Vegetation removal will be kept to a minimum.

Modifications to River Camac Headwall

Works to modify the headwall where the Camac_040 is culverted under the R134 / Oak Road roundabout will include in-stream works. To ensure there are no water quality impacts as a result of this, no works will take place during the closed (fisheries) season (October to June) without the approval of Inland Fisheries Ireland, in consultation with the NTA. A bund will be used to provide a dry area of work. This could be in the form of sandbags or a silt curtain. Any silty water will be directed to a settlement area or silt-buster tank prior to discharge back to the water body. Furthermore, the design of the proposed works has specified that the upstream part of the existing culvert i.e., the area in which the culvert extension and headwall construction are proposed, will include a concrete base with overlain gravel base and benching to direct flows. Thus, the already modified watercourse at this location will, as far as is practical, reinstate a natural riverbed surface atop the concrete base, facilitating quicker re-establishment of aquatic vegetation and potential use by aquatic mammals, fish and invertebrates.

12.5.1.2.3 Habitat Degradation – Groundwater

The following mitigation measures will be implemented with regard to pollution of soil and groundwater:

- The construction management of the site will be implemented by the appointed contractor will take account of the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams *et al.* 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination;
- Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures;
- Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g., by a roll-over bund, raised kerb, ramps or stepped access;
- The location of any fuel storage facilities will be considered in the design of the Construction Compounds. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded;
- Good housekeeping at the site (e.g., daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase;
- All concrete mixing and batching activities will be located in areas away from watercourses and drains;
- Potential pollutants to be adequately secured against vandalism;
- Provision of proper containment of potential pollutants according to codes of best practice;
- Thorough control during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and
- Spill kits will be provided and be kept close to the storage area. Staff to be trained on how to use spill kits correctly.

An Environmental Incident Response Plan as described in the CEMP (Appendix A5.1 CEMP in Volume 4 of this EIAR) will be implemented by the appointed contractor, which will identify the actions to be taken in the event of a pollution incident. It will address, between others, containment measures, emergency discharge routes, a list of appropriate equipment and clean-up materials and notification procedures to inform the relevant environmental protection authority.

The mitigation measures to protect groundwater quantity and quality during the Construction Phase are also outlined in Chapter 14 (Land, Soils, Geology & Hydrogeology) and Appendix A5.1 in Volume 4 of this EIAR. This includes control measures for the loss or damage of topsoil, and the pollution of soil and groundwater.

12.5.1.2.4 Habitat Degradation – Air Quality

The mitigation measures relating to the containment of dust emissions during construction are outlined in Section 7.5.1 of Chapter 7 (Air Quality) and Appendix A5.1 CEMP in Volume 4 of this EIAR. These include standard

measures to control nuisance dust such as inspection and cleaning of public roads, measures for managing stockpiling of materials within the Construction Compounds, water misting / spraying, vehicle coverings, and hoarding around the Construction Compounds.

12.5.1.2.5 Habitat Degradation – Non-Native Invasive Plant Species

During the interim between the original non-native invasive species surveys which identified one non-native invasive species at six locations within or adjacent to the Proposed Scheme, and commencement of construction, it is possible that newly established Third Schedule non-native invasive species may have become established within the footprint of the Proposed Scheme.

The NTA will ensure that a confirmatory pre-construction non-native invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and / or extent of all Third Schedule non-native invasive species within the footprint of the Proposed Scheme. Where an infestation is confirmed / identified, this will require the implementation of a non-native Invasive Species Management Plan (refer to the Plan contained in the CEMP in Appendix A5.1 of Volume 4 of this EIAR).

The following mitigation measures will be implemented, as required.

- Where a pre-construction non-native invasive species survey has confirmed the presence of previously identified Third Schedule non-native invasive species, or identifies newly established non-native invasive species within the footprint of the Proposed Scheme, the Invasive Species Management Plan (ISMP) produced will provide a detailed description of the infestations (e.g. approximate area of the respective colonies (m²), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, include calculations of volumes of infested soils to be excavated;
- The ISMP will be finalised following the pre-construction survey as advised by a suitably qualified specialist, with regard to the guidance on The Management of Invasive Alien Plant Species on National Roads (Technical Guidance) (TII 2020a; 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary; and
- The NTA will ensure that all control measures specified in the ISMP will be implemented by a suitably qualified and licensed specialist prior to the construction of the Proposed Scheme to control the spread of non-native invasive species within the footprint of the Proposed Scheme. Furthermore, the appointed contractor will adhere to control measures specified within the ISMP throughout the Construction Phase of the Proposed Scheme.

The site will be monitored by the appointed contractor after control measures have been implemented. Any re-growth will be subsequently treated as detailed in the ISMP.

12.5.1.3 Rare and Protected Plant Species

12.5.1.3.1 Habitat Degradation – Surface Water Quality

No protected plant species listed on the Flora Protection Order were recorded during the field surveys within or in close proximity to the Proposed Scheme. Therefore, no species-specific mitigation is proposed.

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.

Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Chapter 13 (Water).

12.5.1.4 Mammals

12.5.1.4.1 Bats

12.5.1.4.1.1 Protection of Bats during Vegetation Clearance

All bat species and their roost sites are strictly protected under both European and Irish legislation including:

- Wildlife Acts;
- The Habitats Directive; and
- Birds and Habitats Regulations.

It is an offence to kill a bat or to damage or destroy the breeding or resting place of any bat species, and it is not necessary that the action should be deliberate for an offence to occur. This puts an onus of due diligence on anyone proposing to carry out works that might result in such damage or destruction. A derogation may be granted by the Minister where there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range.

Four trees were identified to contain PRFs within the footprint of the Proposed Scheme (permanent and temporary land-take) during the multidisciplinary surveys (see Figure 12.7.2 in Volume 3 of this EIAR). These trees will not be removed during the Construction Phase of the Proposed Scheme, and the following mitigation measures will be implemented by the appointed contractor:

- Retained trees with PRFs will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches, or root system of the tree which could disturb roosting bats. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist;
- Where fencing is not feasible due to insufficient space, protection for the tree will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it;
- The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g., hydrocarbons) or concrete washout areas will not be undertaken within 10m of any retained trees, hedgerows and treelines;
- A qualified arborist engaged by the appointed contractor will assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the Proposed Scheme footprint but whose RPA is impacted by the works;
- Where works are required within the RPA, the mitigation measures as set out in the method statement within the Arboricultural Impact Assessment (refer to Appendix A17.1 in Volume 4 of this EIAR) will be implemented; and
- There will be no additional lighting within 5m of the PRF during the Construction Phase of the Proposed Scheme to avoid potential disturbance to roosting bats.

12.5.1.4.1.2 Roost Loss

As previously mentioned and based on a review of the Landscaping General Arrangement drawings (BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001 in Volume 3 of this EIAR), seven trees with PRFs will be removed during the Construction Phase. However, trees that are currently unsuitable may become roosts between the pre-planning assessment contained within this EIAR and the Construction Phase of the Proposed Scheme.

Potential Roost Feature (PRF) Re-appraisal (First Step of Preconstruction Survey):

The NTA will ensure that a confirmatory preconstruction survey of all trees identified as containing PRFs or not to be removed within the boundary of the Proposed Scheme will be rechecked for PRFs by a suitably qualified ecologist engaged by the NTA as part of the preconstruction surveys. The survey will:

- Confirm that previously identified trees with PRFs which are to be retained are still standing; and

- Identify whether new PRF features (if any) may have developed owing to damage or management change to trees in the intervening period between the original surveys and grant of planning.

Preconstruction Survey

In the unlikely event that trees with PRFs are detected during the preconstruction survey it is recommended that:

- In advance of any clearance, all trees deemed to contain PRFs which are subject to felling / clearance will be checked for the presence of bats by a suitably qualified / licenced bat specialist (using an endoscope under a separate licence held by that individual);
- In the unlikely event that bats are found on the proposed development site during construction works such as vegetation clearance, works will immediately cease in that area and the local NPWS Conservation Ranger will be contacted;
- An application will then be made to the National Parks and Wildlife Service for a derogation licence to permit actions affecting bats or their roosts that would normally be prohibited by law;
- After licence approval from the NPWS (which may include the necessity for additional mitigation measures to those recommended here) bats may be removed by a bat specialist licenced to handle bats and released in the area in the evening following capture; and
- Only then will trees with PRFs be felled and this should be undertaken 'in sections' where the section can be handled to avoid sudden movements or jarring of the sections.

Installation of Bat Boxes

In addition to mitigation proposals that may arise as result of the preconstruction survey (e.g., emergence surveys and confirmation of roost), it is proposed to install generalist/self-cleaning bat boxes for each PRF that is confirmed to be removed:

- Standard Schwegler 1FFH (2 number) and 3FF boxes (1 number) for all PRF trees to be removed;
- The boxes will be installed three months in advance of felling of any tree with PRFs and in public spaces managed by the Local Authority as close as possible to areas of the PRF tree to be felled and which overlap with areas of bat activity confirmed during activity surveys undertaken as part of the EIAR;
- The boxes will be installed on the tree at a height of 3-5m and firmly fixed to tree trunk;
- Where practicable, the bat boxes will be installed in an East, South and West orientation and protected from undue disturbance by selective placement away from light spill and at a height >3.5m;
- There will be 1m clearance (e.g., no overhanging branches or ivy encroachment near installed box) around each bat box opening; and
- Installed bat boxes will labelled and data (reference number, GPS location and photographic record) will be supplied to Bat Conservation Ireland (BCI), Local Authority Biodiversity Officer and NPWS.

12.5.1.4.1.3 Habitat Loss and Fragmentation

Where practicable, habitats of importance to bats such as scattered trees and parkland, treeline and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, that are not directly impacted by the Proposed Scheme will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance by the appointed contractor. Vegetation to be retained is shown on Landscaping General Arrangement drawings (BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

To minimise the loss of habitat associated with the Proposed Scheme, there are also areas within the Proposed Scheme footprint which are included for mitigation planting where general construction works will not be undertaken. Proposed planting incorporated into the Proposed Scheme will be implemented, as listed below and displayed on the Landscaping General Arrangement Drawings (BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001) in Volume 3 of this EIAR:

- 1,055 no. trees planted; and
- 590m of proposed hedgerow.

Many species may not roost near a road development due to disturbance (e.g., high levels of artificial lighting). Whilst the planting is not likely to fully offset the loss of foraging and commuting habitat it is likely to provide additional foraging habitat after trees and hedgerows grow to a sufficient maturity.

12.5.1.4.1.4 Disturbance of Flight Patterns / Foraging Routes as a result of Lighting Impacts

The appointed contractor in liaison with the suitably qualified licensed ecologist(s) will ensure that lighting at the Construction Compounds, and active work areas in proximity to known bat activity (including those work areas in close proximity to watercourses with known bat activity), will be designed to minimise light spill and be cognisant of light-spill onto these areas.

Notwithstanding the urban / peri-urban location of the Proposed Scheme and existing public illumination, there are areas of open and linear vegetation features that provide for bats. However, during construction, the use of security lighting such as that around the Construction Compounds and or additional lighting required for night-time works could impact on commuting / foraging territory.

Mitigation measures to reduce light spill will include the following:

- The use of sensor / timer triggered lighting;
- LED luminaires to be used where practicable due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- Column heights to be considered to minimise light spill;
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed; and
- Where night time works are required, the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works (especially works carried adjacent to watercourses with known bat activity).

12.5.1.4.2 Badger

Badger, and their breeding and resting places, are protected under the Wildlife Acts and it is an offence under that legislation to intentionally kill or injure a badger or to wilfully interfere with or destroy their breeding or resting places (setts).

12.5.1.4.2.1 Disturbance / Displacement

Although there were no signs of badger recorded during field surveys of accessible areas, badger could potentially establish new territory within the Zol of the Proposed Scheme. Therefore, the NTA will ensure that a confirmatory pre-construction check of all suitable badger habitat will be completed within 12 months prior to any construction works commencing.

The presence of any new setts or significant badger activity will be treated and / or protected in accordance with the Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes (NRA 2005b).

12.5.1.4.2.2 Protection of Badgers from Accidental Harm During Construction (Excavations)

Uncovered deep excavations could be potentially hazardous for badgers commuting / foraging in the area. Badgers could fall into these excavations, becoming trapped and potentially hurt and distressed. To protect badgers from indirect harm during construction, all open excavations will be covered when not in use and backfilled as soon as practicable by the appointed contractor.

Unenclosed excavations will also be covered at night, where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow mammals to safely exit should they fall in.

12.5.1.4.2.3 Lighting

Refer to Section 12.5.1.4.1.4.

12.5.1.4.3 Otter

Otter are listed on Annex II and Annex IV of the Habitats Directive and are strictly protected under the Birds and Habitats Regulations. Otter, and their breeding and resting places, are also protected under the Wildlife Acts and it is an offence under that legislation to intentionally kill or injure an Otter or to willfully interfere with or destroy their breeding or resting places (holts / couches). Although there were no signs of otter recorded during the original multidisciplinary field surveys, a potential otter slide was noted in 2022 along the Grand Canal adjacent to, but outside the Proposed Scheme boundary. Evidence of otter activity in the form of two old spraints were recorded in July 2022 at survey site CBC0809AR0002 along the River Camac, confirming documented evidence from earlier surveys. Otter are known to occur in the vicinity of the Proposed Scheme, particularly along the River Camac (Macklin *et al.*, 2019), as well as along the River Dodder and Grand Canal (see Section 12.3.8.3).

Given the requirement for sections of the Proposed Scheme to be undertaken instream e.g. the River Camac or immediately adjacent to The Grand Canal, the appointed contractor will engage a suitably qualified and / or licensed ecologist(s) to oversee and advise works at watercourse crossings during construction to communicate all findings in a timely manner to the NTA and statutory authorities, to acquire any licenses / consents required to conduct the work, and to supervise and direct the ecological measures associated with the Proposed Scheme.

Where a new or reactivated otter holt to be encountered, within 150 metres (up and downstream) of watercourse crossing, the qualified ecologist(s) will consult with the NPWS in conjunction with the NTA and appointed contractor.

The qualified ecologist will review method statements; oversee works; provide instruction to the appointed contractor(s), deliver toolbox talks and temporarily halt works, if, and as, necessary, having conferred with the NTA.

12.5.1.4.3.1 Loss of Breeding / Resting Sites

Although there were no signs of otter recorded during field surveys, a potential slide was recorded adjacent to but outside the Proposed Scheme boundary along the Grand Canal, corroborating desktop data that otter occur in this watercourse. Otter could potentially establish new holt or couch sites within the Zol of the Proposed Scheme. The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed by a suitably qualified ecologist within 12 months prior to any construction works commencing.

The presence of any new holt / couch sites will be treated and / or protected in accordance with the Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (NRA 2006b).

12.5.1.4.3.2 Measures to Prevent Injury / Mortality Impacts

As detailed above in Section 12.5.1.4.3.1 prior to construction works commencing, the appointed contractor will engage the services of a suitably qualified ecologist to conduct a pre-construction otter survey of the Proposed Scheme in accordance with Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006b).

To protect otters from indirect harm during construction, where practicable open excavations will be covered when not in use and backfilled as soon as practicable by the appointed contractor. Excavations will also be covered at night, where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow mammals to safely exit should they fall in.

Fencing requirements as per the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006b) will be erected around Construction Compounds and other working areas which are in close proximity to significant watercourses and have suitable roaming territory for otter. Where mammal-proof fencing cannot for practical reasons be installed to delineate the works area from the riparian zone, the use of physical hoarding 2.4m tall (as specified in the Appendix A5.1 CEMP in Volume 3 of the EIAR) is acceptable given the proposed working time and duration of the works.

12.5.1.4.3.3 Habitat Degradation / Reduced Prey Availability – Water Quality

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.

Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.4.3.4 Disturbance / Displacement

Site set up at or near watercourse crossings will be undertaken in a timely manner to reduce impacts to otter. The works area will be delineated from the watercourse with hoarding by the appointed contractor to obscure the site from otter and prevent access. The appointed contractor will provide site hoarding of 2.4m height between the construction site and the watercourse to mitigate potential impacts associated with otter. The hoarding will be installed to retain as far as is practical, a narrow riparian corridor for use by otter.

The construction works will commence following confirmation from the suitably qualified ecologist that no otter holt is located within 150m of any proposed works near watercourse. Should an otter holt be found to be present, the suitably qualified ecologist will advise, in discussion with the NTA and the appointed contractor on the appropriate actions to be taken.

Where night-time works are required, the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works (especially works carried adjacent to watercourses with known otter activity).

Specific mitigation in respect of the proposed culvert extension and headwall installation at the River Camac along the R134 New Nangor Road / Oak Road intersection is required. Instream works are proposed alongside the existing culvert under the road. In order to keep otter away from the works area, an additional section of mammal resistant fencing, as specified in the NRA (2006b) guidance, is required. The mammal resistant fencing will be placed along either side of the works area (extending at least 25m, but preferably 50m, alongside and away from the works area) but reconnecting with the existing culvert to maintain potential commuting access under the culvert). This temporary dry commuting territory will be provided shortly in advance of works commencing and will be retained for the duration of the proposed works in this area (estimated at 6.5 weeks).

12.5.1.4.3.5 Lighting

Refer to Section 12.5.1.4.1.4 for lighting mitigation measures.

12.5.1.4.4 Marine Mammals

12.5.1.4.4.1 Habitat and Food Source Degradation – Water Quality

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.

Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.4.5 Other Mammal Species

No other mammal species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme. The Construction Phase of the Proposed Scheme is not deemed to affect the local populations of other small mammal species and will not result in a likely significant negative effect, at any geographic scale.

However, in respect of water quality, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.5 Birds

12.5.1.5.1 Breeding Birds

12.5.1.5.1.1 Habitat Loss and Fragmentation

Where possible, habitats of importance to breeding birds such as scattered trees and parkland, treeline and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, that are not directly impacted will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown on the Landscaping General Arrangement drawings (BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the landscape drawings (refer to the Landscaping General Arrangement drawings (BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001) in Volume 3 of this EIAR for locations.

Many species may not nest near a road development due to disturbance (e.g., drowning out of bird song by traffic noise). Whilst the planting is not likely to fully offset the loss of breeding and foraging habitat (due to the proximity of road traffic disturbance on the operational road) it is likely to provide additional foraging habitat for some species.

12.5.1.5.1.2 Mortality Risk

Where practicable, vegetation (e.g., hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between the 01 March and the 31 August, to avoid direct impacts on nesting birds.

Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of breeding birds prior to clearance.

Areas found not to contain nests will be cleared within three days of the nest survey, otherwise repeat surveys will be required. Vegetation clearance will not commence where nests are present, works will resume when birds have fledged and nests are no longer in use, or an agreement is reached with NPWS.

12.5.1.5.1.3 Disturbance / Displacement

Similar to the requirements provided above in terms of reducing mortality risk, vegetation clearance undertaken in the appropriate time should ensure that breeding birds have adequate time in which to identify alternative vegetation in which to establish nests.

To mitigate disturbance and / or displacement to breeding birds from noise and vibration activities the relevant mitigation measures as described in Chapter 9 (Noise & Vibration) will be implemented by the appointed contractor.

The use of noise generating equipment will be tempered by the use of modern machinery that will have appropriate noise restrictors for use in urban situations. Furthermore, the location of equipment that has the potential to cause long-term noise impacts, will be sited in such a manner so that noise baffling screening reduces noise spill to adjacent areas of open ground.

12.5.1.5.1.4 Habitat Degradation – Water Quality

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding,

preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.

Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.5.2 Wintering Birds

12.5.1.5.2.1 Measures to Prevent Disturbance and Displacement Impacts during Construction

The following mitigation measures will be put in place at the Construction Compounds by the appointed contractor to minimise disturbance to SCI bird species:

- The appointed contractor will undertake the establishment of the Construction Compounds (in particular, TC3, TC4 and TC8) outside of the wintering bird season (October to March). However, where the construction programme does not allow these seasonal restrictions to be observed, then the locations of the Construction Compounds will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of wintering birds prior to establishment. Where wintering birds are observed the suitably qualified ecologist will, in discussion with the appointed the contractor, advise how works will be appropriately undertaken;
- Hoarding of the Construction Compounds will be in place prior to the arrival of wintering birds and will be retained on all sides of the compound for the duration of the works;
- The use of lighting at Construction Compounds where required will be such that it is not excessively tall thus providing an obstacle to low-flying birds potentially moving between feeding sites. Furthermore, and where security lighting is not required, lighting should not be continuously on when compound is closed. Sensor-operated lighting timers as necessary should be installed; and
- In addition to lighting at the Construction Compounds aligning with Section 12.5.1.4.1.4 the lighting column heights will be considered by the appointed contractor, so as not to act as an obstacle to birds and lighting including security lighting will be directed as far as is practical away from open ground outside construction compounds.

12.5.1.5.2.2 Habitat Degradation – Water Quality

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.

Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.6 Reptiles

No reptile species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme. The Construction Phase of the Proposed Scheme is not deemed to affect the local reptile population and will not result in a significant negative effect, at any geographic scale. As such, no mitigation is proposed.

12.5.1.7 Amphibians

12.5.1.7.1 Habitat Loss, Disturbance and Mortality Risk

No amphibian species were recorded during the multidisciplinary surveys carried out along the Proposed Scheme; however, potential suitable amphibian habitat was noted along the Proposed Scheme as noted in Section 12.3.11.

If vegetation clearance works by the appointed contractor are to begin during the season where frogspawn or tadpoles may be present (i.e., February to mid-summer), or where breeding adult newts, their eggs or larvae may be present (i.e., mid-March to September), a preconstruction survey of suitable habitat will be undertaken by a suitably qualified ecologist engaged by the appointed contractor to determine whether breeding amphibians are

present. Where amphibians are present, mitigation measures outlined below will be completed before works recommence.

- In the case of common frog, any frog spawn, tadpoles, juvenile or adult frogs present will be captured, under a licence from NPWS and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat, beyond the Zol of the Proposed Scheme;
- In the case of smooth newt, individuals will be captured, under a licence from NPWS, and removed from affected habitat either by hand net or by trapping and translocated to the nearest area of available suitable habitat, beyond the Zol of the Proposed Scheme. If used, the type and design of traps will be approved by the NPWS. This is a standard and proven method of catching and translocating smooth newt;
- If the size or depth of the habitat feature is such that it cannot be determined by a visual survey whether all amphibians have been captured, the suitably qualified ecologist engaged by the appointed contractor will advise on the appropriate course of action to confirm that no amphibian species remain. If drainage of the habitat feature is deemed to be the appropriate course of action, any mechanical pumps used will have a screen fitted, and be sited, such that no amphibian species can be sucked into the pump mechanism; and
- Any capture and translocation works will be undertaken immediately in advance of site clearance / construction works commencing.

12.5.1.7.2 Habitat Degradation - Water Quality

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.

Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.8 Fish

12.5.1.8.1 Habitat Loss and Fragmentation

Instream construction is required as part of the Proposed Scheme, namely the extension of an existing culvert and construction of a new headwall at the River Camac. Although there may be temporary disturbance in terms of potential impeded fish passage by virtue of the proposed works, there will be no significant loss of aquatic habitat nor alteration of potential spawning grounds as a result of its use.

Instream works will be required, and it is estimated that the construction will take approximately 6.5 weeks. Standard environmental protection measures as provided for in the CEMP, Appendix A5.1 in Volume 4 of this EIAR, will be implemented by the appointed contractor to reduce the duration of instream works and disturbance. Works associated with the construction of the Headwall at the Camac River will be undertaken outside the closed (fisheries) season (October to June) unless approved with Inland Fisheries Ireland by the appointed contractor, in consultation with the NTA. As there will be minimal loss of habitat, no further mitigation is proposed in respect of the physical alteration of watercourses during construction.

12.5.1.8.2 Disturbance / Displacement

Notwithstanding the need for instream works being carried out outside of the closed (fisheries) season (October – June), the presence of brown trout, a salmonid species of county importance given its relative paucity within the heavily modified River Camac, requires specific mitigation, which overlaps with that required for Crayfish (see Section 12.5.1.9.2) in terms of its timing. There is a need to electrofish the watercourse in advance of bunding and dewatering by appropriately licenced ecologists i.e., those in possession of a Section 14 licence issued by Inland Fisheries Ireland and the Department of the Environment, Climate and Communications for the purposes of undertaking electrofishing and translocating capture fish to suitable donor sites. The sequence of electrofishing (permitted during period July to September) will be confirmed by the licenced ecologist on site with the appointed

contractor in advance of works commencing and as it overlaps with the licence crayfish search, retrieval and translocation.

Strict biosecurity measures, following the Inland Fisheries Ireland 'Biosecurity Protocol for field surveys work' guidance (IFI 2010) as a minimum and those included in the CEMP (Section 5.3.4) will be implemented. This will include the following measures, and others as site conditions may dictate and advised by the licenced ecologist:

- Clean, check and dry all equipment;
- Steam washing of any plant in advance of arrival onsite and full drying of any equipment; and
- Virkon bath onsite for staff.

Following full dewatering, retrieval, and translocation of fish, over-pumping of the upstream sections of the River Camac will be required to ensure that the proposed works area is 'dry'. Pumps used for over-pumping will have a suitable sized mesh, or similar, as advised by the ecologist to ensure that the intake hose cannot draw up fish.

12.5.1.8.3 Habitat Degradation – Surface Water Quality

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.

Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.1.9 Aquatic Invertebrates and Freshwater Molluscs

White-clawed crayfish were recorded within the ZoI of the Proposed Scheme at the River Camac, and two Red listed molluscs are known from the Grand Canal. A Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment in respect of aquatic invertebrates during the Construction Phase of the Proposed Scheme.

12.5.1.9.1 Habitat Loss and Fragmentation

There will be unavoidable remodelling of approximately 4m of the already modified River Camac at the location for the proposed culvert extension and headwall construction. As the watercourse surface is already concrete with some muds, specific mitigation measures are required to ensure that crayfish are not lost during removal of sediments to facilitate the construction. Thus, the sequence of measures described in Section 12.5.1.9.2 will be put in place to ensure no crayfish mortality during the temporary loss of habitat.

12.5.1.9.2 Disturbance and Displacement

The presence of the Annex II White clawed crayfish at the proposed culvert extension and headwall construction will require specific mitigation measures, which are outlined below and will be implemented in full, although they may be modified if additional needs are identified by the licenced ecologist. The licenced mitigation will be undertaken at the same time as the licenced fish electrofishing (July to September) procedure described in Section 12.5.1.8.2.

- A preconstruction survey (under crayfish licence) of the affected watercourse will be completed in advance of construction to establish current densities;
- Owing to the potential for stress to aquatic organisms and to the protected nature of Crayfish and brown trout, a suitably qualified ecologist (with appropriate licences specific to each operation) will be present throughout works;
- Upstream bunding of the watercourse is required in the works area (under NPWS licence, supervised by a suitably qualified ecologist). Bunding of the area and over-pumping to facilitate translocation

from the works area with partial dewatering and then full dewatering will be implemented. Any remaining crayfish will be detected after full drawdown;

- It should be noted that in conjunction with crayfish translocation, the presence of salmonid spawning / nursery habitat and historical high densities of adult trout (confirmed from catchment surveys (Triturus Environmental Ltd, 2022) requires a Section 14 licence from Inland Fisheries Ireland. The translocation of trout from the proposed works area, as it is being dewatered, will be undertaken at the same time as the crayfish translocation;
- Following full drawdown of water, trapping (overnight) for crayfish will be undertaken by the licenced ecologist. Hand searching of bed refugia will be carried out and all crayfish translocated in a timely manner upstream along the River Camac to survey site CBC0809AQ001;
- Owing to the potential for Crayfish plague (no outbreaks currently known from River Camac), it is a requirement that the proposed upstream translocation site be confirmed as part of the NPWS licence or for an alternative site to be approved by the NPWS; and
- Following full dewatering, retrieval and translocation of white-clawed crayfish, over-pumping of the upstream sections of the River Camac will be required to ensure that the proposed works area is 'dry'. Pumps used for over-pumping will have a suitable sized mesh or similar, as advised by the ecologist, to ensure that the intake hose cannot draw up crayfish.

Similar to the requirement for biosecurity measures in respect of fish (see Section 12.5.1.8.2), strict biosecurity measures will be required for instream survey, mitigation and construction works.

12.5.1.9.3 Habitat Degradation – Surface Water Quality

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.

Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Section 12.5.1.2.2 and Chapter 13 (Water).

12.5.2 Operational Phase

12.5.2.1 Designated Areas for Nature Conservation

12.5.2.1.1 European Sites

The mitigation measures that are specifically required to ensure that the Proposed Scheme will not adversely affect the integrity of the European sites within the Zol are presented in the NIS. Following a consideration and assessment of the Proposed Scheme on the identified relevant European sites, the following mitigation measures were developed to address potential impacts that were identified:

- Measures to protect surface water quality during operation; and
- Measures to prevent the spread of non-native invasive species to downstream European sites.

12.5.2.1.2 National Sites

The mitigation measures in relation to potential impacts arising from the Proposed Scheme on pNHAs within the Zol are as set out for European sites as the boundaries of the pNHAs follow those of the SACs and SPAs. Therefore, the mitigation measures outlined in Section 12.5, and as detailed in the NIS (which accompanies the application for approval), will prevent the Proposed Scheme resulting in a significant negative effect on these pNHAs.

The mitigation measures in relation to potential impacts arising from the Proposed Scheme on the Grand Canal pNHA (and Dodder Valley pNHA in respect of surface water quality) includes habitat degradation as a result of surface water quality effects (See Section 12.5.2.2.1.2) and the spread of non-native invasive species (see Section 12.5.2.2.1.3).

12.5.2.1.3 Habitats

12.5.2.1.3.1 Habitat Loss and Fragmentation

Although there will be some limited remodeling of the linear terrestrial habitats (largely managed or built habitat) of the Grand Canal adjacent to the R134 New Nangor Road, there will no change in the aquatic vegetation and as such no specific mitigation is required.

12.5.2.1.3.2 Habitat Degradation – Surface Water Quality

The proposed SuDS drainage system, as shown in Proposed Surface Water Drainage Works drawings (BCIDA-ACM-DNG_RD-0809_XX_00-DR-CD-9001 in Volume 3 of this EIAR), will be installed by the appointed contractor during the Construction Phase.

Mitigation for the Operational Phase has been built into the design of the Proposed Scheme. The increase in surface water run-off from the increase in impermeable area will be managed for the Proposed Scheme by the appointed contractor through a combination of bioretention areas and filter drains. Where no new paved areas are proposed, the existing drainage network will be retained and utilised. The effective implementation of these measures will ensure that there is no increase in existing runoff rates from newly paved areas and appropriate treatment to ensure runoff quality. The range of measures including SuDS installed during the Construction Phase will reduce both the volume and rate of surface waters discharging into the existing surface water drainage network, as well as improving the environmental quality of any such discharges during the Operational Phase of the Proposed Scheme.

These standard drainage design controls have been proven through widespread use in developments across the country. The proposed SuDS drainage system incorporated into the design of the site are common drainage systems that are used in most development types. They are proposed and designed in accordance with the Greater Dublin Strategic Drainage Study (GSDSDS) (Dublin Drainage Consultancy 2005). Once the Proposed Scheme is in operation, the Local Authorities will be required to implement a maintenance and inspection regime for SuDS which will be subject to their management procedures. No additional mitigation is required.

12.5.2.1.3.3 Habitat Degradation – Non-Native Invasive Plant Species

Once the Proposed Scheme is in operation, the local authorities will implement a maintenance and inspection regime subject to their management procedures, where any introduction of non-native invasive plant species will be managed. No additional mitigation is required.

12.5.2.1.3.4 Habitat Degradation – Groundwater

Given there are no significant effects on habitats owing to impacts from groundwater changes, no mitigation is required.

12.5.2.1.4 Habitat Degradation - Air Quality

As discussed in Chapter 7 (Air Quality) the Proposed Scheme will have a generally neutral impact on air quality in respect of biodiversity and general habitats, and no specific Operational Phase mitigation measures are required.

12.5.2.2 Rare and Protected Flora Species

12.5.2.2.1 Habitat Degradation - Surface Water Quality

Refer to Section 12.5.2.1.3.2.

12.5.2.3 Mammals

12.5.2.3.1 Bats

12.5.2.3.1.1 Habitat Loss and Loss of Breeding / Resting Sites

The operation of the Proposed Scheme is not predicted to result in any significant effects to bats in the vicinity of the Proposed Scheme, particularly given that the bulk of the corridor is characterised by streetscape planting which offers limited roosting potential. There are a number of areas characterised by mixed age / mature planting adjacent to the Proposed Scheme and these areas are directly avoided by retaining them and their connectivity to the wider landscape and suitable potential bat foraging territory is largely maintained. Notwithstanding this, mitigation which has been proposed as part of the bat mitigation strategy and may be implemented dependent on the outcome of survey and / or licenced conditions will continue into Operational Phase of the Proposed Scheme for some time.

Replanting by the appointed contractor will be as per detailed in Section 12.5.1.2.1.

In line with the maintenance contract the appointed contractor will carry out annual post construction monitoring, over a two-year period to ensure the successful re-establishment of vegetation within the Proposed Scheme.

12.5.2.3.1.2 Indirect Disturbance of Flight Patterns Due to Operational Lighting

The operation of the Proposed Scheme is not predicted to result in any physical disturbance impacts to bats in the vicinity of the Proposed Scheme. Therefore, no mitigation is proposed.

Excess light spill from the Proposed Scheme may result in avoidance behaviour from bats within the vicinity of the Proposed Scheme. Where feasible, operational lighting will be kept to a minimum and light spill avoided.

There are no significant effects on bats predicted during the Operational Phase of the Proposed Scheme. It is recognised that installed or relocated lighting may in certain areas and owing to the removal of vegetation result in changes to lighting dispersal, potentially into areas previously where no significant light spill was present. However, the lighting design is such that there are no areas where considerable new lighting is required. Where new lighting is required, its design has already taken account of guidance in relation to bats at design stage. Therefore, no mitigation is required.

12.5.2.3.1.1 Monitoring of Bat Boxes

Where bat boxes are installed as part of the Construction Phase of the Proposed Scheme, monitoring is required under best practice guidance (e.g., Bat mitigation guidelines for Ireland (Marnell *et al.*, 2022)). The level of post-installation monitoring will be dependent on the roost type and the number of bats present. A precautionary approach will be assumed on the basis that bats using these PRFs reflect species that were typically noted during the activity surveys and are occasionally identified from urban transport corridors.

The NTA will ensure that annual inspections of installed bat boxes will be undertaken for two years, or as advised by a suitably qualified ecologist, to confirm occupancy.

Where no occupancy is noted in year 1, the boxes will be relocated to another mature tree and details communicated with the BCI, Local Authority Biodiversity Officer and NPWS.

12.5.2.3.2 Badgers

The Operational Phase of the Proposed Scheme is not predicted to result in any significant effects to populations of badger in the vicinity of the Proposed Scheme. Therefore, no mitigation is proposed.

12.5.2.3.3 Otter

12.5.2.3.3.1 Habitat Loss and Fragmentation

The Operational Phase of the Proposed Scheme is not predicted to result in any significant effects to populations of otter in the vicinity of the Proposed Scheme including the extended River Camac culvert and remodelled headwall. The design of the culvert extension and headwall includes the provision of gravel bed over concrete base, with benching to direct flows. Thus, the corridor will not be changed. Therefore, no specific mitigation is proposed in respect of habitat loss / fragmentation.

12.5.2.3.3.2 Disturbance / Displacement

There are no significant effects on otter predicted during the Operational Phase of the Proposed Scheme. The approximate 4m extension of the R134 New Nangor Road / Oak Road Culvert will not significantly alter the habitat nor the commuting corridor for otter, above what is the current situation.

While the pedestrian and cycle lanes alongside the Grand Canal may be remodeled to accommodate the Proposed Scheme along the R134 New Nangor Road, there should be no significant change in potential disturbance to otter as a result of human presence, above what is the current situation.

Similarly light levels will not be significantly different from current levels during the Operational Phase of the Proposed Scheme. No significant effects on otter species are predicted during the Operational Phase of the Proposed Scheme. Therefore, no specific mitigation is required.

12.5.2.3.3.3 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.3.2.

12.5.2.3.4 Marine Mammals

12.5.2.3.4.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.3.2.

12.5.2.3.5 Other Mammals Species

The Operational Phase of the Proposed Scheme is not predicted to result in any significant effects to populations of other small mammal species in the vicinity of the Proposed Scheme. Therefore, no mitigation is proposed.

12.5.2.4 Birds

12.5.2.4.1 Breeding Birds

12.5.2.4.1.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.3.2.

12.5.2.4.2 Wintering Birds

12.5.2.4.3 Habitat Loss and fragmentation

As part of the landscape plan for the Proposed Scheme and following on from the completion of works in the areas where Construction Compounds TC3, TC4 and TC8 are located, the re-establishment of vegetation in a timely manner is required. The reinstatement of grassland habitats within the footprint of the Construction Compounds TC3, TC4 and TC8 will be carried out by the appointed contractor, at the earliest possible moment. The re-establishment of the sward should be done outside of the wintering bird season so that it is established in advance of wintering bird return.

In line with the maintenance contract, a suitably qualified landscape contractor as engaged by the appointed contractor, will carry out annual post construction monitoring, over a two year period to ensure the successful re-establishment of vegetation within the Proposed Scheme.

12.5.2.4.4 Disturbance / Displacement

During the Operational Phase, the Proposed Scheme has the potential to disturb and displace wintering bird species from known wintering bird sites near the Proposed Scheme boundary due to an increase in noise, human activity and visual disturbance associated with increased human presence and increased bus flow. Although the operational disturbance / displacement effect cannot be quantified it would be expected to be much less than the 300m ZoI associated with construction works. Most species of wintering birds are likely to habituate to the increased traffic flows and human presence along cycle tracks etc. Any Operational Phase noise increases are not likely to alter the existing baseline effect on wintering birds using the habitats locally.

Although there is still likely to be some level of displacement effect, a perceptible effect would be expected to be limited to habitats immediately adjacent to the Proposed Scheme. Tymon Park is immediately adjacent to the Proposed Scheme, whilst other documented wintering birds sites and large open spaces including Clonmacnoise Roundabout, Eamonn Ceannt Park, Synge St. GAA Pitches, Beechfield Road Sports Grounds, Pearse Memorial Park and Brickfields are proximal but setback from the Proposed Scheme.

Wintering birds disturbed during Operational Phase would revert to suitable sites in the surrounding environment, and therefore impacts are not considered to be significant beyond the local level. Therefore, in consideration of these factors, and the fact that there is no significant loss of suitable foraging habitat within the Proposed Scheme boundary that is utilised by wintering birds and an increase in short-term disturbance or displacement effects will not affect the conservation status of any wintering bird species and will not result in a significant negative effect, at any geographic scale.

12.5.2.4.4.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.3.2.

12.5.2.5 Reptiles

No significant effects on reptile species are predicted during the Operational Phase of the Proposed Scheme. Therefore, no mitigation is required.

12.5.2.6 Amphibians

12.5.2.6.1 Habitat Degradation- Surface Water

Refer to Section 12.5.2.1.3.2.

12.5.2.7 Fish

The Operational Phase of the Proposed Scheme is not predicted to result in any significant effects to populations of fish in the vicinity of the Proposed Scheme, including the extended River Camac culvert and remodelled headwall. The design of the culvert extension and headwall includes the provision of gravel bed over concrete base, with benching to direct flows. Therefore, no additional mitigation is proposed in respect of habitat loss / fragmentation, and over time natural riverine dynamic will also model the edges.

12.5.2.7.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.3.2.

12.5.2.8 Aquatic Invertebrates and Freshwater Molluscs

The Operational Phase of the Proposed Scheme is not predicted to result in any significant effects to populations of aquatic invertebrates in the vicinity of the Proposed Scheme, including the extended River Camac culvert and

remodelled headwall. The design of the culvert extension and headwall includes the provision of gravel beds over concrete base, with benching to direct flows. Therefore, no additional mitigation is proposed in respect of habitat loss / fragmentation, and over time, natural riverine dynamic will bring in more gravel and muds which would be utilised by White-clawed Crayfish.

12.5.2.8.1 Habitat Degradation - Surface Water

Refer to Section 12.5.2.1.3.2.

12.6 Residual Impacts

12.6.1 Construction Phase

Following the implementation of the mitigation measures outlined in Section 12.5, the Proposed Scheme will not result in any significant residual effects above the local scale on the KERs identified (see Table 12.17) on its own, or cumulatively together with other proposed developments during the Construction Phase.

Table 12.17: Summary of Construction Phase Significant Residual Impacts

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Designated Areas for Nature Conservation				
North Dublin Bay SAC North Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale	No significant residual effect
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale	No significant residual effect
Howth Head SAC Howth Head pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Wicklow Mountains SAC Wicklow Mountains pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA North Dublin Bay pNHA Booterstown Marsh pNHA	International Importance National Importance National Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale	No significant residual effect
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
			national geographic scale	
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale	No significant residual effect
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Rogerstown Estuary SPA Portrairie Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Grand Canal pNHA	National Importance	Habitat degradation (hydrology; air quality; non-native invasive plant species)	Likely significant effect at the national geographic scale	No significant residual effect
Dodder Valley pNHA	National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the national geographic scale	No significant residual effect
Habitats (outside of designated areas for nature conservation)				
Canal (FW3)	National Importance	See Grand Canal pNHA	See Grand Canal pNHA	No significant residual effect
Depositing/ lowland rivers (FW2)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Reed and large sedge swaps (FS1)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Depositing/ lowland rivers (FW2)	Local Importance (Higher Value)	Habitat Loss, Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Canals (FW3)	National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Drainage ditches (FW4)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Dry meadows and grassy verges (GS2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	No significant residual effect
(Mixed) broadleaved woodland (WD1)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Mixed broadleaf/conifer woodland (WD2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	No significant residual effect
Scattered trees and parkland (WD5)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	No significant residual effect
Hedgerows (WL1)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Treelines (WL2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Immature woodland (WS2)	Local Importance (Higher Value)	Habitat loss	Likely significant effect at the local geographic scale	Likely significant effect at the local geographic scale
Rare / Protected Plant Species				
Flora Species listed on the Flora Protection Order (<i>opposite leaved pondweed</i>)	National Importance	Habitat degradation (hydrology)	Likely significant effect at national geographic scale	No significant residual effect
Flora Species on Irelands Red Lists (Vulnerable or of higher concern concern)	National Importance	Habitat degradation (hydrology)	Likely significant effect at the national geographic scale	No significant residual effect
Non-native invasive plant species	N/A	Spread at expense of other habitats, habitat degradation (hydrology)	Likely significant effect at the local to international scale geographic scale	No significant residual effect
Fauna Species				
Bats	Local Importance (Higher Value)	Habitat loss / fragmentation; disturbance / displacement	Likely significant effect at the local geographic scale	No significant residual effect
Badger	Local Importance (Higher Value)	Disturbance / displacement	Likely significant effect at the local geographic scale	No significant residual effect
Otter	County Importance	Habitat loss / fragmentation, mortality risk; disturbance / displacement; habitat, degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Marine Mammals	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale	No significant residual effect
SCI bird species	International Importance	See SPAs above	See SPAs above	See SPAs above
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Habitat loss; mortality risk; disturbance / displacement; habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect (Habitat Degradation (hydrology) Mortality risk) Likely significant residual effect at the local geographic scale (Habitat Loss; Disturbance / Displacement)
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Amphibians	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Fish species – Brown Trout)	County Importance	Habitat loss; mortality risk; disturbance / displacement, Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Non-Annex other fish	Local importance (Higher Value)	Habitat loss; mortality risk; disturbance / displacement; Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Invertebrates – White clawed crayfish and Freshwater molluscs	County Importance	Habitat loss; mortality risk; disturbance / displacement; habitat (White clawed Crayfish only Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Local Biodiversity Areas				
South Dublin County Green Infrastructure	County Importance	See River Camac under habitats	Likely significant effect at the local geographic scale	No significant residual effect
Dublin City's Green Infrastructure Network	County Importance	River Camac and Grand Canal captured under habitats, Wintering birds sites captured under Birds and habitats	Likely significant effect at the local geographic scale	No significant residual effect

12.6.2 Operational Phase

Following the implementation of the mitigation measures outlined in Section 12.5, the Proposed Scheme will not result in any significant residual effects on the KERs identified (Table 12-18) on its own, or cumulatively together with other proposed developments during the Operational Phase.

Table 12-18: Summary of Operational Phase Significant Residual Impacts

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Designated Areas for Nature Conservation				
North Dublin Bay SAC North Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale	No significant residual effect
South Dublin Bay SAC South Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale	No significant residual effect
Howth Head SAC Howth Head pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Rockabill to Dalkey Island SAC Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Lambay Island SAC Lambay Island pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Wicklow Mountains SAC Wicklow Mountains pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
South Dublin Bay and River Tolka Estuary SPA Dolphins, Dublin Docks pNHA South Dublin Bay pNHA North Dublin Bay pNHA Boosterstown Marsh pNHA	International Importance National Importance National Importance National Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale	No significant residual effect
Baldoyle Bay SPA Baldoyle Bay pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
North Bull Island SPA North Dublin Bay pNHA	International Importance National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the international to national geographic scale	No significant residual effect
Malahide Estuary SPA Malahide Estuary pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Ireland's Eye SPA Ireland's Eye pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Howth Head Coast SPA Howth Head pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Rogerstown Estuary SPA Portraine Shore pNHA Rogerstown pNHA	International Importance National Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Lambay Island SPA Lambay Island pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Dalkey Island SPA Dalkey Coastal Zone and Killiney Hill pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
Skerries Islands SPA Skerries Islands NHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international to national geographic scale	No significant residual effect
The Murrough SPA The Murrough pNHA	International Importance National Importance	Habitat degradation (hydrology)	Likely significant effect at the international geographic scale	No significant residual effect
Grand Canal pNHA	National Importance	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the national geographic scale	No significant residual effect
Habitats (outside of designated areas for nature conservation)				
Canals (FW3)	National	See Grand Canal pNHA	Likely significant effect at the national geographic scale	No significant residual effect
Reed and large sedge swamps (FS1)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Depositing/lowland rivers (FW2)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Drainage ditches (FW4)	Local Importance (Higher Value)	Habitat degradation (hydrology; non-native invasive plant species)	Likely significant effect at the local geographic scale	No significant residual effect
Rare / Protected Plant Species				
Flora Species listed on the Flora Protection Order (opposite leaved pondweed)	National Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale	No significant residual effect
Flora Species on Irelands Red Lists (Vulnerable or of higher concern concern)	National Importance	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale	No significant residual effect

Ecological Receptor	Ecological Valuation	Potential Impact (Pre-Mitigation and Monitoring)	Potential Significance	Significant Residual Impact (Post Mitigation and Monitoring)
Non-native invasive plant species	N/A	Spread at expense of other habitats	Likely significant effect at the local to International geographic scale	No significant residual effect
Fauna Species				
Otter	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Marine Mammals	County	Habitat degradation (hydrology)	Likely significant effect at the local to national geographic scale	No significant residual effect
SCI bird species	International Importance	See SPAs above	See SPAs above	See SPAs above
All other breeding bird species (non-SCI)	Local Importance (Higher Value)	Disturbance / displacement; habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
All other wintering bird species (non-SCI)	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Amphibians	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Fish Species – Brown Trout	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Non-Annex fish species	Local Importance (Higher Value)	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Invertebrates – white clawed crayfish and freshwater molluscs	County Importance	Habitat degradation (hydrology)	Likely significant effect at the local geographic scale	No significant residual effect
Local Biodiversity Areas				
South Dublin County Green Infrastructure	County Importance	See River Poddle under habitats	Likely significant effect at the local geographic scale	No significant residual effect
Dublin City's Green Infrastructure Network	County Importance	See River Camac and Grand Canal captured under habitats, Wintering birds sites captured under Birds and habitats	No likely significant effect at any geographic scale	No significant residual effect

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