

Chapter 10.0

Biodiversity

10 Biodiversity

10.1 Introduction

This chapter outlines the biodiversity (floral and faunal features) of the receiving environment within the planning application area and within a wider Zone of Influence (Zoi)¹ in the vicinity of the proposed development at Ballyvolane. It comprises information as required by Annex IV to the EIA Directive to be contained in an EIA Report, in respect of flora, fauna and avifauna.

The aims of this ecological impact assessment are to:

- Establish baseline ecological data for the proposed development site;
- Determine the ecological value of the identified ecological features;
- Appraise the impact of the proposed development on ecological features of value (flora and fauna);
- Propose effective mitigation measures to avoid, reduce, remedy or compensate potential impacts; and
- Identify any residual impacts predicted to arise after mitigation.

A full description of the development is provided in Chapter 2: Description of Proposed Development.

10.2 Methodology

This ecological impact assessment was carried out by Karen Banks, MCIEEM. Karen is an ecologist with Greenleaf Ecology and has 13 years' experience in the field of ecological assessment. Karen is experienced in the production of Ecological Impact Assessments (EclA) including those for small to large scale housing and mixed-use developments, flood alleviation schemes, wind farms and transport infrastructure. Karen is an experienced and licenced bat surveyor and has conducted bat survey and assessment for numerous projects, including bridge repair and replacement works, domestic dwelling repair and demolition works and large scale energy and infrastructure projects.

10.2.1 Desk Study

In addition to those listed in the References Section, the sources of published material that were consulted as part of the desk study for the purposes of the ecological review are as follows:-

- Review of the National Parks & Wildlife Service (NPWS) natural heritage database for designated areas of ecological interest and sites of nature conservation importance within and adjacent to the study area;
- Review of Ordnance Survey maps and ortho-photography;
- Review of the National Biodiversity Data Centre (NBDC) database for records of rare and protected species within 2km of the subject site;
- Review of the National Biodiversity Data Centre (NBDC) database for mapping of the Model of Bat Landscapes for Ireland (Lundy *et al.*, 2011) and bat roost sites within a 10km radius of the site;
- Aerial Photography;
- 1:50,000 Ordnance Survey (OS) Map; Discovery Series; and
- Environmental Protection Agency mapping (<http://gis.epa.ie/Envision>).

¹ In accordance with CIEEM (2018) guidelines, the Zone of Influence is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities.

10.2.1.1 Relevant Planning Policy and Legislation

The appraisal of the likely significant impacts of the proposed development on ecological features has considered legislation, policy documents, and guidelines as outlined in Appendix 10.1, where relevant. The Cork County Development Plan 2014-2020 was reviewed. The Cork County Development Plan (CDP) sets out Cork County Council's policies and objectives for the development of the county over the Plan period. It prescribes policies and objectives in relation to water services, surface water and waste in Chapter 11 of the Plan, heritage in Chapter 12 and green infrastructure and environment in Chapter 13 of the Plan. Information on designated sites is set out in Chapter 3 of Volume 2, Heritage and Amenity; and a list of protected species of flora and fauna and habitats of special conservation significance occurring in County Cork is set out in Volume 2, Heritage and Amenity, Chapter 4 Habitats and Species Data. Relevant Policies and Objectives of the CDP are outlined in **Appendix 10.1** of this Report.

10.2.1.2 Consultation

An EIA scoping exercise was undertaken by Cunnane Stratton Reynolds in August/ October 2017. A letter was sent to relevant ecological bodies as described in Chapter 1: Introduction. A summary of the consultation responses is provided in Chapter 1 of this EIAR.

Relevant correspondence for the ecological assessment is summarised below in Table 10.1.

Table 10.1 Consultation Undertaken for the Proposed Development

Consultee	Summary of Consultation
<p>Development Applications Unit of the Department of Culture, Heritage and the Gaeltacht.</p> <p>Letter sent by Cunnane Stratton Reynolds on 2nd October 2017;</p> <p>Email sent by Greenleaf Ecology on 10th July 2019.</p>	<p>No response has been received to date.</p>
<p>Sharon Casey, Cork County Council. Email sent to Cunnane Stratton Reynolds on 15th August 2017.</p>	<p>Comments included <i>inter alia</i>: It is recommended that the applicants, with support from an ecologist, would explore opportunities for biodiversity enhancement while designing their scheme.</p> <p>The implications of the proposed development on ecological resources and the natural environment will need to be assessed by ABP and to that end, it is advised that the applicants be requested to provide an Ecological Impact Assessment Report which should be prepared in accordance with CIEEM Guidelines for Impact Assessment in the UK and Ireland (January 2016).</p>

	<p>It is advised that field survey and report preparation be carried out by appropriately qualified and experienced ecologist(s). Relevant experience of consultant ecologists should be cited within the report.</p> <p>It is recommended that applicants would have regard to CDP Policies HE 2-1, HE 2-2, HE 2-3, HE 2-4, HE 2-5, GI 3-2, WS 5-1, WS 5-2 and WS 5-3 and to CCC Guidance - Biodiversity and the Planning Process in the development of the scheme and completion of required assessments.</p> <p>It is recommended that the applicants would submit a Construction and Environmental Management Plan which would contain details of all measures to be implemented on site to minimise risk of impact on key environmental and (where appropriate) other heritage receptors.</p>
<p>Mr Michael McPartland Inland Fisheries Ireland Macroom Co. Cork.</p> <p>Email sent by Greenleaf Ecology on 10th June 2019;</p> <p>Email sent by Greenleaf Ecology on 24th September 2019 clarifying proposed works.</p>	<p>Clarification requested regarding whether the proposals will interfere with the bed or banks of any watercourse.</p> <p>No response to date</p>

10.2.2 Designated Sites

A review of European and nationally designated sites within a 15km radius of the site was undertaken (www.npws.ie). Cognisance was also taken of any sites with a potential impact receptor pathway outside of the 15km assessment area, none of which are relevant in this case.

Special Areas of Conservation (SACs) are sites of international importance due to the presence of Annex I habitats and / or Annex II species listed under the EU Habitats Directive. Special Protection Areas (SPAs) are designated for birds based on the presence of internationally significant populations of listed bird species.

Natural Heritage Areas (NHAs) are sites deemed to be of national ecological importance and are afforded protection under the Wildlife (Amendment Act) 2000. The proposed Natural Heritage Areas (pNHA) have not been statutorily proposed or designated; however do have some protection under Agri Environmental Options Scheme (AEOS), Coillte, County Development Plans and Licensing Authorities.

10.2.3 Field Survey

10.2.3.1 Habitats and Flora Survey

Walkover surveys of the site and its environs were undertaken on 15th March 2017, 13th July 2017, 29th June 2018, 31st August 2018 and 5th September 2019. The habitat and flora site assessment was carried out in accordance with current guidelines (Smith et al. 2010). The habitats found in the study area (shown on Figure 10.3), were classified in accordance with the guidelines set out in 'A Guide to Habitats in Ireland' (Fossitt, 2000), which classifies habitats based on the vegetation present and management history. The classification is a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. The classification is hierarchical and operates at three levels, outlining the correlation between its habitat categories and the phytosociological units (plant communities) of botanical classifications. Dominant species, indicator species and/or species of conservation interest were recorded and species recorded were given both their Latin and common names, following the nomenclature as given in the 'New flora of the British Isles' (Stace, 2010). Any other records of interest (e.g. invasive plant species) were also noted.

The conservation status of habitats and flora was considered in respect of the following: Irish Red Data Book for Vascular Plants (Wyse Jackson et al. 2016); Red List of Bryophytes (Lockhart et al. 2012); Flora Protection Order (2015); the EU Habitats Directive (92/43/EEC).

10.2.3.2 Fauna Survey

Fauna were surveyed through observation of field signs such as direct observation, tracks, feeding signs and droppings. Habitats were assessed for their potential for use, or confirmed use, by protected species of fauna during the site walkover undertaken on 15th March 2017. The results of the site walkover then informed the scope of taxon specific surveys as detailed in the following sections.

Bats

Bat surveys undertaken at the site were cognisant of the following guidelines:-

- Bat Conservation Ireland, (2010). *Guidance notes for Planners, Engineers, Architects, and Developers*;
- BTHK (2018). *Bat Roosts in Trees- A Guide to Identification and Assessment for Tree-Care and Ecology Professionals*. Exeter: Pelagic Publishing.
- Collins, J. (ed.) (2016). *Bat Surveys for Professional ecologists: Good Practice Guidelines* (3rd ed.). The Bat Conservation Trust, London;
- Kelleher, C. & Marnell, F. (2006). *Bat Mitigation Guidelines for Ireland*; and
- NRA (2006). *Guidelines for the Treatment of Bats During the Construction of National Road Schemes*.

Trees present on site were assessed for their suitability to support bats. This includes features with potential as roosting or resting places, such as frost cracks, damaged limbs, lifting bark plates and knot-holes. Trees were categorised according to the criteria described in Table 10.2 below (Collins, J. 2016). The suitability of habitats for commuting, foraging or swarming was also assessed and categorised according to Table 10.2.

Table 10.2 Suitability of Habitats for *Bats*

Suitability	Description Roosting Habitats	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).</p> <p>A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.</p>	<p>Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.</p>
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only- assessments are made irrespective of species conservation status, which is established after presence is confirmed).	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	<p>Continuous, high quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to and connected to known roosts.</p>

Bat activity surveys were conducted across the proposed site using an Anabat Walkabout detector, which records bat echolocation calls directly on to an internal SD memory card. Each time a bat is detected, an individual time-stamped (date and time to the second) file is

recorded. Data was then downloaded and bat calls were later analysed by BatSound spectrogram sound analysis software version 4.1 and Anabat Insight Version 1.9.

Dusk activity surveys (from sunset, for a minimum of 120 minutes) were conducted. These surveys enable a determination of the approximate numbers and species of bats present within the site, areas used for foraging, commuting routes to and from roosts and any changes in mid to late summer activity levels. The approximate flying height and direction taken by bats were estimated and detailed where possible.

Assessment of bat activity was undertaken between July 2017 and September 2019. A total of 5 dusk activity surveys were completed, and were undertaken on 22nd July 2017, 29th August 2017 and 16th September 2017, 29th August 2018 and 5th September 2019. All surveys were conducted in optimum weather conditions (avoiding periods of very heavy rain, strong winds (> Beaufort Force 5), mists and dusk temperatures below (10°C).

The proposed site does not support any structures that may support potential roosting sites. Therefore no emergence/ re-entry roost surveys were undertaken.

The conservation status of bats was considered with reference to the Irish Wildlife Acts (as amended), Red List of Terrestrial Mammals (Marnell et al. 2009), The Status of EU Protected Habitats and Species in Ireland (NPWS, 2013) and the EU Habitats Directive.

Ground Mammals

Upon review of the results of the site walkover, badger surveys were conducted within the proposed development footprint and the blue line boundary of the site on 13th July 2017, 31st August 2018 and 5th September 2019. Badger surveys were conducted in accordance with Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009).

Field signs of badger activity are characteristic and sometimes quite obvious and can include tufts of hair caught on barbed wire fences and scrub, conspicuous badger paths, footprints, small excavated pits or latrines in which droppings are deposited, scratch marks on trees, and snuffle holes, which are small scrapes where badgers have searched for insects and plant tubers (NRA, 2009).

Notes were made on signs of other mammals in order to deduce the likelihood of faint tracks and/or feeding signs belonging to badgers. The objectives of the badger surveys were to:

- Confirm whether or not badger setts occur within the area surveyed.
- Confirm where possible the status of any setts identified in surveys.
- Describe field signs of badger activity.

The conservation status of mammals was considered with reference to the Irish Wildlife Act (as amended), Red List of Terrestrial Mammals (Marnell et al. 2009) and the EU Habitats Directive.

Birds

A record was made of birds observed during the initial site walkover undertaken on 15th March 2017. Breeding bird surveys were undertaken on 13th July 2017 between 07.30 and 09.30, 28th July 2017 between 07.45 and 09.45 and 9th April 2019 between 09.00 and 11.00 using a line transect methodology (Bibby *et al.*, 2000 and Sutherland *et al.*, 2004). All species that were seen or heard within 50m of the surveyor were recorded. All bird locations, numbers and behaviour were recorded by annotating field maps and taking notes. Breeding evidence such as singing males, agitated behaviour, carrying food and recently fledged young was recorded. The breeding status of all species encountered during surveys were classified into four categories: Confirmed (Br), Probable (Pr), Possible (Po) and Nonbreeder (N), based on British Trust for Ornithology (BTO) categories of breeding evidence, as

detailed in Table 10.3. The surveys were conducted under dry, calm and light weather conditions.

The conservation status of bird species recorded was considered in respect of the following: Irish Wildlife Act (as amended); Birds of Conservation Concern in Ireland (BoCCI) Red, Amber and Green lists (see Colhoun & Cummins 2013); EU Birds Directive Annex I list.

Table 10.3 BTO categories of breeding bird evidence

Breeding status	Confirmed breeder (Br)	Probable breeder (Pr)	Possible breeder (Po)	Non-breeder (N)
Observed behaviours	Distraction display or injury feigning (DD)	Pair in suitable nesting habitat (P)	Observed in suitable nesting habitat (H)	Flying Over (F)
	Used nest or eggshells found from current season (UN)	Permanent Territory (T)	Singing Male (S)	Migrant (M)
	Recently fledged young or downy young (FL)	Courtship and Display (D)		Summering non-breeder (U)
	Adults entering or leaving nest site indicating occupied nest (ON)	Visiting probable nest site (N)		
	Adult carrying faecal sac or food for young (FF)	Agitated Behaviour (A)		
	Nest containing eggs (NE)	Brood patch of incubating bird (I)		
	Nest with young seen or heard (NY)	Nest Building or excavating nest hole (B)		

Reptiles and Amphibians

A survey for amphibians and reptiles was undertaken as part of the site walkover survey undertaken on 15th March 2017, which is during the amphibian breeding season (January to May). Potential breeding sites, e.g. areas of standing water were the targeted habitats for the species surveys.

The conservation status of invertebrates was considered with reference to Irish Wildlife Acts (Amended) and the Irish Red List for Amphibians, Reptiles & Freshwater Fish (King et al. 2011).

Invertebrates

Surveys for invertebrates were undertaken as part of the habitat survey undertaken on 13th July 2017 and the site walkover undertaken on 31st August 2018.

The conservation status of invertebrates was considered with reference to Irish Wildlife Acts (Amended), Irish Red List for Butterfly (Regan et al. 2010), Irish Red List for Damselflies & Dragonflies (Nelson et al. 2011), Regional Red List of Irish Bees (Fitzpatrick et al. 2006) and the EU Habitats Directive.

10.2.4 Impact Assessment

The information gathered from desk study and survey has been used to make an ecological impact assessment (EclA) of the proposed development upon the identified ecological features. The EclA has been undertaken following the methodology set out in CIEEM (2018) and with reference to BS 42020:2013. EclA is based upon a source-pathway-receptor model, where the source is defined as the individual elements of the proposed development that have the potential to affect identified ecological features. The pathway is defined as the means or route by which a source can affect the ecological features. An ecological feature is defined as the feature of interest, being a species, habitat or ecologically functioning unit of natural heritage importance. Each element can exist independently however an effect is created where there is a linkage between the source, pathway and feature.

A significant effect is defined in CIEEM (2018) as:

“an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’.... or for biodiversity in general”.

BS 42020:2013 states that if an effect is sufficiently important to be given weight in the planning balance or to warrant the imposition of a planning condition, e.g. to provide or guarantee necessary mitigation measures, it is likely to be “significant” in that context at the level under consideration. The converse is also true: insignificant effects would not warrant a refusal of permission or the imposition of conditions.

Likely significant effects are predicted on the basis of the proposed development as set out in Chapter 2: The Development.

The valuation of ecological features is in accordance with the methodology detailed in National Roads Authority Guidelines (2009). To qualify as an ecological feature (referred to as key ecological receptors in the NRA Guidelines), features must be of local ecological importance (higher value) or higher as per the geographical frame of reference detailed in **Appendix 10.2**. Features of lower ecological value are not assessed.

10.3 Baseline Ecological Conditions

10.3.1 Designated Sites

The proposed site does not comprise any protected areas. There are three European Sites within 15km of the proposed site. The closest are Cork Harbour SPA, located c. 2.8km to the south-east and Great Island Channel SAC and pNHA, which is located c. 6.9km to the south-east of the proposed site. A list of designated sites recorded within 15km of the proposed site is presented in Table 10.4. European Sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) are illustrated in Figure 10.1 and Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) in Figure 10.2 below. A review of nationally designated sites indicates that there are nineteen sites designated for nature conservation within 15km of the proposed site.

A Natura Impact Statement (NIS) in support of Appropriate Assessment for the proposed development has been prepared in accordance with the requirements of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) as amended and the Planning and Development Act, 2000 – 2019, and is presented separately to this EIAR.

Table 10.4 International and National Designated Sites within 15km of the Proposed Site

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
Great Island Channel SAC and pNHA	001058	<p>Annex I Habitats</p> <p>Mudflats and sandflats not covered by seawater at low tide (1140)</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) (1330)</p>	6.9km	Field drains at the site drain to an unnamed stream located to the west of Ballyhooly Road. The unnamed stream flows into the Ballincolly River, which ultimately drains into the open waters of Cork Harbour.
Blackwater River SAC	002170	<p>Annex I Habitats</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Perennial vegetation of stony banks [1220]</p> <p><i>Salicornia</i> and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p>	11.6km	No, due to the distance and absence of hydrological, hydrogeological or habitat connectivity.

² Distance measured “as the crow flies”

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
		<p>Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachium</i> vegetation [3260]</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II Species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p> <p><i>Trichomanes speciosum</i> (Killarney Fern) [1421]</p>		
Cork Harbour SPA	004030	<p>Bird Species:</p> <p>Little grebe (<i>Tachybaptus ruficollis</i>) [wintering]</p> <p>Great crested Grebe (<i>Podiceps cristatus</i>) [wintering]</p>	2.8km	Field drains at the site drain to an unnamed stream located to the west of

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
		Cormorant (<i>Phalacrocorax carbo</i>) [wintering] Grey heron (<i>Ardea cinerea</i>) [wintering] Shelduck (<i>Tadorna tadorna</i>) [wintering] Wigeon (<i>Anas penelope</i>) [wintering] Teal (<i>Anas crecca</i>) [wintering] Pintail (<i>Anas acuta</i>) [wintering] Shoveler (<i>Anas clypeata</i>) [wintering] Red-breasted Merganser (<i>Mergus serrator</i>) [wintering] Oystercatcher (<i>Haematopus ostralegus</i>) [wintering] Golden Plover (<i>Pluvialis apricaria</i>) [wintering] Grey Plover (<i>Pluvialis squatarola</i>) [wintering] Lapwing (<i>Vanellus vanellus</i>) [wintering] Dunlin (<i>Calidris alpina</i>) [wintering] Black-tailed Godwit (<i>Limosa limosa</i>) [wintering] Bar-tailed Godwit (<i>Limosa lapponica</i>) [wintering] Curlew (<i>Numenius arquata</i>) [wintering] Redshank (<i>Tringa totanus</i>) [wintering]		Ballyhooly Road. The unnamed stream flows into the Ballincolly River, which ultimately drains into Cork Harbour SPA.

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
		Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [wintering] Common Gull (<i>Larus canus</i>) [wintering] Lesser Black-backed Gull (<i>Larus fuscus</i>) [wintering] Common Tern (<i>Sterna hirundo</i>) [breeding] Wetlands		
Rockfarm Quarry, Little Island pNHA	001074	Rock Farm Quarry is located c. 9km west of Cork City on Little Island in the River Lee estuary. The area is of considerable interest botanically because of its species diversity and the presence of 'rarities' for the region, such as the dense-flowered orchid and the Portland Spurge.	6.9km	No, due to the distance and absence of hydrological or habitat connectivity.
Cork Lough pNHA	001081	This small lake is situated in the north-west of Cork City, 1km. north of the River Lee. The site is a N.H.A. of local important for its bird community.	4.1km	No, due to the distance and absence of hydrological or habitat connectivity.
Blarney Lake pNHA	001798	This site is situated approximately 1km south west of Blarney, close to Blarney Castle. This site contains an interesting wetland community which is one of three closely situated rich and varied sites.	7.6km	No. The proposed site and this pNHA are situated in the same Groundwater Body ³ . However, review of

³ <https://gsi.ie/Mapping.htm>

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
				local topography and WFD sub-catchment boundaries indicates that groundwater would not flow from the site towards this pNHA. There is no hydrological or habitat connectivity.
Ardamadane Wood pNHA	001799	Ardamadane Wood is situated north of Blarney along the banks of the River Martin. This site comprises mainly dry deciduous woodland of Sessile Oak (<i>Quercus petraea</i>) and Downy Birch (<i>Betula pubescens</i>).	7.3km	No. The proposed site and this pNHA are situated in the same Groundwater Body. However, review of local topography and WFD sub-catchment boundaries indicates that groundwater would not flow from the site towards this pNHA. There is no hydrological or habitat connectivity.

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
Dunkettle Shore pNHA	001082	This site is located at the mouth of Glashaboy River, where it meets the Lee estuary, on the eastern edge of Cork city. It is adjacent to Glanmire Wood, N.H.A., and is an integral part of Cork harbour, which contains several other N.H.A.'s. The site is of value because its mudflats provide an important feeding ground for waterfowl and it acts as a significant roost for birds in the upper harbour. Furthermore, it is an integral part of Cork harbour which is an internationally important wetland, regularly holding flocks of over 20,000 waterfowl.	3.8km	No, due to the distance and absence of hydrological or habitat connectivity.
Monkstown Creek pNHA	001979	Monkstown Creek is situated between Monkstown and the major seaport of Ringaskiddy on the western shores of Cork Harbour. The area is of value because its mudflats provide an important feeding area for waterfowl and it is a natural part of Cork Harbour which, as a complete unit, is of international importance for waterfowl.	11.4km	No, due to the distance and absence of hydrological or habitat connectivity.
Blarney Castle Woods pNHA	001039	This site is situated approximately 1km south west of Blarney, in the	7.6km	No. The proposed site and this pNHA are

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
		<p>grounds of Blarney Castle.</p> <p>The base rich woodland is an example of a habitat not widely found in Cork where acid uplands predominate.</p>		<p>situated in the same Groundwater Body. However, review of local topography and WFD sub-catchment boundaries indicates that groundwater would not flow from the site towards this pNHA. There is no hydrological or habitat connectivity.</p>
Blarney Bog pNHA	001857	<p>Blarney Bog is an area of fen situated in the flat valley floor of the River Blarney. The main habitats of the area are lowland wet grassland and freshwater marsh/fen. The area as a whole is used by a variety of bird species.</p>	5.1km	<p>No. The proposed site and this pNHA are situated in the same Groundwater Body. However, review of local topography and WFD sub-catchment boundaries indicates that groundwater would not flow from the site towards</p>

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
				this pNHA. There is no hydrological or habitat connectivity.
Bride/Bunaglanna Valley pNHA	000079	No site synopsis available.	13.4km	No, due to the distance and absence of hydrological or habitat connectivity.
Douglas River Estuary pNHA	001046	This is a large site situated in the north-west corner of Cork Harbour, stretching from Blackrock to Passage West. It is an integral part of Cork Harbour, which contains several other N.H.A.'s. This site occurs within the upper harbour and consists of extensive mudflats, formed from fine silts, bisected by the Douglas River. Damp grassland occurs on part of the southern side, extending to some low islands which are inundated in extreme tides. This site is of interest because it is an essential part of the Cork Harbour complex and contains much higher densities of waders than would be expected from its relative size. It is ranked as the second most important area within the harbour.	3.7km	No, due to the distance and absence of hydrological or habitat connectivity.

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
Cuskinny Marsh pNHA	001987	This site is located 2.5km east of the centre of Cobh on the shores of Cork Harbour. Cuskinny Marsh is of interest because it contains a nice mix of habitats, within a small area, and supports locally important numbers of wildfowl.	13.3km	No, due to the distance and absence of hydrological or habitat connectivity.
Owenboy River pNHA	001990	Cork Harbour consists of a central basin with a number of narrow estuaries running E-W in line with the ridge structure of this part of Ireland. The Owenboy River is the most southerly of these bays on the western side and runs from Carrigaline to Crosshaven. It consists of two expanded sections with extensive mudflats at low tide, separated by a much narrower channel. Only the upper part is included in the NHA because it is here that the great majority of birds congregate in winter.	13.2km	No, due to the distance and absence of hydrological or habitat connectivity.
Glanmire Wood pNHA	001054	Glanmire Wood occurs on the east bank of the Glashaboy River, immediately south of Glanmire village. The main habitat of interest is mixed broad-leaved woodlands dominated by oak (<i>Quercus</i> sp.), beech (<i>Fagus sylvatica</i>) and sycamore (<i>Acer pseudoplatanus</i>) with a	2.8km	No, due to the distance and absence of hydrological or habitat connectivity.

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
		few conifers. This site is of interest because this type of woodland is rare in east Cork.		
Lee Valley pNHA	000094	This site occupies five separate sections of the valley of the River Lee, immediately to the west of Cork City. The diverse range of intact semi-natural habitats in the Lee Valley makes this a site of regional conservation importance.	5.3km	No, due to the distance and absence of hydrological or habitat connectivity.
Leamlara Wood pNHA	001064	This site is situated 6km north-west of Middleton in the steep sided valley of the Leamlara River. This area is of local importance as there are few areas of semi-natural oak woodland in east Cork, and it is a good example of this community.	13.4km	No. The proposed site and this pNHA are situated in the same Groundwater Body. However, review of local topography and WFD sub-catchment boundaries indicates that groundwater would not flow from the site towards this pNHA. There is no hydrological or habitat connectivity.
Ballincollig Cave pNHA	001249	Ballincollig is situated approximately 5km west	11.1km	No, due to the distance

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
		<p>of Cork City on a linear depression, based on limestone.</p> <p>The site is relatively species rich, with some uncommon native and introduced plants. It is also an example of natural habitat in an area of intensive agriculture and also rapid urbanisation. It contains cave deposits that are interesting from a geological viewpoint.</p>		<p>and absence of hydrological or habitat connectivity.</p>
Lough Beg (Cork) pNHA	001066	<p>Lough Beg is a constituent part of Cork Harbour, occurring south of Ringaskiddy in the lower harbour. As part of the Harbour complex, Lough Beg plays a part in supporting internationally important numbers of waders (over 20,000) and of two particular species, the Black-tailed Godwit (peak in 1991/92: 2,077) and Redshank (1,859). There are also nationally important flocks of nineteen others. Wildfowl are relatively numerous as compared to other parts of the Harbour, but the area is perhaps more valuable as a secure roosting site for flocks of all shorebirds when their feeding areas on the mudflats are covered by the tide.</p>	13.7km	<p>No, due to the distance and absence of hydrological or habitat connectivity.</p>

Site Name	Site Code	Qualifying Interests	Distance from Proposed Development (km) ²	Do any potential source-pathway-receptor links exist between the proposed site and the designated site
Shournagh Valley pNHA	000103	This site includes two lower sections of the lower Shournagh River c. 8km west of Cork City. The woods along the Shournagh Valley included in this site are recommended for conservation and are noted to be of regional importance.	9.6km	No. The proposed site and this pNHA are situated in the same Groundwater Body. However, review of local topography and WFD sub-catchment boundaries indicates that groundwater would not flow from the site towards this pNHA. There is no hydrological or habitat connectivity.

Figure 10.1 European Sites within 15km of the Proposed Site

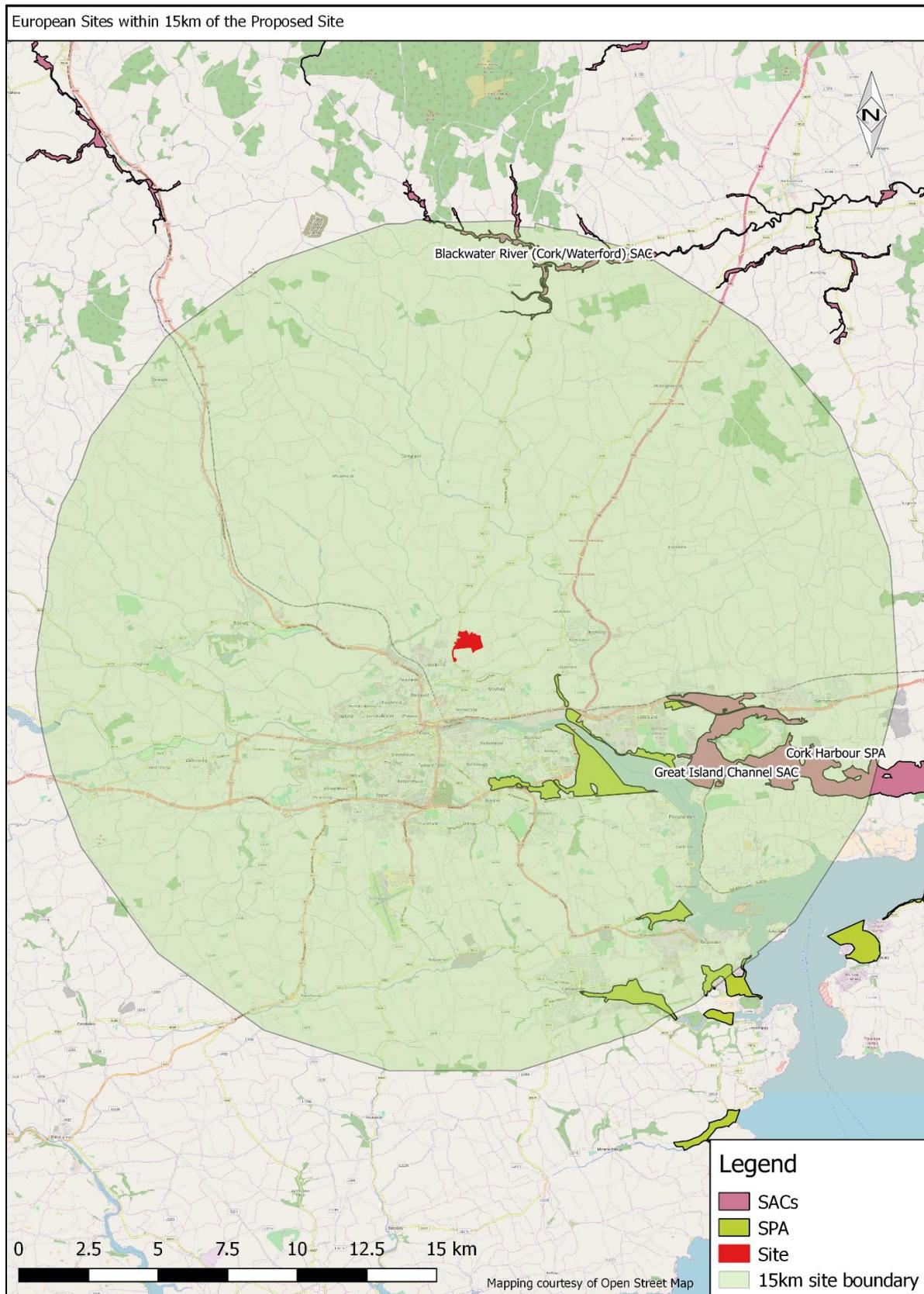
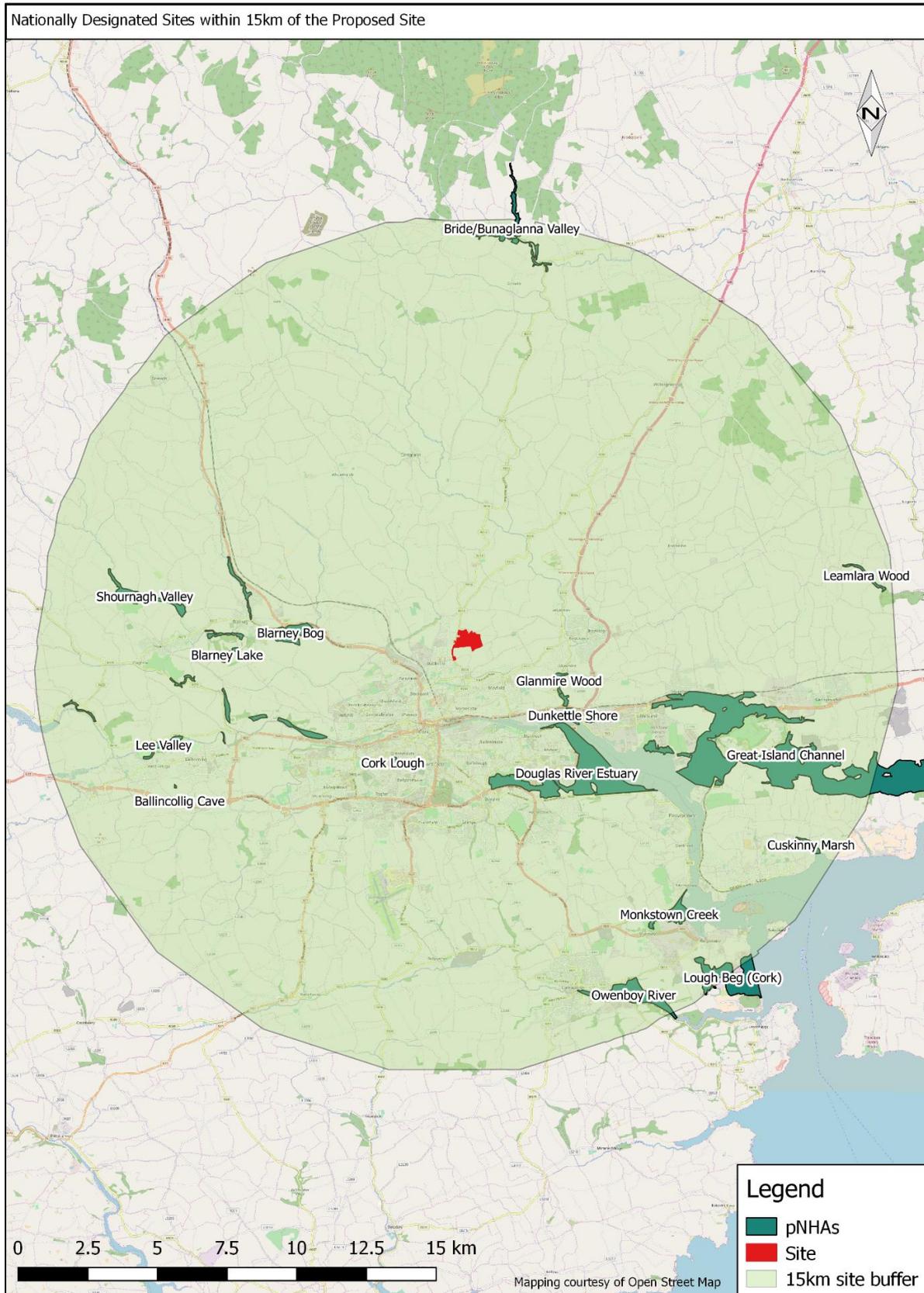


Figure 10.2 Nationally Designated Sites within 15km of the Proposed Site



10.3.2 Habitats

The following habitat types (codes according to Fossitt, 2000) were identified within the proposed site (see Figure 10.3):

- Arable crops (BC1);
- Dry meadows and grassy verges (GS2);
- Wet grassland/ scrub (GS4/ WS1);
- Hedgerows (WL1);
- Treeline (WL2);
- Drainage ditches (FW4); and
- Buildings and artificial surfaces (BL3).

10.3.2.1 Arable Crops (BC1)

The predominant habitat on the site is arable crops. Common arable 'weed' species growing amongst the crops included Annual Meadow-grass (*Poa annua*), Wild Oat (*Avena fatua*), Groundsel (*Senecio vulgaris*), Prickly Sow-thistle (*Sonchus asper*), Redshank (*Persicaria maculosa*), Pineapple Weed (*Matricaria discoidea*), Sun Spurge (*Euphorbia helioscopia*), Purple Ramping-fumitory (*Fumaria purpurea*), Coltsfoot (*Tussilago farfara*), Black Bindweed (*Fallopia convolvulus*), Knotgrass (*Polygonium aviculare*), Dame's-violet (*Hesperis matronalis*) and Field Pansy (*Viola arvensis*).

10.3.2.2 Dry meadows and grassy verges (GS2)

Many of the arable fields had narrow verges, which were comprised predominantly of grasses including Cock's-foot (*Dactylis glomerata*), Yorkshire Fog (*Holcus lanatus*), Rough Meadow-grass (*Poa trivialis*) and Perennial Rye-grass (*Lolium perenne*). Herbs commonly occurring included Dandelion (*Taraxacum* agg), Broad-leaved Dock (*Rumex obtusifolius*), Creeping Thistle (*Cirsium arvense*), Spear Thistle (*Cirsium vulgare*), Hoary Willowherb (*Epilobium parviflorum*), White Clover (*Trifolium repens*), Chickweed (*Stellaria media*), Silverweed (*Potentilla anserina*), Creeping Buttercup (*Ranunculus repens*), Good-King-Henry (*Chenopodium bonus-henricus*), Cleavers (*Galium aparine*), Hogweed (*Heracleum sphondylium*) and Nettle (*Urtica dioica*). Scrub, predominantly comprised of Bramble (*Rubus fruticosus*), was encroaching in field margins to the south-west of the site.

The field margins present on site correspond most closely with Fossitt habitat GS2, however they are a species poor variant of this habitat and do not correspond with the Annex I habitat 'lowland hay meadows [6510]'.

10.3.2.3 Wet Grassland/ scrub (GS4/ WS1)

The vegetation around field drains to the west of the site was abundant with, and in places, dominated by Bramble. Tall grasses including Cock's-foot and False Oat-grass (*Arrhenatherum elatius*) were common, with Yorkshire Fog and Soft Rush (*Juncus effusus*) also present. Herbs present included abundant Nettle and Great Willowherb (*Epilobium hirsutum*) and occasional Creeping Thistle, Silverweed, Marsh Woundwort (*Stachys palustris*) and Curled Dock.

There was also an area of wet grassland and scrub in a poorly drained area at the margin of a field to the east of the site. The predominant species in this area was Rough Meadow-grass (*Poa trivialis*), with Soft Rush, Rosebay Willowherb (*Chamerion angustifolium*), Broad-leaved Dock, Prickly Sow-thistle, Cleavers, Creeping Buttercup, Nettle; and occasional Willow (*Salix* spp) and Bramble.

10.3.2.4 Hedgerow (WL1)

The hedgerows at the proposed site are associated with earth and stone banks vegetated with species including Bramble (*Rubus fruticosus*), Honeysuckle (*Lonicera periclymenum*),

Ivy (*Hedera helix*), grasses, Navelwort (*Umbilicus rupestris*), Wood Sage (*Teucrium scorodonia*) and mosses. The internal hedgerows were species poor and predominantly comprised of Hawthorn (*Crataegus monogyna*) and Blackthorn (*Prunus spinosa*), with occasional Gorse (*Ulex europaeus*), Elder (*Sambucus nigra*) and Ash (*Fraxinus excelsior*). The hedgerows are unmanaged with many gaps.

The hedgerow adjacent to Ballyhooly Road is more diverse, with species recorded including Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*), Sycamore (*Acer pseudoplatanus*), Blackthorn (*Prunus spinosa*), Scot's Pine (*Pinus sylvestris*), Holly (*Ilex aquifolium*) and occasional Grey Willow (*Salix cinerea*).

Parts of the site to the north were bounded by garden hedges predominantly comprised of Cypress (*Cupressus* spp).

10.3.2.5 Treeline (WL2)

A treeline comprised of Cypress (*Cupressus* spp) bounds part of the site to the west. A line of semi-mature Ash (*Fraxinus excelsior*) runs from the south-west corner of the site to the proposed pumping station.

10.3.2.6 Wet Ditch (FW4)

Drainage ditches run alongside the road outside the site boundary to the north-west of the site. There are also two field drains at field boundaries at the west of the site. Species present here included Wavy Bitter-cress, Water Forget-me-not (*Myosotis scorpiodes*) and Brooklime.

10.3.2.7 Buildings and artificial surfaces

This habitat is restricted to small sections of Ballyhooly Road to the west of the site.

10.3.2.8 Notable Flora

There is a historical record of the Flora Protection Order species Meadow Barley (*Hordeum secalinum*) to the east of the proposed site in 10km Grid Square W77 (see **Appendix 10.3**). This species grows in meadows and pastures, along roadsides and in river valley floodplains—it prefers sticky, clay soils⁴ and is unlikely to be present in the habitats present at the proposed site. Further, no protected, Red Data Book (Wyse Jackson et al., 2016) or rare flora species were recorded on the proposed site during the site walkovers or habitat survey.

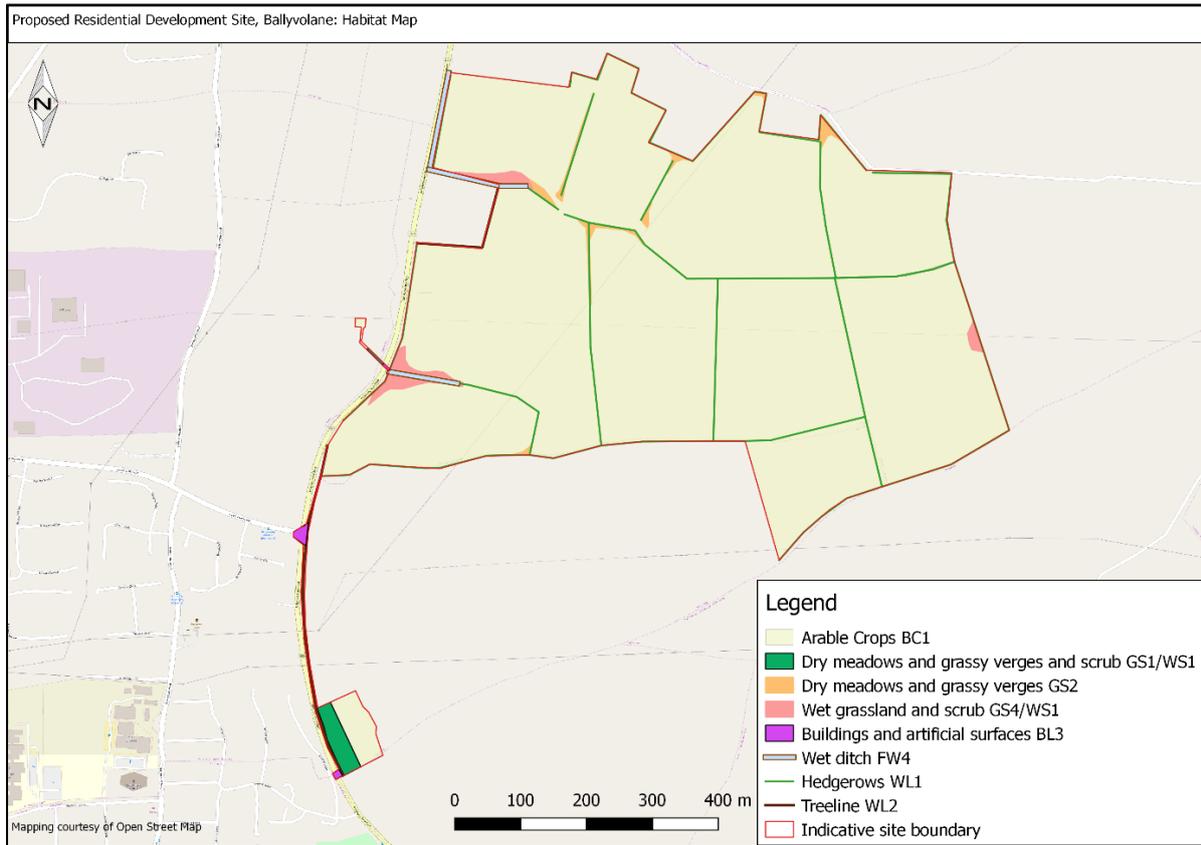
10.3.2.9 Invasive Non-native Species

There are records of the Third Schedule⁵ non-native invasive plant species Japanese Knotweed and Indian Balsam from within 2km of the proposed site. No non-native plant species listed in the Third Schedule were recorded within the proposed site during the site surveys. One small stand of Japanese Knotweed was recorded c.25m outside of the site boundary, to the west of Ballyhooly Road.

⁴ Preston et al (2002) Species Status No. 7: The Vascular Plant Red Data List for Great Britain. JNCC.

⁵ Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011)

Figure 10.3 Habitat Map



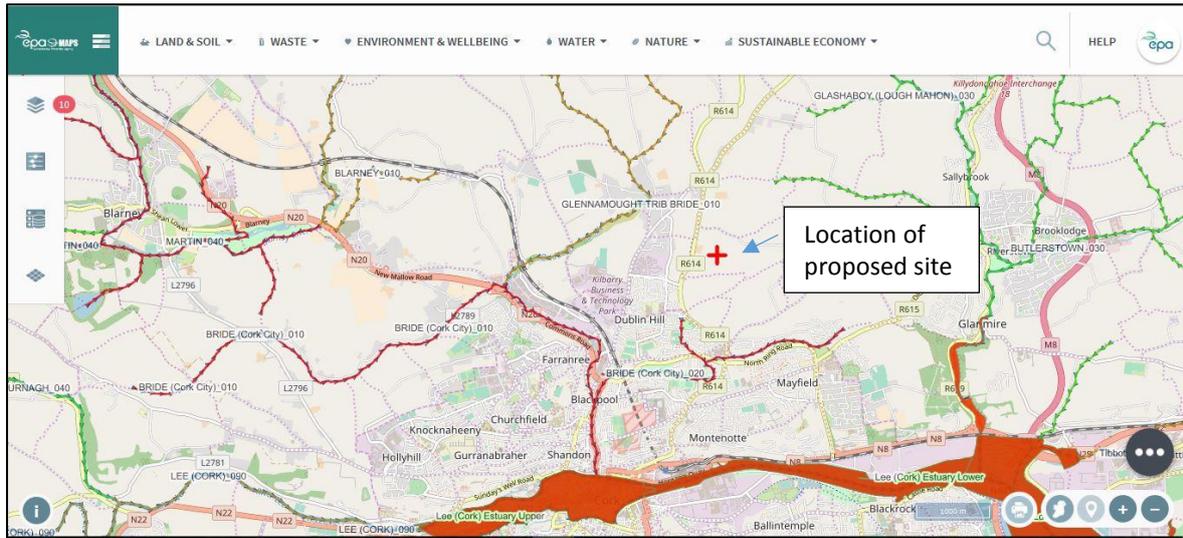
10.4 Hydrology and Water Quality

There are no streams, rivers or waterbodies located within the site. Two field drains to the west of the site drain to Ballyhooly Road and are then culverted to an unnamed watercourse to the west of Ballyhooly road, which is not included in EPA mapping. This watercourse drains the pasture and arable lands to the west of the proposed site and has been heavily modified so that it runs parallel to Ballyhooly Road. Other modifications to the channel include sections of bank reinforcement, re-sectioned banks and bridge crossings; the watercourse is also culverted underneath the crossroads to the north of the site, and at field and business entrances. The watercourse is choked by vegetation along the majority of its length and is inaccessible in many areas due to heavy bramble growth. In view of the heavily modified nature of the watercourse and the barrier presented by the extensive culverting present upstream and downstream of the site (see text below), this watercourse is not suitable to support salmonid, white-clawed crayfish or lamprey species.

The unnamed watercourse joins the Ballincolly watercourse (Figure 10.4) c.124m to the south west of the proposed pumping station. The Ballincolly is a small first order stream, which is further culverted at Kempton Park for c.0.8km before flowing into the Glen River, a second order watercourse. The Glen River in turn confluences with the Kiln River (a 3rd order watercourse) c.2.2km downstream, before flowing into the River Lee, which is a large 6th order river, a further c.1.0km downstream. The River Lee is part of the Lee Estuary transitional waterbody, which flows into Cork Harbour.

No 'Q-values' are available for these watercourses. Figure 10.4 below shows a screenshot of EPA mapped river network and Water Framework Directive (WFD) mapping for the site and surrounding area (the red cross on the map marks the site centre). The northernmost portion of the site is located within the Glennamought Trib Bride_010 WFD River Sub-basin; the southernmost portion of the site is within the Bride (Cork City) _020 River Sub-basin. The watercourses within the Bride (Cork City) Sub-basin are classified as 'At risk' under the WFD. The transitional water quality of the Lee (Cork) Estuary Lower (IE_SW_060_0900), into which the site ultimately drains, is classified as 'intermediate' and has been assigned as 'at risk' under the WFD.

Figure 10.4 EPA mapping of the watercourses and waterbodies at the proposed site (indicated by a red cross) and its environs (<https://gis.epa.ie/EPAMaps/>)



10.5 Soils, Geology and Hydrogeology

The GSI soils map (www.gsi.ie) for the site area indicates that the site and its environs are overlain by Deep well drained mineral (Mainly acidic) soils (AminDW), with an area of Mineral poorly drained (Mainly acidic) soils (AminPD) at the south-west of the site. In regards to bedrock geology, a band of Ballytrasna Formation composed of Purple mudstone and sandstone underlies the majority of the site; a band of Gyleen Formation composed of Sandstone with mudstone & siltstone underlies the south-east corner of the site.

The bedrock units which underlie the site are part of the same Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones. The groundwater vulnerability is described as Extreme (Figure 10.5).

The proposed site is located within the Ballinhassig East WFD Groundwater Body (IE_SW_G_004), which is classified as being of 'Good' status under the WFD.

Figure 10.5 EPA mapping of aquifer vulnerability at the proposed site and its environs



10.6 Fauna Survey Results

This section describes the fauna that have been recorded historically within 2km of the proposed site, the potential for the site to support protected species and results of the site surveys. Species records extracted from the NBDC database are included in **Appendix 10.3**.

10.6.1 Bats

There are records of two species of bat within 2km of the site: common pipistrelle and soprano pipistrelle. The bat landscape association model (Lundy *et al*, 2011) suggests that the proposed site is part of a landscape that is of moderate to high suitability for bats including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*P. pygmaeus*), brown long-eared (*Plecotus auritus*), Leisler's (*Nyctalus leisleri*), Daubenton's (*Myotis daubentonii*), natterer's (*M. nattereri*) and whiskered bat (*M. mystacinus*). The proposed site and its environs are of low suitability for Nathusius' pipistrelle (*Pipistrellus nathusii*) and is outside of the distribution range for lesser horseshoe bat (*Rhinolophus hipposideros*) (Roche *et al*, 2014).

The potential bat roost survey of the site undertaken on 15th March 2017 recorded two semi-mature Ash trees within the hedgerows on site with limited potential roost features (PRFs) such as Ivy cover and broken limbs. In accordance with the criteria detailed in Table 10.2, these trees were classified as being of low suitability for bats. The mixed hedgerows, stonewalls and treelines all provide suitable habitat for foraging and commuting bats.

The bat activity surveys undertaken within the active season in summer and autumn 2017, summer 2018 and 2019 recorded the presence of three species of bat within the proposed site.

No evidence of roosting bats was recorded at the proposed site or its immediate environs. However, bats do commute to the site to forage. Common pipistrelle was recorded foraging along the hedgerows throughout the site during the activity surveys. This was the most frequently recorded species at the site. Soprano pipistrelle was recorded in smaller numbers foraging along hedgerows across the site. Leisler's was also recorded foraging and commuting overhead across the site. All of the bat species noted at the site are considered to be relatively widespread and common nationally (Roche *et al*, 2014 and Marnell, 2009) and are all considered to be of 'Favourable' conservation status (NPWS, 2013). The location of bat calls recorded across the proposed site is illustrated in **Appendix 10.4**.

10.6.1.1 Ground Mammals

Badger, hedgehog, otter, sika deer, fallow deer and red squirrel have been recorded within 2km of the proposed site but there are no records of these species from within the footprint of the site. The habitats present on site are not suitable to support red squirrel, otter and deer; and would provide limited shelter for hedgehogs.

No badger setts were observed during the site surveys. However, badger droppings were recorded at the east of the site indicating that this area forms part of a badger territory. There is suitable habitat for badgers in the field boundaries. The badger is widespread and relatively common in Ireland (Marnell, 2009).

10.6.1.2 Avifauna

The proposed site is within 2km of the River Bride and its tributary the Glennamought, the Glen River; and tributaries of the Glashaboy River. Further, as detailed in Section 10.3.2, the proposed site is located 2.8km from Cork Harbour SPA (Site Code: 004030). Therefore, a number of protected species of birds have been recorded within 2km of the proposed site (**Appendix 10.3**). No species of Special Conservation Interest (SCIs) for Cork Harbour SPA were recorded on the proposed site during the site walkover undertaken on 15th March 2017 or the breeding bird surveys undertaken in July 2017 and April 2019.

Thirteen species of bird were recorded during the site survey undertaken on 15th March 2017 (**Appendix 10.5**). No species of High Conservation Concern (Red listed) were identified during the bird survey undertaken on 15th March 2017. Two Amber listed species considered to be of Moderate conservation concern were identified, namely robin and greenfinch. The remaining eleven breeding bird species are Green listed and comprise a range of relatively common species typically associated with the arable, hedgerow and garden habitats present within, and adjacent to, the footprint of the site.

A total of twenty species of bird were recorded during the breeding bird surveys within the proposed site (as listed in **Appendix 10.5**). In accordance with BTO categories (Table 10.3), eight species were identified as 'probably breeding' on site and the remaining twelve species were identified as 'possibly breeding' or 'non-breeders'. One species of High Conservation Concern (Red listed) was identified during the breeding bird surveys, namely yellowhammer, with 3 pairs of this species recorded during the survey undertaken in April 2019. Five Amber listed species considered to be of Moderate Conservation Concern were recorded during the breeding bird surveys, namely house sparrow, swallow, robin, greenfinch and snipe. The remaining fourteen bird species recorded during the breeding bird surveys are Green listed and comprise a range of relatively common species typically associated with the hedgerow, garden and arable habitats present within, and adjacent to, the footprint of the proposed development. A map of the location of notable species recorded as potentially breeding at the site is included in **Appendix 10.5**.

The arable fields and hedgerows, which dominate the proposed site provide some limited nesting to species typical of the intensified agricultural environment. The presence of 3 pairs of Yellowhammer is a noteworthy interest, given this is a Red-listed BOCCI, and breeding is considered probable.

No Annex I species were recorded during the course of the site surveys.

10.6.1.3 Reptiles and amphibians

There are historical records of smooth newt (*Lissotriton vulgaris*) and common frog (*Rana temporaria*) within the 2km of the proposed site. However, there is no suitable breeding habitat and limited overwintering habitat for amphibians present within the proposed development site. No amphibians or common lizards (*Lacerta vivipara*) were observed during the survey.

10.6.1.4 Invertebrates

Marsh Fritillary (*Euphydryas aurinia*) has been recorded near the Glennamought River, approximately 1.4km to the west of the proposed site. Marsh Fritillary inhabits a range of different habitat types, but is mainly a species associated with wet grassland and heath habitat in Ireland. The habitats present on site are not suitable to support this species and no Devil's-bit Scabious (*Succisa pratensis*), which is the food plant of the caterpillar larvae, is present on site. The butterfly species Red Admiral (*Vanessa atalanta*) and Meadow Brown

(*Maniola jurtina*) were recorded on site during the site surveys, both of which are widespread in Ireland and the conservation status of these species is considered to be of 'Least Concern' (Regan *et al*, 2010).

10.6.2 Summary of Ecological Evaluation

Table 10.5 summarises all identified ecological features. Ecological features have been identified as at risk of potentially significant impacts via a source-pathway-receptor link. Ecological features are valued as being of local ecological importance (higher value) or above per the criteria set out in **Appendix 10.2**.

Table 10.5 Ecological valuation of ecological features (also referred to as key ecological receptors)

Habitat/ Species	Ecological Value ⁶	Ecological Feature
European Site	International	Yes
Natural Heritage Area	National	Yes
Arable crops (BC1)	Local Importance (Lower Value). The arable fields within the site are of low botanical importance; however this habitat does provide a foraging area for some species of avifauna.	No
Dry meadows and grassy verges (GS2)	Local Importance (Lower Value). The field margins are species poor and are of low botanical importance. However, this habitat does provide suitable habitat for small mammals and a foraging area for some species of avifauna.	No
Wet grassland and scrub (GS4/ WS1)	Local Importance (Lower Value). The wet grassland is dominated by scrub in areas and is species poor. However this habitat does provide suitable habitat for small mammals and a foraging area for some species of avifauna.	No
Hedgerows (WL1)	Local Importance (Higher Value). The majority of the hedgerows bounding the fields are species poor with several gaps. Nonetheless, they do provide habitat for birds and mammals in addition to providing	Yes

⁶ In accordance with NRA (2009) Guidelines for the Assessment of Ecological Impacts of National Road Schemes Rev. 2. National Roads Authority

Habitat/ Species	Ecological Value ⁶	Ecological Feature
	connectivity in the landscape.	
Treeline (WL2)	Local Importance (Lower-higher Value). The treeline to the west of the site comprises non-native species and is of local conservation interest. The treeline to the south-west of the site is comprised of native tree species and is of higher local value due to its potential to provide habitat for birds and provide connectivity in the landscape.	Yes
Drainage ditches (FW4)	Local Importance (Lower Value). Two ditches which contain running water and a limited semi-natural flora.	No
Buildings and artificial surfaces (BL3)	This habitat is represented by Ballyhooly Road, which is not of conservation importance.	No
Foraging/ commuting bats	Bat species as they occur within the study area are considered to be of Local Importance (Higher Value)	Yes
Badger	No evidence of badger setts was observed on site however there is suitable habitat for badger within the site and badgers forage to the east of the site. Badgers are protected under the Irish Wildlife Acts and are considered to be of Local Importance (Higher Value).	Yes
Breeding birds	Yellowhammer are Red-listed BOCCI, and breeding is considered probable. The overall breeding bird assemblage within the footprint of the proposed development is therefore considered to be an ecological feature of Local Importance (Higher Value).	Yes

10.7 Characteristics of the Proposed Development

The proposed development will consist of a strategic housing development including 753 residential units to be constructed in a series of phases (six neighbourhoods in total), a local centre including retail (2 no. units), a crèche, doctors surgery and community use unit and all associated and ancillary infrastructure, services and site development works.

The proposed 753 no. residential units are comprised of the following:

- 67 no. detached houses including 31 no. 4 bedroom units and 36 no. 3 bedroom units
- 278 no semi-detached houses including 41 no. 4 bedroom units and 237 no. 3 bedroom units
- 186 no. terrace houses including 18 no. 4 bedroom units, 96 no. 3 bedroom units and 72 no. 2 bedroom units
- 69 no. duplexes including 36 no. 3 bedroom units and 33 no. 2 bedroom units
- 153 no. apartments including 6 no. studio apartments, 42 no. 1 bedroom apartments, 79 no. 2 bedroom apartments and 26 no. 3 bedroom apartments. Three apartment blocks will be provided (2 no. in Neighbourhood 6 and 1 no. in Neighbourhood 2)

The proposed development includes a number of open spaces and play areas in addition to general landscaping, boundary treatments (including walls and landscaping to the houses to the north) and lands to the east, and landscaped parkland / greenway. The proposal includes an internal distributor road providing access to neighbouring lands, associated internal roads, car parking, pedestrian and cycle paths (providing access to neighbouring lands), public lighting, internal bus stops and turning area, bin storage (in apartment locations) and cycle parking and all site services infrastructure. The associated site and infrastructural works include water supply, foul and surface / storm water drainage infrastructure to local services and drains and 5 no. unit sub stations. The proposed development makes provision for two no. pumping stations (and connections to / from same), one in neighbourhood 5 and one adjacent to the Ballyhooly Road, with access, to serve this site and future lands as required by Irish Water.

Two no. vehicular accesses are proposed from the Ballyhooly Road and one no. access to / from the local road to the north of the site (pedestrian access points will also be allowed to the local road to the north), all including local road widening within applicant lands, resurfacing and boundary works. Signalisation of the Lower Dublin Hill / Ballyhooly Road Junction is also proposed along with the provision of a new bus stop on the eastern side of the Ballyhooly Road close to the junction of Lower Dublin Hill and the Ballyhooly Road. The application also provides for the reservation of lands to accommodate the widening of the Ballyhooly Road and the provision of new pedestrian and cyclist infrastructure along the eastern side of the Ballyhooly Road with crossing of same close to Mervue Lawn south of the proposed development.

Groundworks, excavation and ground reprofiling are required and proposed to provide a Distributor Road through the site and all development areas internally within the site. The proposed development also provides for the line diversion and partial undergrounding of the Kilbarry-Flaxfort-Mayfield 38kv line that traverses the landholding east / west, the removal of existing pylons and the provision of two new pylons one in the Lahardane Townland and one in the Ballincolly Townland and landscaping works within the 110 kv power line wayleaves that also traverse the site.

The site covers 46.9 hectares.

10.7.1 Storm Water Network

The following features are proposed within the project design:

- The proposed road gradients, road levels, and dwelling finished floor levels (FFL) have been designed to ensure the concentration of surface water run-off in any one location is avoided.
- Each drainage area has been assessed independently of others in terms of allowable run-off rates. SuDS measures are proposed for each neighbourhood, which have not been included for in the sizing of the storm sewer network, reducing the discharge rate to below greenfield run-off rates (QBar). These proposed interception measures will ensure that the initial 5mm of rainfall is prevented from discharging to the storm network, thereby ensuring the water quality of the receiving watercourse to the west is preserved.
- Surface water runoff on the western side of the site will be attenuated to greenfield runoff rates (Qbar) as agreed with the Drainage Department of Cork City Council.
- SuDS measures in this location will include the use of permeable paving at traffic calmed junctions and the use of planted swales where possible along road edges to provide a primary cleaning of run-off before entering the storm network.
- Surface water discharge rates will be controlled by a Hydrobrake type vortex control device or similar approved, in conjunction with below ground Stormtech attenuation chamber storage, or similar approved.
- Surface water runoff to the eastern side of the site will be routed to buried Stormtech chambers for infiltration into the existing subsoil in-line with site investigation results. This will facilitate the recharge of aquifers in the area whilst limiting the run-off from the overall site to less than the current rate.
- A contract will be entered into with a suitably qualified contractor for the maintenance of the attenuation system including Hydro-brake and the installed hydrocarbon interceptors.

The following methodologies are being implemented as part of the SuDS surface water treatment approach:

- The use of on-site infiltration where feasible (eastern side of the scheme).
- Permeable paving at suitable locations in and around the retail/crèche area.
- Permeable paving to be used for junction treatments and tied into storm sewer network in all locations.
- Planted swales along access roads where practical (including tree-pits).
- Attenuation chambers sized to 30 and 100 year return period storms.
- Installation of Hydrobrake vortex control system (limiting surface water discharge from the site to Qbar (5 l/s/ha)).
- Fuel/oil separators will be sized and installed in accordance with permitted discharge from the site for the various phases.
- Attenuation storage design allows for 20% growth of rainfall intensity due to climate change.
- Green Roof attenuation storage provided for in Apartments in neighbourhood 6.

It is proposed to construct two surface water outfalls (Outfall 1 and Outfall 2) to the watercourse running on the western side of Ballyhooly Road. The majority of the site will discharge to Outfall 2, specifically located downstream of an existing culvert under the Kilbarry Link Road.

10.7.2 Foul Water Network

The construction of the foul sewer pipe network shall be in accordance with Irish Water Code of Practice for Wastewater Infrastructure Doc IW-CDS-5030-03.

The proposed development makes provision for two no. pumping stations (and connections to / from same), one in neighbourhood 5 and one adjacent to the Ballyhooly Road, with access, to serve this site and future lands as required by Irish Water. The foul water will be treated at the Carrigrenan WWTP, which has sufficient capacity for the proposed development.

The following indicates how the foul network will develop as the various phases are complete.

Phase 1: Foul network will be gravity fed and will connect to existing 225mm foul sewer running north to south on Ballyhooly Road.

Phase 2: A new strategic pump station is required along Ballyhooly Road to the south of the residential development. This station is required to accommodate additional phases and future developments in the Urban Expansion Area (UEA). The existing foul network has capacity for Phase 1 only. The applicant has entered into a Project Works Service Agreement (PWSA) with IW for the delivery of this infrastructure.

Phase 3: Additional foul network required for Phase 3 housing will be tied into development foul network and be gravity fed to new Irish Water pumping station.

Phase 4: Additional foul network required for Phase 4 housing will be tied into development foul network installed along Ballyhooly Road and be gravity fed to new Irish Water pumping station.

Phase 5: Due to topography constraints, wastewater from Phase 5 will need to be pumped in order to connect to the overall development foul network. A new pumping station will be constructed bordering Phase 5 to achieve this. The rising main from the pumping station will extend north along the main distributor road through the proposed development before tying into the overall development foul network at a location adjacent to Phase 2. Wastewater will then be gravity fed to the new Irish Water pumping station.

Phase 6: Additional foul network required for Phase 6 will be tied into development foul network and be gravity fed to new Irish Water pumping station.

Network extensions will be delivered by Irish Water to service this application and potentially adjacent lands under the provisions of the Water Services Act. These works will include rising mains from the proposed Ballyhooly Rd Pumping Station, south along the Ballyhooly Rd to the junction with the North Ring Road at which point it will be routed east along the North Ring Road to a termination point at the Old Youghal Rd Junction. The overall rising mains will include 2400 m of 150mm rising main from the Pumping Station to the Old Youghal Road Junction; a parallel length from the pumping station of 800 m of 250 mm diameter watermain to allow connection / network management by IW including potential connect to existing interceptor sewers; or further extension as required. The rising mains will be routed in public roads (an alternative route is possible in the Glen Park area for the section proposed for the North Ring Road). 250 mm dia foul sewer connecting the housing scheme has been incorporated into the scheme drainage to connect to the Pumping Station proposed on Ballyhooly Road for all phases of housing delivery. This will also capture existing flows from the current 225 mm gravity foul to the north.

10.7.3 Flood Risk

A flood risk assessment for the proposed development has been undertaken (MHL, 2019). As part of the sequential test, the OPW flood hazard maps were consulted, as were the draft Preliminary Catchment Flood Risk Assessment Maps produced by the OPW. Other sources of flood risk were investigated including development drainage. In all cases it was found that the development is at low risk of flooding and the development is deemed appropriate in the proposed site location.

10.8 Potential Impacts of the Proposed Development

This section provides an assessment of likely significant impacts on ecological features, as listed in Table 10.5. An impact is considered to be significant when it supports or undermines biodiversity conservation objectives for important ecological features. In this section, all impacts are described in the absence of mitigation.

10.8.1 Construction Phase

10.8.1.1 Designated Sites

As indicated in Table 10.4, there are twenty one sites designated for nature conservation within 15km of the subject site.

A check of potential source-pathway-receptor links between the proposed site and sites designated for nature conservation did not reveal links to thirteen of these designated sites (see Table 10.4). There is no habitat connectivity or direct surface water connectivity between the proposed site and Cork Harbour. However, field drains at the site are connected via culverts to an unnamed stream which flows into the Ballincolly River, which confluences with the Glen River, which in turn confluences with the Kiln River before flowing into the River Lee and Cork Harbour. There is therefore remote and indirect connectivity between the proposed site and Cork Harbour SPA and in turn Great Island Channel SAC via field drains at the site. In consideration of the connectivity described above and the size and scale of the proposed development, potential for impacts on these sites cannot be excluded.

Potential surface water emissions from the proposed development area may be generated by surface water run-off from hardstanding areas and overland flow during periods of heavy rainfall. Excavation of soil, subsoil and bedrock layers will be required in order to allow the construction of the roads network, reprofiling of ground to facilitate the construction of units, foundation excavation, drainage and utility services installation and the provision of underground attenuation/infiltration systems. There will be works associated with the crossing of the watercourse to the west of Ballyhooly road via direct drilling as part of the diversion of the 38KV Overhead ESB Line. In the absence of protective measures, indirect impacts may arise from the excavation and stockpiling of earth and construction material (sand, gravel, etc.) during the construction phase of the proposed development. Excavation and ground disturbance during the construction phase could potentially lead to suspended solids runoff into drainage systems adjacent to the site and eventually into Cork Harbour SPA.

There is also potential for a range of pollutants, such as concrete, hydrocarbons, or improper drainage from the contractor's compound, to enter groundwater and drainage ditches and in turn Cork Harbour SPA during construction work and the transportation of materials to and from the construction site.

The NIS concluded that with the implementation of best practice and the recommended mitigation measures there will be no potential for direct, indirect or cumulative impacts arising from the proposed Residential Development, either alone or in combination with any other plans or projects. No reasonable scientific doubt remains as to the absence of such adverse effects.

Please refer to the Natura Impact Statement accompanying the planning application for further details.

10.8.1.2 Habitats

Hedgerows and Treelines

Construction of the proposed development will result in the loss of c. 3,131m of hedgerows. The hedgerows at the proposed site are predominantly species poor with many gaps; the hedgerow against Ballyhooly Road is more diverse. Overall, the hedgerows and treelines are considered to be of local importance as they provide habitat for birds and mammals as well as providing connectivity within the landscape. In the absence of mitigation, it is considered that this would be a long-term significant adverse impact at the local geographic scale.

10.8.1.3 Species

Bats

The results of the bat activity survey undertaken for the proposed residential development indicate that the site supports three species of foraging bat. Loss of treelines and hedgerows during construction will impact on commuting and foraging bats and may reduce the available insect prey species and also reduce the feeding area available for bats in some locations. In the absence of mitigation, it is considered that the removal of foraging and commuting habitat would be a long-term significant adverse impact at the local geographic scale.

Temporary lighting required during the construction phase may cause disturbance to bats commuting through or feeding at the proposed site. In the absence of mitigation, disturbance of bats due to lighting would have a temporary significant adverse impact at the local geographic scale.

Badger

No evidence of badger setts within the site was recorded during the course of the site surveys undertaken in 2017, 2018 and 2019, therefore there will be no direct impacts to badgers. However, badgers create new setts regularly, and the site provides suitable habitat for sett excavation in earth banks associated with hedgerows/ treelines at the site. Direct impacts on badgers are therefore possible should badgers establish setts in hedge banks adjacent to areas of construction. This would be a temporary significant adverse impact at the local geographic scale.

Badger droppings were present to the east of the site, indicating that this area is part of a badger territory. There is potential that the proposed development will result in indirect effects as a result of a minor reduction in foraging area and disruption of commuting routes for the local population of badgers. However, in view of the small area of the proposed site utilised by badgers and the abundance of suitable habitat for badgers available in the wider landscape, this is not likely to have a significant adverse impact on the local badger population.

Avifauna

The loss of hedgerows will result in a reduction of potential nesting habitat for three bird species of moderate conservation concern that are potentially breeding at the proposed site, namely house sparrow, robin and greenfinch. The loss of hedgerow and arable farmland during construction of the proposed development will also result in a reduction in nesting and foraging opportunities for 3 pairs of Yellowhammer, a species of high conservation concern recorded as 'probably breeding' at the site. If the hedgerow removal is not timed appropriately, nests containing eggs or young chicks could be destroyed. This would be a long-term significant adverse impact at the local geographic level.

10.8.2 Operational Phase

10.8.2.1 Designated Sites

As described in Section 10.8.1.1, potential impacts on designated sites are limited to potential adverse impacts on water quality in Cork Harbour SPA and in turn Great Island Channel SAC. Operational surface water for the development will be treated by the proposed Sustainable Urban Drainage System, including attenuation, storm water soakpits and hydrocarbon interceptors. Foul water will be treated at Carrigrenan WWTP, which has sufficient capacity for the proposed development. It is considered that significant adverse impacts to designated sites during the operational phase of the proposed development, whether considered on its own or in combination with the effects of other plans or projects, can be excluded beyond reasonable scientific doubt.

Please refer to the Natura Impact Statement accompanying the planning application for further details.

10.8.2.2 Habitats

Hedgerows and treelines

No impacts on hedgerows and treelines are anticipated during the operational phase.

10.8.2.3 Species

Bats

The street and domestic lighting proposed for the development will increase light levels within the proposed development area. Increased lighting may reduce the availability of feeding sites for bats and would be a long-term significant adverse impact at the local geographic scale in the absence of mitigation.

Badger

As noted previously, there is potential that the proposed development will result in indirect effects as a result of a minor reduction in foraging area and disruption of commuting routes for the local population of badgers. However, badgers are known to utilise urban landscapes and domestic gardens and may potentially continue to forage across the landscaped areas of the site during the operational phase. In view of the small area of the proposed site currently utilised by badgers, the abundance of suitable habitat for badgers available in the wider landscape and the potential that badgers may continue to utilise the site as part of their foraging territory, no significant adverse impacts on the local badger population are anticipated during the operational phase.

Avifauna

There will be no further loss of habitat during the operational phase. No significant adverse impacts on birds are anticipated during the operational phase.

Yellowhammer nest close to the ground in field margins with long grass, dense hedges and scrub/ woodland edge. As such, the retention of the site boundary hedgerows where possible may provide some nesting opportunities for this species. Adult yellowhammer will forage on a wide range of plant seeds, including cereal grains. The loss of arable land is likely to result in an ongoing reduction in foraging area for 3 pairs of yellowhammer during the operational phase, however in view of the extensive arable and pasture habitats available in the surrounding landscape and the new planting provided for the proposed development, the operational impacts on yellowhammer are not anticipated to be significant.

10.9 'Do Nothing' Scenario

In the absence of development, it is likely that the site would continue to support hedgerows and treelines of local conservation interest. Bats would continue to forage at the site and the farmland would continue to support yellowhammer and other flora and fauna of local value.

10.10 'Worst Case' Scenario

In the 'worst-case' scenario, the proposed development would result in the loss of habitat that provides shelter and foraging areas for fauna of local conservation value.

10.11 Cumulative Impact

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. A search of Myplan (Myplan.ie), Cork City Council planning enquiry system and the EIA Portal⁷ was conducted for developments that may have in-combination effects on ecological features with the proposed works. Plans relevant to the area were searched in order to identify any elements of the Plans that may act cumulatively or in-combination with the proposed development.

Based on this search a list of those projects and Plans which may potentially contribute to Cumulative or In-Combination Impacts with the proposed works was generated, as listed in **Table 10.6** below.

Table 10.6 Cumulative and In-combination Impacts of Other Plans and Projects

Name of Plan	Key Issues Directly Linked to Relevant European Sites	Potential Cumulative or In-Combination Impacts on Relevant European Sites
Cobh Municipal District Plan (MDP) 2017	The MDP includes the following Objectives of relevance to the proposed site: General Development Objectives for Cork City North Environs. LAS-01: The Council is committed to the preparation and implementation of a Wastewater Management Strategy for	The policies and objectives of the MDP will ensure that local planning applications comply with proper planning and sustainability and with the requirements of relevant EU Directives and environmental

⁷ <https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal>

Name of Plan	Key Issues Directly Linked to Relevant European Sites	Potential Cumulative or In-Combination Impacts on Relevant European Sites
	<p>the Cork Harbour Area as per the 2014 County Development Plan.</p> <p>NE-GO-02: In order to secure the sustainable population growth and supporting development proposed in NE-GO-01, appropriate and sustainable water and waste water infrastructure that will secure the objectives of the relevant River Basin Management Plan must be provided and be operational in advance of the commencement of any discharges from the development. Waste water infrastructure must be capable of treating discharges to ensure that water quality in the receiving harbour does not fall below legally required levels.</p> <p>NE-GO-06: Design an integrated approach to surface water management which considers land use, water quality, amenity and habitat enhancements, thereby replicating the current greenfield rate of surface water runoff, post development, to prevent flooding of lands and settlements downstream. A Sustainable Urban Drainage Strategy should be completed for the site prior to development.</p> <p>NE-GO-07: Create an ecological network by linking green areas to allow for movement of wildlife. All environmental resources should be incorporated from waterways to woodlands to adopt a green infrastructure approach within the site with links to the surrounding countryside. Open space for public recreation including the provision of playing pitches, amenity walks, children's playground, open parkland, subject to appropriate scaling and siting.</p>	<p>considerations; there is no potential for adverse in-combination effects on biodiversity.</p>
<p>Cork County Development Plan 2014-2020</p>	<p>The policies and objectives of this plan are intended to contribute to the delivery of a number of key aims for the county as a whole. They are as follows:</p> <ul style="list-style-type: none"> • Enhanced quality of life for all • Sustainable patterns of growth in urban and rural areas • Sustainable and balanced economic investment 	<p>Policies and objectives of the Cork County Development Plan 2014 – 2020 ensure that local planning applications comply with proper planning and sustainability and with the requirements of relevant EU Directives and environmental</p>

Name of Plan	Key Issues Directly Linked to Relevant European Sites	Potential Cumulative or In-Combination Impacts on Relevant European Sites
	<ul style="list-style-type: none"> • An effective physical and community • Infrastructure • A quality built environment • A network of enhanced natural resources • Responsible guardianship of the County 	<p>considerations, there is no potential for adverse in-combination effects on biodiversity.</p>
<p>River Basin Management Plan 2018-2021</p>	<p>The project should comply with the environmental objectives of the Irish Draft RBMP which are to be achieved generally by 2021.</p> <ul style="list-style-type: none"> • Ensure full compliance with relevant EU legislation; • Prevent deterioration; • Meeting the objectives for designated protected areas; • Protect high status waters; and • Implement targeted actions and pilot schemes in focus sub-catchments aimed at <ul style="list-style-type: none"> ○ targeting water bodies close to meeting their objective; and ○ addressing more complex issues which will build knowledge for the third cycle. 	<p>The implementation and compliance with key environmental policies, issues and objectives of this management plan will result in positive in-combination effects on biodiversity. It will not contribute to adverse in-combination or cumulative impacts with the proposed development.</p>
<p>Inland Fisheries Ireland Corporate Plan 2016 -2020</p> <p>The Inland Fisheries Act 2010.</p>	<p>To ensure that Ireland's fish populations are managed and protected to ensure their conservation status remains favourable. That they provide a basis for a sustainable world class recreational angling product, and that pristine aquatic habitats are also enjoyed for other recreational uses.</p> <p>To develop and improve fish habitats and ensure that the conditions required for fish populations to thrive are sustained and protected.</p> <p>To grow the number of anglers and ensure the needs of IFI's other key stakeholders are being met in a sustainable conservation focused manner.</p> <p>EU (Quality of Salmonid Waters) Regulations 1988. All works during development and operation of the project must aim to conserve fish and other species of fauna and flora habitat; biodiversity of inland fisheries and</p>	<p>Implementation and compliance with the goals of the IFI corporate plan and legislation will result in net positive in-combination effects to biodiversity.</p>

Name of Plan	Key Issues Directly Linked to Relevant European Sites	Potential Cumulative or In-Combination Impacts on Relevant European Sites
	ecosystems and protect spawning salmon and trout.	
Irish Water Capital Investment Plan 2014-2016	Proposals to upgrade and secure water services and water treatment services countrywide.	Likely net positive impact due to water conservation and more effective treatment of water.
IPPC Programme	The nearest facility is Heineken Ireland Limited (P0445), located c2.8km to the south-west of the proposed site.	Discharges from these facilities are governed by strict limits to ensure compliance with quality standards. The long-term cumulative impact is predicted to be negligible.
WwTP discharges	Cork City, Carrigtwohill and Environs and Passage- Monkstown.	Discharges from municipal WWTPs are required to meet water quality standards. Irish Water Capital Investment Plan 2014-2016 and 2017 – 2021 proposes to upgrade water treatment services countrywide. The long-term cumulative impact is predicted to be negligible.
Pumping Station	The proposed development includes the provision of two pumping stations. One Type 3 Pumping Station for local services in neighbourhood 5 is provided. Foul waste collected by this Pumping Station will then be transferred to the main proposed pumping station on Ballyhooly Road which forms part of the planning application. This Pumping Station with access to the Ballyhooly Road to accommodate this site and future lands in the area can be constructed on a phased basis as it is a three chamber design.	A full assessment of the potential ecological impacts associated with the pumping station as part of the proposal has been carried out. The associated rising main route has been identified and pipe sizes identified. Delivery of the rising main will include the appropriate research and survey work necessary in order to inform a robust assessment of the potential impacts associated with the proposed works on biodiversity within the Zone of Influence of the works. In consideration of this requirement, no adverse cumulative or in-combination impacts with the proposed

Name of Plan	Key Issues Directly Linked to Relevant European Sites	Potential Cumulative or In-Combination Impacts on Relevant European Sites
		development works at Ballyvolane on biodiversity are anticipated.
Water Supply	A new 250mm HDPE water supply pipeline extension of approximately 780m from the Dublin Hill area along Ballyhooly Road is required to reach the proposed development connection point. Works to be carried out by Irish Water.	With the implementation of standard best practice guidelines during construction, no cumulative impacts on biodiversity are expected.
Local Planning Applications⁸	Various local planning applications in proximity and within the Zone of Influence of the proposed residential development. These include a 20 unit residential development at Banduff Road, Banduff (Ref: 19/5326), 74 unit residential development in Ballincroikig (Ref: 17/6781), demolition of Lidl foodstore and construction of new foodstore with associated site works (Ref: 16/5477); and small scale domestic dwelling construction, extensions to domestic dwellings and public buildings and permission and retention permission for commercial development at Ballyvolane.	Adherence to the overarching policies and objectives of the Cork County Development Plan 2015 - 2020 ensure that local planning applications and subsequent grant of planning comply with the core strategy of proper planning and sustainability and with the requirements of relevant EU Directives and environmental considerations, there is no potential for adverse in combination effects on biodiversity.

10.12 Mitigation

As with any development, all measures necessary should be taken to ensure comprehensive protection of local ecological features, in the first place by complete impact avoidance and as a secondary approach through mitigation by reduction and remedy.

10.12.1 Construction Phase

10.12.1.1 General

A preliminary Construction Environment Management Plan (CEMP) has been prepared for the proposed development (MHL, 2019). The Contractor appointed by Longview Developments Ltd. to undertake the construction works shall be responsible for developing and managing the project specific CEMP, incorporating the methodologies described in the preliminary CEMP. The project specific CEMP will detail how implementation of the

⁸ The Local Planning Applications included in this potential in-combination impacts assessment support the following criteria: planning applications granted within the past five years that may contribute to potential cumulative impacts on European sites of concern. They include planning applications that support proximity or potential connectivity with Cork Harbour. Their development and operation could provide in-combination impacts with the proposed development to those screened in European sites.

environmental management and mitigation measures will be monitored by an Ecological Clerk of Works.

The preliminary CEMP details the assignment of responsibility for the implementation of the plan. A set of environmental management procedures is also set out in the CEMP, including an environmental accident, incident and corrective procedure plan.

The control measures for the proposed development will follow current best practice guidelines:

- H. Masters-Williams et al (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA;
- IFI (2016) *Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters*. Inland Fisheries Ireland, Dublin;
- Murnane et al (2002) Control of Water Pollution from Construction Sites- Guide to Good Practice. SP156; and
- Murphy, D. (2004) *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*. Eastern Regional Fisheries Board, Dublin.

10.12.1.2 Control of Surface Water Run-off

The following measures are proposed during the construction phase to mitigate against potential risks to the water quality of the receiving environment:

- The proposed grounding of the 38KV ESB overhead line and subsequent crossing of the watercourse to the west will be carried out in accordance with ESB Networks requirements and will include directional drilling to avoid impact with the watercourse. All necessary measures including protective bunds, temporary bridges and silt fences will be provided by the appointed contractor. Inland Fisheries Ireland will be consulted before any of these works are carried out on-site.
- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where effective measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate, to the existing watercourse.
- Weather conditions and typical seasonal weather variations will be accounted for when planning the stripping of topsoil and excavations with an objective of minimising soil erosion and protecting the excavated subsoil and rock for re-use on site.
- All spoil/earthworks storage areas (plans of which are included) will be located on well-vegetated lands and will be surrounded by secure silt fencing. It is proposed to use the lands reserved for the school campus as stock-pile areas, in conjunction with existing ditches to create the necessary barriers and sediment ponds to ensure silt run-off is fully controlled.
- If de-watering of earthworks materials is required the resulting water will be pumped out onto well-vegetated areas away from springs, drains or rock outcrops and allowed to run-off into formed settlement ponds prior to discharge to the main drainage system.
- To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks will be stored in designated areas, and these areas will be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) will be diverted for collection and safe disposal.

- Refueling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area (or where possible off the site) which will be a minimum of 20m away from nearby surface water gulley's or drains. In the event of a machine requiring refueling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment.
- All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to surface water and the underlying subsoil. The pouring of concrete will take place within a designated area using a geo-synthetic material to prevent concrete runoff into surface water and the soil/ groundwater media. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off site.
- Discharge from any vehicle wheel wash areas will be directed to on-site settlement ponds and will pass through a hydrocarbon interceptor prior to discharge.
- The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be tankered off-site to a licensed facility if necessary, until a connection to the public foul drainage network has been established.
- The construction compound's potable water supply will be protected from contamination by any construction activities or materials in the instance that a temporary well has to be sunk.
- Spill Kits to be kept in designated areas.

10.12.1.3 Designated Sites

Potential impacts on designated sites will be mitigated by the general measures and best practice construction methods for control of surface water run-off as included above in Section 10.12.1.1 and Section 10.12.1.2. Please refer to the NIS accompanying the application for further detail.

10.12.1.4 Habitats

Hedgerows and Treelines

No hedgerow clearance or tree felling will occur during the bird breeding season from 1st March to 31st August.

Existing trees being retained at the site and its immediate environs will be protected in line with current guidelines (e.g. NRA (now TII) 2006a).

The design of the proposed development incorporates the retention of c.2,165m of hedgerow. However, the proposed works will require the removal of c. 3,131m of hedgerow. The loss of hedgerow will be compensated by the landscaping plans for the proposed development which include planting of the following:

- c.1,291m of new hedgerow planting, comprised of native species
- c.2,722m woodland planting with understorey (native species)
- c.5,325m² native and semi-native shrub planting
- 580 street trees (mix of native and non-native species)
- 986 specimen trees (mix of native and non-native species)
- Boundary screening tree planting

The new planting of woody species will connect to other planted areas or existing hedgerows and treelines to maintain connectivity to the wider landscape. The species mix comprises native and non-native species and includes some pollinator friendly tree species listed in the *Pollinator Friendly Planting Code*⁹. As noted in Section 10.8.1.2, the hedgerows within the site are predominantly species poor with many gaps. As such, the landscaping plan will provide a net gain in the cover of woodland habitats at the proposed site.

The landscaping plan also includes a 'wildflower meadow', which incorporates several ornamental species listed in the *Pollinator Friendly Planting Code*.

10.12.1.5 Species

Where open excavations are to be left in-situ overnight, measures will be taken to ensure that mammals do not become inadvertently trapped and potentially injured within the open excavations. Such measures (covering, fencing off, allowing access/egress) will be decided under the advice of the project Ecological Clerk of Works at construction stage.

Bats

Loss of commuting and foraging habitat at the site will be mitigated by the landscaping proposals, which include hedgerow, tree and woodland planting, as detailed in Section 10.12.1.4 above.

To minimise disturbance to bats and other fauna that are roosting/resting or active at night, construction operations during the hours of darkness will be kept to a minimum. If construction lighting is required during the bat activity period (April to September), lighting shall be directed away from all hedgerow/ treeline habitats to be retained. This can be achieved by using directional lighting (i.e. lighting which only shines on the proposed works and not nearby countryside) to prevent overspill. This shall be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.

Badgers

A pre-construction survey shall be undertaken prior to the commencement of construction to identify active badger setts occurring within the site.

In the event of badger setts being identified within proximity to the proposed works area, the following mitigation measures are proposed to ensure no disturbance of the local badger population during the construction phase of the proposed works (NRA 2005):-

- A buffer distance of 10m from sett entrances should be employed in instances where light works such as digging by hand or in the event of scrub clearance.
- A buffer distance of 20m from Badger sett entrances should be incorporated where light machinery (generally wheeled vehicles) are in operation within the site.
- A buffer distance of 30m from Badger setts should be employed where heavy machinery is in operation within the site.
- None of the above activities should be undertaken within 50m of active setts during the breeding season (1st December to 31st June inclusive).

In the unforeseen event that the project requires works to be undertaken within the recommended buffer distances outlined above, further measures as outlined in NRA (2009) will be adopted in liaison with local NPWS staff.

⁹ National Biodiversity Data Centre (2015) Pollinator Friendly Planting Code. All-Ireland Pollinator Plan 2015-2020. www.biodiversityireland.ie/pollinator-plan.

Birds

No hedgerow clearance or tree felling will occur during the bird breeding season from 1st March to 31st August.

It is anticipated that the landscaping proposals will mitigate for the loss of habitat utilised by birds for foraging and shelter.

The landscaping plan also includes for the installation of bird boxes in the wayleave area. These shall comprise of a mixture of box types to attract different species as follows:

- C. 7 no. bird boxes suitable for species such as tits¹⁰.
- C. 7 no. open nest boxes suitable for wren, robin, blackbird and song thrush¹¹.

The final number and location of boxes will be decided by the Ecological Clerk of Works.

Invasive Species

There are records of the high impact non-native invasive plant species Japanese Knotweed and Indian Balsam from within 2km of the proposed site. No high impact non-native plant species were recorded within the proposed site during the site walkovers or habitat survey, however one small stand of Japanese Knotweed was recorded c.25m outside of the site boundary, to the west of Ballyhooly Road

The presence of invasive species has the potential to lead to an offence under the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). Regulation 49 of the 2011 Regulations prohibits (unless under licence) the breeding, release, or allowing or causing the dispersal from confinement of any animal listed in the Third Schedule of the Regulations; or the planting, allowing or causing dispersal, and spreading of any plant listed in the Third Schedule. Japanese Knotweed is a plant listed in the Third Schedule.

It is an offence to plant or encourage the spread of invasive species by moving contaminated soil from one place to another, or incorrectly handling and transporting contaminated material or plant cuttings. Persons must therefore take all reasonable steps and exercise due diligence to avoid committing an offence under the 2011 Regulations:-

- As stated in the preliminary CEMP, "*There are no invasive species recorded on site. An Invasive Species management plan will nevertheless be put in place so as manage the spread of any such species and prevent them entering the site. Japanese Knotweed has been identified on lands west of the site and an extermination programme for that has been initiated by JK Ireland". No works are proposed in areas where Japanese Knotweed is present*".

10.12.2 Operational Phase

10.12.2.1 Species

Bats

The proposed landscaping plan includes areas of hedgerow, woodland planting, street tree and specimen tree planting which will provide darker areas within the site and potential foraging and commuting areas for bats.

¹⁰ For example: <https://birdwatchireland.ie/product/tom-chambers-snoozy-bird-nest-box/>

¹¹ For example: <https://birdwatchireland.ie/product/kew-green-open-nestbox/> or <https://birdwatchireland.ie/product/birch-log-open-nestbox/>

The proposed lighting scheme also provides for the incorporation of darker areas within the proposed site, including habitats of potential value to bats such as woodland and peripheral areas of the wayleave that will be planted with trees. Furthermore, lighting proposed at the periphery of these areas of woodland planting is limited to low level lighting of 1 lux, which is the equivalent of levels of light typically present at twilight.

10.13 Predicted Residual Impacts

10.13.1 Construction Phase

As noted in Section 10.8.2.3, there is likely to be an ongoing reduction in the available foraging area for 3 pairs of yellowhammer as a result of the development, however in view of the extensive arable and pasture farmland habitat available in the surrounding landscape, the retention of boundary hedgerows where possible and the new planting provided for the proposed development, the residual impacts on the local yellowhammer population are not anticipated to be significant. Provided that the mitigation measures described in Section 10.12 are implemented in full then it is not anticipated that there will be any residual significant negative impacts on fauna as a result of the proposed development.

10.13.2 Operational Phase

No residual impacts will occur during the operational phase.

10.14 Monitoring

An Ecological Clerk of Works (ECoW) will be appointed for the construction phase of the project. The EcOW will be responsible for the following:

- Monitor the implementation of the project specific CEMP and the mitigation measures as outlined in Section 10.12.
- Pre-construction surveys for:
 - Invasive species
 - Badger setts
- Monitor the landscaping from the time of planting to one year post construction to ensure viable growth of new planting. Planted material shall be checked periodically over the growing season to remove dead material. Any dead material shall be replaced within the same season with viable stock according to age/height restrictions already specified in mitigation.
- Review construction/operational phase lighting plan to ensure minimal light spillage nuisance on retained/new wildlife corridors.

10.15 References

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