6 BIODIVERSITY (FLORA AND FAUNA)

6.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) comprises an appraisal of the likely effects on biodiversity (flora and fauna) of proposed development at Woodbrook, Shanganagh, Co. Dublin.

The potential for any impacts on sites designated as European (Natura 2000) sites, under the EU Habitats and Birds Directives was also appraised, and the results of that study are presented in a separate Report (Information for Screening for Appropriate Assessment).

Brady Shipman Martin was commissioned to prepare this chapter of the EIAR on behalf of Aeval UC, part of the Castlethorn Group. It was carried out by consultant ecologist Matthew Hague CEnv MCIEEM, with additional ecological surveys undertaken by bat/large mammal specialist Brian Keeley MCIEEM and ornithologist John Fox.

6.2 Assessment Methodology

6.2.1 Desk Study and Consultations

A comprehensive desk-based assessment has been undertaken, and numerous site visits have been carried out, between February 2018 and October 2019. Informal consultations have been undertaken with the local NPWS Conservation Ranger, and with the Dún Laoghaire-Rathdown County Council Biodiversity Officer.

This chapter, comprising an Ecological Impact Assessment (EcIA) has been undertaken in accordance with the following **publications**: -

- EPA Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2002) (and revised and draft guidelines 2015/2017).
- EPA Advice Notes of Current Practice (in the Preparation of Environmental Impact Statements (EPA, 2003) (and revised advice notes 2015).
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018).
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (Transport Infrastructure Ireland (formerly the National Roads Authority), 2009).
- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine ('the CIEEM Guidelines') published by the Chartered Institute of Ecology and Environmental Management (CIEEM), September 2018.

This Chapter has regard to the following **legislative instruments**: -

- The Planning and Development Acts (2000, as amended).
- The Wildlife Act 1976 as amended by the Wildlife (Amendment) Act 2000.
- European Commission (EC) Habitats Directive 92/43/EEC.
- European Commission (EC) Birds Directive 2009/147/EC.
- European Communities (Birds and Natural Habitats) Regulations 2011-2015.
- Flora (Protection) Order 2015.
- EIA Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014.
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

The report has regard to the following **Policies** and **Plans**: -

- Third National Biodiversity Plan 2017 – 2021 (Department of Culture, Heritage and the Gaeltacht, 2017).
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016).
- Dún Laoghaire Rathdown County Development Plan 2016 – 2022 including the accompanying Appropriate Assessment Documentation (Natura Impact Report).
- Woodbrook – Shanganagh Local Area Plan 2017 – 2023 and the accompanying Appropriate Assessment Screening Statement.

Information was also collated from the **sources** listed below: -

- Data on rare and protected plant and animal species contained in the following databases: -
    - The National Parks and Wildlife Service (NPWS) of the Department of Culture, Heritage and the Gaeltacht (www.NPWS.ie).
    - The National Biodiversity Data Centre (NDBC) (www.biodiversityireland.ie).
    - Birdwatch Ireland (www.birdwatchireland.ie).
    - Bat Conservation Ireland (www.batconservationireland.org).
- Recent aerial photography and photographs taken at the site.
- Recent and historic ordnance survey mapping (www.geohive.ie).
- Information on protected areas, as well as watercourses, catchments and water quality in the area available from https://gis.epa.ie/EPAMaps/.
- Information on soils, geology and hydrogeology in the area available from www.gsi.ie.
- Information on the Status of EU Protected Habitats and Species in Ireland (Article 17 report) (NPWS, August 2019).
- Information on land-use zoning from the online mapping of the Department of the Environment, Community and Local Government www.myplan.ie/en/index.html.

6.2.2 Field Surveys

The site was first surveyed by the author on 8th February 2018, with follow up ecological field surveys undertaken in July and September 2018 and May and October 2019. Numerous additional ecological surveys have been undertaken, across all seasons, by specialist bird and mammal ecologists in order to provide a comprehensive baseline on the local ecological environment. The baseline surveys covered the following elements and where relevant the results are included in this document: -

- Habitat surveys and mapping.
- Rare plant surveys and surveys of invasive alien plants.
- Badger and large mammal surveys.
- Bat activity and roosting surveys.
- Assessment of proposed lighting and its impacts on bats.
- Winter birds surveys.
- Appraisal of site suitability for breeding birds.
- Appraisal of site suitability for lepidoptera, amphibians and reptiles.

Habitats

During the course of the site visits the habitats were identified, described and mapped. Habitats were surveyed using the guidelines of Smith et al. (2011) and were classified using A Guide to Habitats in Ireland (Fossitt, 2000). Vascular plant nomenclature follows that of the New Flora of the British Isles 3rd Edition (Stace, 2010).

Bats

The site was examined for evidence of bat activity on 17 to 18 August, 25 September and 3 October 2018 for evidence of roosting, feeding and commuting bats. This was undertaken by a single surveyor within the site and included a pre-dawn evaluation and three post-dusk evaluations. Full details of the bat survey undertaken are included in Appendix 6.1.

A walked transect was undertaken along all hedgerows within the site and any bat activity was recorded with an Echometer 3 (EM3) monitor and a static Songmeter2Bat+ (SM2). This was placed along a hedgerow which was considered to have high feeding and commuting potential based on a visual inspection.

The survey commenced prior to sunset (and continued for approximately 1.5 hours. It re-commenced one hour prior to sunrise of the following morning. All bat activity was noted, and the species of bat present was determined both based on field observations and by later examination of the recorded bat signals (from the EM3 and the SM2). Any bats observed prior to dawn were followed to determine their roost destination if possible. At this time, it is possible to identify roost sites of individual bats more easily than at any other time of night as bats undertake a circling of the roost site known as swarming prior to entry (on most occasions, bats may also enter immediately into a roost). Trees within the site were examined for their potential as roost sites in winter 2018/19 as this is a period when leaves are absent from broadleaf trees and it is more possible to locate cavities and crevices.

Large Mammals

All hedgerows, tree lines, field edges and watercourses/ditches were searched for any evidence of badgers, such as setts, commuting routes, territorial marking, latrines or feeding signs as well as paw prints, snagged hairs and piles of bedding material. One potentially active badger sett was encountered and this was further examined using sticks in the entrances and by placing motion-activated (passive infrared) cameras nearby. In tandem with the badger surveys, examinations of the streams and drainage ditches in the wider area were undertaken to search for evidence of otters, such as tracks, slides, spraints (droppings), feeding signs and holts.

Mammal surveys followed the methodologies contained in the NRA Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes and the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes.

Birds

Bird activity was recorded on the site during the course of each site visit. In addition, an appraisal of bird species and activity levels was undertaken on 18th August 2018 to identify resident and migratory species within the site.

This involved a walkover of the site following each hedgerow, tree line, fence and boundary as well as a transect through the centre of the fields to identify any birds that may have been perched on the ground and less obvious to see.

Separately a number of wintering bird surveys were undertaken at the site, with four visits undertaken between 20 December 2018 and 1 March 2019. Each survey period was for a minimum of three to four hours. Full details of the wintering bird survey undertaken are included in Appendix 6.2.

During each visit the Woodbrook lands were walked extensively. All fields were entered and much of the ground was covered by walking up and down each field several times at different locations. All hedgerows and boundaries were also walked. The secondary area of Woodbrook Golf Course was also walked in a similar manner during each of three of the visits. During each visit all birds present on the land or seen close to the lands were identified where possible and their locations noted.

Observations were made primarily with the naked eye and through 42x10 binoculars. An 80x20-60 telescope was also used on several occasions. The songs and calls of birds were also used to identify various species and their locations on the lands.

The lands were also observed from various vantage points using a telescope to identify more distant birds without disturbing them.

All water birds seen on the land were identified, counted and their behaviour noted.

Night time visits were not undertaken to the lands as Light-bellied Brent are not known to feed on inland sites after dark.

The Woodbrook lands were walked during each of the four visits and were examined for the presence of geese dropping which would indicate that geese had been present recently. Walkers and golfers that were encountered on the lands or nearby were also questioned regarding any geese sightings they may have had on the lands.

Other Species

During the course of the walkover surveys the site was evaluated for the presence of and suitability for lepidoptera (butterflies and moths), amphibians (common frog and smooth newt) and reptiles (common/viviparous lizard).

Watercourses

A visual appraisal of ditches and watercourses in the vicinity of the site was undertaken. Biological kick-sampling, a method of assessing the ecological quality of a watercourse, was not carried out, due to the unsuitable substrate of the drainage ditches within the site, the flow regime and general overall condition.

6.2.3 Evaluation of Ecological Features

The methodologies used to determine the value of ecological resources, to characterise impacts of proposed development and to assess the significance of impacts and any residual effects are in accordance with the NRA Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA/TII, 2009). This methodology is consistent with the Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine ('the CIEEM Guidelines', CIEEM, September 2018).

In accordance with the NRA Guidelines, impact assessment is undertaken of sensitive ecological receptors (Key Ecological Receptors) within the Zone of Influence of the proposed development. According to the NRA (TII) Guidelines, the Zone of Influence is the "effect area" over which change resulting from the proposed development is likely to occur and the Key Ecological Receptors are defined as features of sufficient value as to be material in the decision-making process for which potential impacts are likely. In the context of the proposed development at Woodbrook, a Key Ecological Receptor is defined as any feature valued as follows: -

- International Importance.
- National Importance.
- County Importance.

- Local Importance (Higher Value).

Features of local importance (Lower Value) and features of no ecological value are not considered to be Key Ecological Receptors.

6.3 Receiving Environment (Baseline Situation)

6.3.1 General Description of the Existing Environment

The proposed development site (see Figure 6.1) is located in South County Dublin, close to the Wicklow border. It forms Phase 1 of a larger masterplan for development at Woodbrook, and has a total area of approximately 21.9 Ha including approximately 6.2 Ha to the east of the railway line and 1 Ha for the purposes of providing a foul rising main connection to St. Anne's Park, Shankill.

The Woodbrook Residential Area comprises a number of fields, until recently in agricultural use (arable and grassland fields), bounded by mature hedgerows/tree lines. A section of Woodbrook Golf Club is also included (all/part of the existing second and third holes).

The Woodbrook Golf Development Area is area is located immediately east of the railway and comprises a small triangular area of scrub to the west of the existing seventh golf hole, and two grassland fields to the west of the existing eighth golf hole at Woodbrook Golf Club . This part of the Site is to be used for the provision of two new golf holes in replacement of those lost on the existing course west of the railway.

In addition, the study area includes a narrow band located on an existing path extending north through Shanganagh Park, for the purposes of providing the foul rising main connection to St. Anne's Park, Shankill.

The site is bordered to the west by the R119 Old Dublin Road, to the north by Shanganagh Park and Shanganagh Cemetery, and to the south by the access road to Woodbrook Golf Club and a small block of woodland. Woodbrook Golf Course is located to the east of the site.

According to the EPA water features database[1], the nearest watercourse is the Crinken/Woodbrook Stream (also known as the Rathmichael Stream. This minor (2nd order) stream is located to the west and south of the site and is within 150m of the south western corner of the site at its closest point. It rises approximately 3km upstream and 2.5km northwest of the site. This watercourse enters the Irish Sea approximately 1km downstream of the site at Bray Strand. It does not drain directly into any European sites – Bray Head SAC is approximately 2km to the south and Rockabill to Dalkey Island SAC is approximately 4km to the north. Two other watercourses, the Shanganagh River and the Dargle River pass within 2km of the site, however neither of these features have any hydraulic connectivity to the site.

There are no on-site streams, however a drainage ditch is located running south through the centre of the site, associated with a north-south field boundary (hedgerow / tree line).

Groundwater monitoring undertaken to inform the Water chapter of this EIAR noted that regional groundwater flow is expected to follow topography in a general easterly direction, towards the Irish Sea.

[1] https://gis.epa.ie/EPAMaps/

Figure 6.1: Location of proposed development site at Woodbrook, Co. Dublin, showing watercourses in the vicinity (red line shows indicative site area – refer to planning application documentation for full details) (*source: OpenStreetMap*).

6.3.2 Designated Conservation Areas

For the risk of an adverse effect to occur there must be a *'source'*, such as a construction site; a *'receptor'*, such as a designated site for nature conservation; and a '*pathway'* between the source and the receptor, such as a watercourse that links the construction site to the designated site. Although there may be a risk of an impact it may not necessarily occur, and if it does occur, it may not be significant.

The potential for any impacts on European sites from the proposed development site was considered. Full details of that study are presented in a separate report (Information for Screening for Appropriate Assessment). The report concluded that there would be no likely significant effects on any European site as a result of the proposed development, either alone or in combination with other plans or projects.

No designated conservation areas occur within the area of the proposed development, nor in the immediate vicinity of the Woodbrook landholding.

Relevant European Sites

The nearest Special Areas of Conservation (SAC) are Ballyman Glen SAC (site code 000713), c. 2.6km to the south west, Bray Head SAC (site code 000714), c. 3.1km to the south east and Rockabill to Dalkey Island SAC (site code 003000), c. 3.5km to the north east.

The nearest Special Protection Areas (SPA) are Dalkey Islands SPA (site code 004172), c. 5.8km to the north east, Wicklow Mountains SPA (site code 004040), c. 7.9km to the west and South Dublin Bay and River Tolka Estuary SPA (site code 004024), c. 8.8km to the north.

These and the other relevant European sites are shown in Figure 6.2.

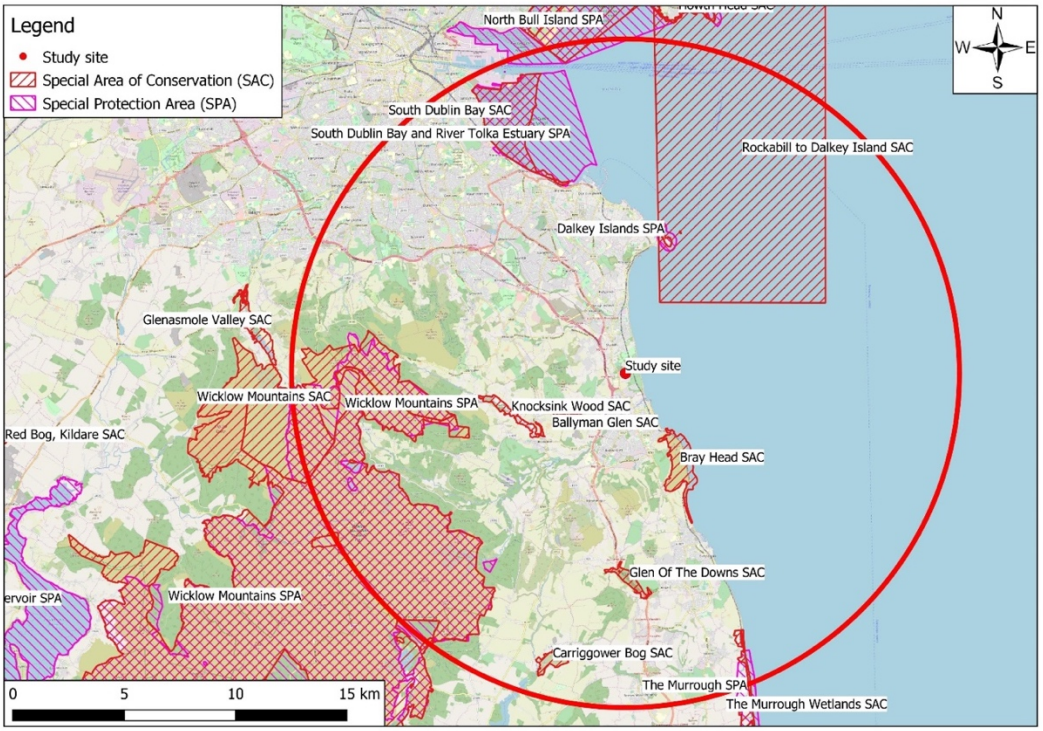

Figure 6.2: Study site at Woodbrook showing European sites (Circle denotes a 15km radius from the centre of the study site) (*source: OpenStreetMap*).

Other Designated Conservation Areas (other than European Sites)

The nearest sites designated for nature conservation that are not already also listed as European sites are Loughlinstown Woods proposed Natural Heritage Area (pNHA) (site code 001211, c.2.6km to the north), Dalkey Coastal Zone and Killiney Hill pNHA (site code 001206, c.3.0km to the north), Dargle River Valley pNHA (001754, c.4.0km to the south west), Dingle Glen pNHA (site code 001207, c.4.6km to the north west, and Powerscourt Woodland pNHA (site code 001768, c.4.9km to the south west).

These sites are shown in Figure 6.3.

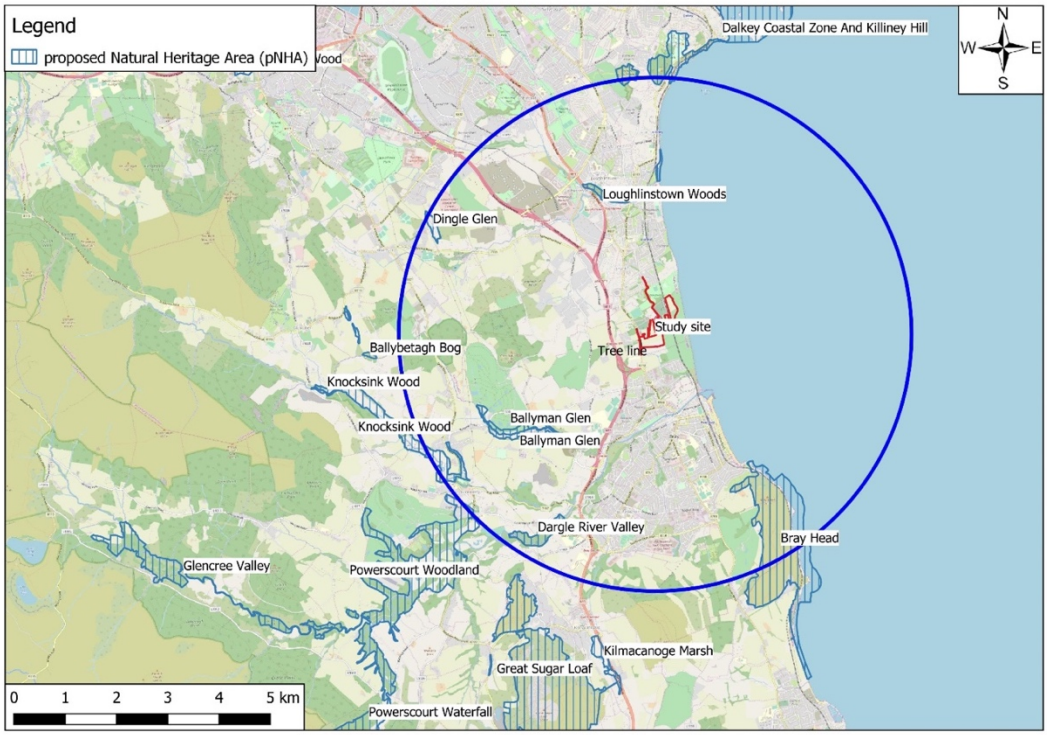

Figure 6.3: Study site at Woodbrook showing designated conservation areas (non-European sites) (Circle denotes a 5km radius from the centre of the study site) (*Source: OpenStreetMap*).

6.3.3 Rare and Protected Species

The NPWS and NBDC databases were consulted with regard to rare species (Curtis & McGough 1988) and species protected under the Flora Protection Order (2015). There are no known records of rare or protected plant species within the immediate vicinity of the proposed development.

There are records of lesser snapdragon (*Misopates orontium*), red hemp nettle (*Galeopsis angustifolia*), tufted saltmarsh grass (*Puccinellia fasciculata*), basil thyme (*Acinos arvensis*) within the 10km grid squares (O12 and O22) that cover the site. None of these plants are known to occur at the Woodbrook site. In addition there are records of common frog, smooth newt, red squirrel, Sika deer and otter, as well as yellowhammer within these squares.

No invasive plant species (i.e. those species listed on Schedule 3 of the Birds and Habitats Regulations, 2011-2015, such as Japanese knotweed (*Fallopia japonica*) or giant hogweed (*Heracleum mantegazzianum*) were identified on site, however several, including American skunk cabbage (*Lysichiton americanus*), Canadian waterweed (*Elodea Canadensis*), floating pennywort (*Hydrocotyle ranunculoides*), Himalayan knotweed (*Persicaria wallichii*), Hottentot-fig (*Carpobrotus edulis*), Indian balsam (*Impatiens glandulifera*), New Zealand pigmyweed (*Crassula helmsii*), Nuttall's waterweed (*Elodea nuttallii*), sea-buckthorn (*Hippophae rhamnoides*), least duckweed (*Lemna minuta*), Spanish bluebell (*Hyacinthoides hispanica*) and three-cornered garlic (*Allium triquetrum*) have been recorded within 10km.

6.3.4 Habitats

All habitats present on the proposed development site are described in this section and are shown in Figure 6.4.

Fields

The majority of the site (i.e. the Woodbrook Residential Area) comprises large agricultural fields. These were by and large under arable crop production (Fossitt code **BC1**) up until 2018. In 2019 no crops were grown and the fields have been left fallow. The fields in the southern-most part of the site are former agricultural grassland (**GA1**), grading into dry calcareous and neutral grassland (**GS1**), with encroaching willow (*Salix caprea*) and bramble (*Rubus fruticosus* agg.) scrub (**WS1**). The north eastern-most part of the proposed Woodbrook Residential Area is part of the existing Woodbrook Golf Club, comprising amenity grassland (**GA2**). Further north and east (i.e. at the Woodbrook Golf Development Area) are two more agricultural/amenity grassland fields (**GA1/GA2**), with regularly mown paths around the edges. These fields are regularly accessed by dog walkers and others using Shanganagh Park to the immediate north.

Several grasses have been recorded in the fields at the site, including meadowgrass (*Poa annua*), ryegrass (*Lolium perrene*), creeping bent (*Agrostis stolonifera*), crested dogstail (*Cynosurus cristatus*), Yorkshire fog (*Holcus lanatus*), Timothy (*Phleum pratense*) and the bent grasses *Agrostis capillaris* and *A. stolonifera*, as well as some ryegrass (*Lolium perenne*).

Non-grass species present in the grassland include nettle (*Urtica dioica*), ribwort plantain (*Plantago lanceolata*), silverweed (*Potentilla anserina*), cleavers (*Galium aparine*), greater stitchwort (*Stellaria holostea*) red clover (*Trifolium pratense*), white clover (*Trifolium repens*), broad-leaved dock (*Rumex obtusifolius*), common hogweed (*Heracleum sphondylium*), tufted vetch (*Vicia cracca*), dandelion (*Taraxacum* spp.), teasel (*Dipsacus fullonum*), herb-Robert (*Geranium robertianum*), great willowherb (*Epilobium hirsutum*) and hoary willowherb (*E. parviflorum*). Patches of rapeseed (*Brassica napus*) have grown in places.

Patches of bramble are encroaching in places. Other species occasionally present on the field boundaries include scarlet pimpernel (*Anagallis arvensis*), self-heal (*Prunella vulgaris*) and knapweed (*Centaurea nigra*).

Field Boundaries – Tree Lines, Hedgerows and patches of scrub

The field boundaries in the Woodbrook Residential Area are dominated by dense and mature but gappy hedgerows (**WL1**) and tree lines (**WL2**). There is a variety of tree species including lime (*Tilia europea*) and wych elm (*Ulmus glabra*), as well as sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*) and occasional horse chestnut (*Aesculus hippocastanum*) and beech (*Fagus sylvatica*). Additional species present in the Woodbrook Golf Development Area include spindle (*Euonymus europaeus*), dogwood (*Cornus* sp.) hazel (*Corylus avellana*) and rowan (*Sorbus aucuparia*). A block of mixed broadleaved woodland (**WD1**), dominated by lime, beech and sycamore and with a notably poor ground flora (ivy) is located to the south of the Residential Development area.

The hedgerows and tree lines are in poor ecological condition, with lower species diversity than would be expected at such a site. Although formerly dominated by planted hawthorn (*Crataegus monogyna*), much of the hawthorn has now been lost. Occasional wild cherry (*Prunus avium*) is present in some of the old hedgerows. In most parts of the site the field boundaries have associated pockets of bramble-dominated scrub (**WS1**), with dense pockets of ivy (*Hedera helix*) and nettles, with patches of old man's beard (*Clematis vitalba*) also present.

As noted in the Woodbrook Tree Survey report, prepared by The Tree File and submitted separately as part of the planning application, a large proportion of the trees on the site are in poor health with significant evidence of decline, due to poor management and neglect. In addition, Dutch elm disease has claimed a number of the elms on the site, raising concern about the viability of the remaining elm trees, including those that are currently in good condition.

The narrow strip proposed for the foul rising main connection to St. Anne's Park, Shankill, comprises **ED2/ED3** (bare ground) and **BL3** (on existing path within grassland and woodland).

Watercourses

As noted in Section 6.3.1 the nearest watercourse is the Crinken/Woodbrook Stream (also known as the Rathmichael Stream, located to the west and south of the site. It is within 150m of the south western corner of the site at its closest point and enters the Irish Sea approximately 1km downstream of the site at Bray Strand. Two other watercourses, the Shanganagh River and the Dargle River pass within 2km of the site, however neither of these features have any hydraulic connectivity to the site.

There are no watercourses on the site and few significant drainage ditches (**FW4**), except for a linear drainage ditch, associated with the field boundary tree line running from north to south through the centre of the site. Apart from small and isolated pockets of standing water, this ditch was generally dry when checked during the field surveys undertaken. On the most recent survey (14th October 2019), during a period of prolonged heavy rain, water was observed flowing south in the ditch. According to the information presented in **Chapter 8**: **Water**, during a storm event rainfall runoff from across the site is likely to drain primarily to this ditch, with some recharge also occurring to ground.

The site has no fisheries value whatsoever.

6.3.5 Fauna

Bats

The bat surveys undertaken to inform this report concluded that there are no bat roosts within the Phase 1 area (either the proposed residential area or the golf development area), however this does not rule out the occasional use of features (mature trees) on the site by roosting bats (refer to Appendix 6.1).

Three species of bat (common pipistrelle, soprano pipistrelle and Leisler's bat) were noted feeding or commuting within the site during the surveys undertaken. The highest level of bat activity within the main site (behind the cemetery and St. James's Church) was of common pipistrelle. This species was encountered primarily along the western section of the site while bat activity at the golf course was almost entirely absent during the summer assessment.

Soprano pipistrelle bat activity was lower within the site, but this was the only pipistrelle species noted prior to sunrise on 18th August 2019 and is likely to be roosting closer to the site than the common pipistrelles noted.

Leisler's bat activity was sparse both after sunset and prior to sunrise while the final bat noted was a Leisler's bat close to the church. The buildings associated with the church may be a roost for individual bats.

Feeding within the lands currently treated as part of the public park (i.e. the fields in the north eastern part of the study area) was relatively high.

Bat activity within the site differed between the two sections under consideration. More bat activity was present within the fields that are adjoining the public park than the larger fields behind the Church of Ireland. Within the part of the site adjoining the park, to the north east, common and soprano pipistrelle were noted repeatedly while there were no fewer than two Leisler's bats on several occasions and one individual for much of the period of observation.

All Irish bat species are fully protected under the Wildlife Act (1976) and subsequent amendments, and under the EU Habitats Directive, via the European Communities (Birds and Natural Habitats) Regulations, 2011-2015.

Badgers and other large mammals

A badger sett is located within a hedgerow/patch of scrub in the northern part of the Woodbrook Residential Area, just outside the Phase 1 development boundary. According to information provided by the local NPWS ranger this is a long-established sett, likely to be in excess of 100 years old. It has been subject to vandalism in recent years, however, following a period of monitoring undertaken in late 2018/early 2019 (including for several weeks with a passive infrared camera) it was confirmed that the sett is an active 'main' sett, likely used by breeding badgers.

No other active badger setts were recorded within the Phase 1 lands, however active setts have been recorded to the south east of the site (east of the railway line) and a long-disused sett is present in the woodland immediately to the south of the site.

Badger activity is evident throughout the Phase 1 area, predominantly associated with the field boundaries. Evidence recorded in 2018 and 2019 included latrines, badger hair, snuffle holes (feeding signs), paw prints and trails.

Badgers are fully protected under the Wildlife Act (1976) and subsequent amendments.

Otters are fully protected under the Wildlife Act (1976) and subsequent amendments, and in the European Communities (Birds and Natural Habitats) Regulations, 2011-2015. No evidence of otters has been observed on the site. Foxes, which are not protected, are frequently seen on the land.

Birds

No light-bellied Brent geese were observed on the Woodbrook Lands during any of the visits including the wintering bird surveys. No evidence in the form of geese droppings were found to suggest that geese might have been present recently. Geese were neither heard nor seen in flight at any time during the visits.

The development lands (i.e. the Woodbrook Residential Area and the Woodbrook Golf Development Area) in their current state are not suitable for grazing Light-bellied Geese. Their unsuitability is due to the nature of the habitats present within the lands. That is primarily, stubble and unmaintained improved grassland.

On 20th December 2018 a single lapwing was observed foraging on the lands and on 1st March 2019 a flock of 25 curlew was observed also foraging on the lands. No other waterbirds were observed on the lands during these or any of the other visits.

A small number of herring gulls were seen flying over the site during each visit.

A total of 32 other bird species were recorded on the site during the surveys (refer to Appendix 6.2). Of these the majority were not species of conservation concern (green listed on the list of *Birds of Conservation Concern in Ireland 2014 to 2019* (Colhoun and Cummins 2013)). Amber listed species included linnet, starling, skylark and stock dove, and red listed species included yellowhammer, herring gull, curlew and lapwing (all present in small numbers).

Birds, as well as their nests and eggs, are fully protected under the Wildlife Act (1976) and subsequent amendments.

Other species

Overall, the main development areas at Woodbrook are dry, with very few areas suitable for use by breeding amphibians (newts and frogs). No amphibians have been observed during the surveys undertaken to date at the site.

Nevertheless, even minor wet areas and temporary ponds may be of value for amphibians, in particular during the spring breeding season.

Similarly, no evidence of common lizard has been recorded, however, it is possible that lizards may occur within the site, although the area of suitable habitat (such as exposed rock) is limited.

Amphibians and reptiles are fully protected under the Wildlife Act (1976) and subsequent amendments.

The site was assessed for the presence of butterflies and for the suitability of the habitats for butterfly abundance and diversity. The fields are of only limited value for these insects, however, a number of species of butterfly (peacock, painted lady, ringlet and meadow brown, were recorded on the site in 2018 and 2019. No evidence of Ireland's only protected insect, the marsh fritillary butterfly, or its food plant (devil's bit scabious (*Succisa pratensis*)) was recorded on the site.

6.3.6 Overall Evaluation of the Proposed Development Site

Designated Sites

The site is not within or adjacent to any designated area. Neither Rockabill to Dalkey Island SAC nor Bray Head SAC (within 2km of the mouth of the Crinken/Woodbrook Stream) are considered to be sensitive ecological receptors in the context of proposed development at Woodbrook (refer to the accompanying report (Information for Screening for Appropriate Assessment) for full details).

Habitats

The hedgerows/tree lines that form the field boundaries, both within the site and along the boundaries, as well as patches of scrub associated with the linear features, are the main ecological feature on the Woodbrook Phase 1 site (both the proposed residential and golf club development areas). These features are of **Local Importance (Higher Value)**, in accordance with the ecological resource valuations presented in the NRA Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA/TII, 2009 (Rev.2)). They are considered to be sensitive ecological receptors.

The fields that dominate the site are of **Local Importance (Lower Value)** and are not considered to be sensitive ecological receptors (other than as feeding and foraging habitat for badgers).

Fauna

No features of significance for roosting bats are present within the Phase 1 lands at Woodbrook, however the site is of some importance for commuting and foraging bats. The larger hedgerows and tree lines within and around the site are all of importance for nesting birds. The site is of **Local Importance (Higher Value)** for bats and breeding birds and these species are considered to be sensitive ecological receptors.

Given the presence of an active 'main' badger sett on the site boundary to the north, the site is considered to be of **Local Importance (Higher Value)** for badgers, which are considered to be sensitive ecological receptors.

The following species groups are considered to be sensitive ecological receptors, however in each case the site at Woodbrook is of no more than Local Importance (Lower Value):

- Lepidoptera;
- Common lizard;
- Amphibians

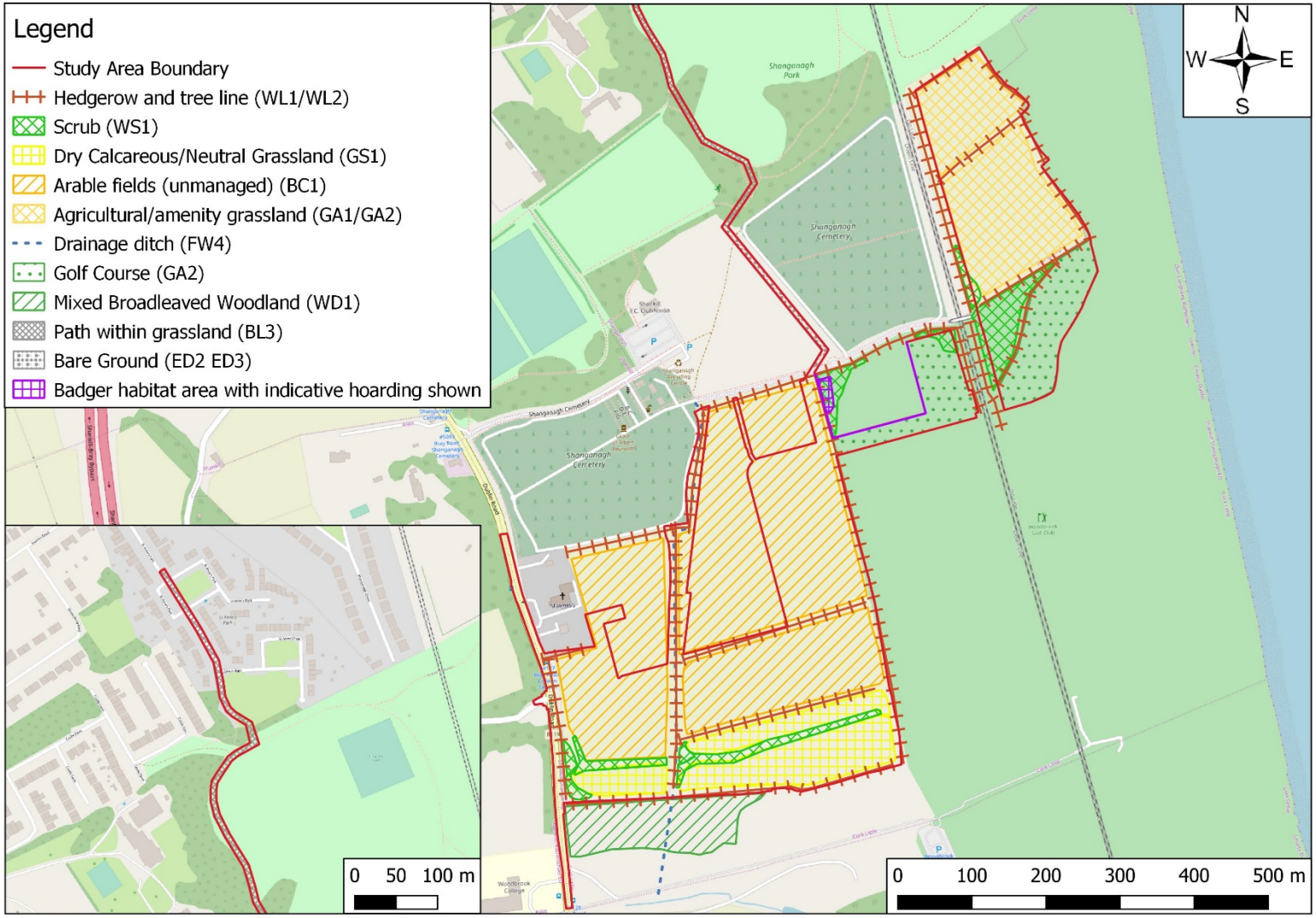

Figure 6.4: Habitat map (Note: only the general location of the badger sett is shown on this map, for reasons of biosecurity. The indicative location of temporary protective hoarding/fencing is also shown – refer to Section 6.6.1) (*source: OpenStreetMap*)

6.4 Characteristics of the Proposed Development

6.4.1 Proposed Development

The proposed development will comprise a residential-led development comprising 685no. residential units (207no. houses, 48no. duplexes & 430no. apartments) and a crèche facility (429m^2) in buildings ranging from 2 to 8 storeys. The proposed development also includes the provision of 2 replacement golf holes for Woodbrook Golf Club, a 164no. space temporary car park adjacent to the future Woodbrook Dart Station and all associated landscaping and site development works. Sustainable urban Drainage System (SuDS) infrastructure and wastewater infrastructure will also be provided.

A detailed description of the development is included in the Architectural Design Statement associated with this application.

6.5 Potential Impact of the Proposed Development

6.5.1.1 Construction Stage

Designated Conservation Areas – Screening for Appropriate Assessment

The potential for any impacts on European sites, designated under the EU Habitats and Birds Directives, (the provision of information for Screening for Appropriate Assessment) was considered. Full results of that study are presented in a separate report (Information for Screening for Appropriate Assessment). The following paragraphs comprise a summary of the conclusions outlined in that report: -

> *"This report concludes on the best scientific evidence that it can be clearly demonstrated that no elements of the project will result in any likely significant impact on any relevant European site, either on their own or in-combination with other plans or projects, in light of their conservation objectives. Based on these conclusions a Stage 2 Natura Impact Statement is not required for the proposed development.*
>
> *As such no mitigation measures are required for the protection of any European sites.*
>
> *It is considered that this report provides sufficient relevant information to allow the Competent Authority (An Bord Pleanála) to carry out an AA Screening, and reach a determination that the proposed development will not have any likely significant effects on European sites under Article 6 of the Habitats Directive (92/43/EEC) in light of their conservation objectives."*

Habitat Loss

The proposed development at Woodbrook (Phase 1) i.e. both the Woodbrook Residential Area and the Woodbrook Golf Development Area will require the removal of the existing fields and their replacement with either residential development and landscaping or new golf club holes and associated features.

- There will be no significant impacts as a result of this habitat loss, however these fields are of importance for foraging badgers. This potential impact is discussed below.

The proposed development will involve the loss of sections of the internal hedgerow and tree line network on the site as well as the removal of patches of scrub. In particular, the proposed development will result in the removal of the two internal east-west hedgerows/tree lines and the southern half of the north-south hedgerow/tree line running through the centre of the residential development lands (shown in Figure 6.4). This will be a total loss of approximately 700m of internal hedgerow. The removal of individual trees to accommodate development and the provision of services and roads will also be necessary, both in the Residential Area and in the Golf Development Area.

The drainage ditch that runs from north to south through the site will also be partly culverted.

In addition to being of local ecological value in their own right, these linear habitats are also wildlife corridors, allowing movement through the site and connectivity to the wider countryside.

- This loss is considered to be a probable permanent, significant negative impact at a site level.

Disturbance to/loss of Habitat for Badgers and other Large Mammals

According to Section 3.6.5 of the Woodbrook – Shanganagh LAP it is the policy of Dún Laoghaire-Rathdown County Council "*To continue to protect and enhance the landscape, green spaces, recreational amenities and the green infrastructure network, through sustainable planning and design for both existing and new communities in accordance with the policies and objectives of the County Development Plan and the objectives of this LAP.*"

Three LAP objectives in particular are relevant to this Section of the EIAR: -

- OR8: "*To protect and enhance biodiversity throughout the Plan Area by protecting habitats and creating new habitat opportunities through native planting and landscaping schemes*".
- OR12: "*Planning applications for all future development shall be accompanied by an ecological assessment, informed by ecological surveys where relevant, of how proposed developments are compliant with provisions of both the Local Area Plan and the County Development Plan relating to the protection and management of ecology, including protected species such as badgers, bats and owls. Disturbance or destruction to the resting places of protected species will be avoided where possible. In the instances where avoidance is not possible a full assessment will be carried out by a qualified ecologist and the derogation licence process will be followed through engagement with the NPWS. "*
- OR13:"*Badger setts within the Plan area shall be protected insofar as possible through the provisions of adequate buffers between the sett and proposed development or as otherwise agreed by the NPWS prior to commencement of development*."

The proposed development of the overall site at Woodbrook follows the development strategy set out in the Woodbrook – Shanganagh Local Area Plan 2017 – 2023. In order to complete all phases of development (including future phases of residential development as well as a Dart station and a link road through the site) it is likely that the removal and permanent closure of the 'main' badger sett, located on the edge of the Phase 1, will be required.

However, following consultations undertaken by the author with the Dún Laoghaire-Rathdown County Council Biodiversity Officer and the Local NPWS Conservation Ranger it is considered appropriate to retain the sett *in-situ* until a suitable site for a replacement, artificial badger sett is chosen. Discussions are currently taking place between all relevant parties with a view to establishing the replacement sett as early as possible and well in advance of the development of Phase 2 at Woodbrook.

Although the intention is to retain the badger sett as part of Phase 1, the proposed development under the current planning application will nevertheless result in potential disturbance to the sett. It is not proposed to close the sett even on a temporary basis in order to facilitate the Phase 1 development, however a licence to disturb badgers (issued by NPWS under Section 23 of the Wildlife Act, 1976, as amended), will be required, and an application for such a licence will be progressed at the appropriate time. The mitigation proposed will be agreed with NPWS and Dún Laoghaire-Rathdown County Council, however it will include the provision of buried fencing (e.g. chain link fencing) and solid hoarding to prevent badgers from accessing the works area and to prevent damage to badger sett tunnels (see Section 6.6.1.1 for further details).

- In the absence of mitigation to avoid disturbance to the badger sett the construction of elements of Phase 1 would be a temporary significant negative impact;
- Although outside the scope of the current application, the long-term delivery of key elements of the Woodbrook – Shanganagh LAP will result in the loss of this badger sett. In the absence of mitigation this loss would be significant and permanent at the local level. It is therefore proposed to provide an artificial (replacement) sett prior to such work being undertaken.

No significant impacts on otters, or any other large mammals are expected as a result of the proposed development.

Disturbance to/loss of Habitat for Bats

No confirmed bat roosts have been recorded within the proposed development area at Woodbrook. Regardless, the felling of mature trees creates a risk of roost loss. Reduced vegetation will lead to reduced insect abundance.

- In the absence of mitigation this will be a permanent moderate negative impact.

Disturbance to/loss of Habitat for Nesting Birds

There will be a reduction in vegetation cover for nesting birds as a result of the proposed development.

- In the absence of mitigation this will be a permanent moderate negative impact.

Disturbance to/loss of Habitat for Amphibians, Reptiles and Lepidoptera

It is not expected that impacts on amphibians, reptiles and lepidoptera will be significant, and the open space and landscaped areas provided as part of the proposed development will incorporate features suitable for use by these species.

Discharges to Surface Water from the Construction Site

Both the construction and operational phases of the proposed development at Woodbrook could have impacts on water quality, via contaminated run-off and sedimentation. However, all construction works will proceed in line with the recommendations and guidance provided in the Outline Construction & Environmental Management Plan (OCEMP) for the proposed development (prepared by AWN Consulting). Contamination of water (including surface water and ground water) from foul water, hydrocarbons, silt or other pollutants will be prevented by these mitigation measures.

- Provided that site facilities are correctly designed and proper working procedures are strictly adhered to, no impacts on existing watercourses are expected, either during the construction or operation of the proposed development.

6.5.1.2 Operational Stage

Impacts of Lighting from the Development

Increased lighting and increased human activity has the potential to impact on bat feeding and commuting behaviour. The proposed lighting for the scheme (prepared by Atkins Consulting Engineers), has been designed in accordance with the following guidelines:

- Bats and Lighting – Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland, 2010);
- Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2011);
- Bats and Lighting in the UK – Bats and the Built Environment Series (Bat Conservation Trust UK, January 2018).

Lighting can affect feeding and commuting behaviour for some species and for many individuals of species that are considered more light-tolerant, such as the three species recorded at Woodbrook.

- There are no roosts known within the site and therefore illumination would only affect commuting and feeding rather than roosting. At worst, lighting associated with the proposed development would be a permanent slight negative impact.

Discharges to Surface Water from the Development

The proposed surface water drainage system has been designed to incorporate multiple SuDS features across each of the catchment areas within the Woodbrook Residential Area. Storm water from each catchment will pass through various SuDS and an attenuation system prior to discharge at Qbar greenfield run-off rates. The restricted discharge from the proposed site will be conveyed via a new surface water sewer on the Dublin Road before discharge to the Crinken/Woodbrook Stream (Rathmichael River) immediately south of the site.

The SuDs techniques to be applied within the development include the following:

- Swales to be used within the site as conveyance systems for storm water runoff from sections of road, footpaths and shared surfaces;
- Permeable paving to be used in light traffic areas (to the front of residential units, courtyards and car parks);
- Extensive green roof (sedum roof) and intensive green courtyards will be provided on suitable buildings in accordance with Dún Laoghaire Rathdown County Development Plan, 2016 – 2022 and Woodbrook – Shanganagh LAP. The green roofs / courtyards will provide reduced peak flow rates, attenuation, evaporation and improved water quality;
- Underground modular systems to be used within public green corridors / park areas to allow for storm water attenuation (designed for up to a 1 in 100-year event). The modular systems will also allow for infiltration to ground were suitable;
- Filter drains (only roof run-off from the rear of each residential unit will discharge into the filter drains);
- Vortex flow control devices will be used throughout the site to allow for storm water control and reduce peak runoff.

In keeping with the Woodbrook – Shanganagh LAP requirements, run-off will pass through at least one level of treatment where possible using a SuDS component prior to the final levels of treatment in the public realm areas. Based on the proposed storm water drainage design, there will be no impact to surface water flows in the Crinken/Woodbrook Stream (Rathmichael River).

Storm water from the replacement golf holes will similarly include the SuDS treatment train, to improve water quality, reduce run off, and to ensure no downstream flooding occurs when discharging into the existing water course. It is proposed to discharge the system into an existing ditch in the southern corner of the lands. As the proposed system is being attenuated and discharge has been limited to the equivalent Greenfield run-off rate it is not anticipated that the discharge would cause any increased flood risk to the receiving drainage ditch.

- There will be no operational phase impacts related to surface or ground water as a result of the proposed development.

Discharges to foul sewer from the Development

Foul drainage services will be provided and all wastewater will discharge via gravity to a proposed wastewater pumping station in the southern part of the site, where it will be pumped via the proposed rising main and discharge on a temporary basis into St. Anne's Park housing development. Ultimately foul water from the development will be pumped directly to Shanganagh Bray Wastewater Treatment Plant (WWTP) located approximately 1.5km north of the proposed development in Shankill. Irish Water (IW) has confirmed that the existing foul network has sufficient capacity to meet the combined wastewater discharge volumes of approximately 283m^3/ day from the proposed residential development, including the proposed childcare facility, once operational. The proposed onsite waste water pumping station will have capacity for 24-hour emergency storage with an emergency overflow discharge point to the storm drainage network.

IW issued a Confirmation of Feasibility (COF) letter on the 16 of July 2018 which stated that "based upon the details you have provided with your pre-connection enquiry and on the capacity currently available as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place and the conditions listed below, your proposed connection to the Irish Water network can be facilitated". The COF letter is included as Appendix D of the accompanying Engineering Report prepared by Atkins. In addition, IW issued a Statement of Design Acceptance (2nd October 2019) which states that "Irish Water has no objection to [the] proposals" (see Appendix G of the Engineering Report).

It is noted that there are no foul water drainage requirements associated with the two proposed new golf holes. The new golf holes will not increase the foul loading from the existing golf course club house as they are replacing two existing golf holes.

As stated, foul sewage will be piped to Shanganagh Wastewater Treatment Works for treatment and ultimate discharge to the Irish Sea, which, according to information (coastal water quality data) provided by the EPA (https://gis.epa.ie/EPAMaps/), is classified as unpolluted.

According to Section 3.3 (Sustainable Infrastructure) of the Woodbrook Shanganagh LAP 2017-2023 document: -

> *"Since the original 2006 LAP was adopted, the 'Shanganagh Bray Main Drainage Scheme' and upgrading of Shanganagh Treatment Plant have been completed. The Shanganagh Drainage Scheme was commissioned and became operational in 2012. Since completion of the project, the Waste Water Treatment Plant (WWTP) is operating at less than two-thirds capacity. There is therefore significant treatment capacity available to serve future developments within the Plan Area.*
>
> *Dún Laoghaire-Rathdown County Council has actively engaged with Irish Water over the last two years in relation to advancing water and drainage infrastructure schemes to unlock the southern part of the County. Irish Water has indicated that the Plan Area forms part of the 'Old-Conna-Woodbrook Water Supply and Sewerage Scheme' – identified in the IW Capital Investment Programme (2017-2021) – and it will be prioritised in order to deliver the latent development potential of the area.*
>
> *The Plan Area benefits from the existence of, and immediate proximity to, the Shanganagh Recycling Centre. This centre is one of three provided within the County, and is operated and managed in accordance with the provisions and obligations of the Eastern and Midlands Waste Management Plan 2015- 2021."*

Shanganagh Wastewater Treatment Works has been upgraded as part of the Shanganagh Bray Wastewater Project, to cater for existing and all projected future catchment development flows. It has the capacity to treat effluent from 186,000 population equivalent with the potential to increase capacity to 248,000 in the future.

The capacity available at Shanganagh Wastewater Treatment Works is sufficient to accommodate the inflow arising from the proposed development at Woodbrook, as well as other developments in the area and it will therefore be possible to maintain the unpolluted status of the coastal waters.

- There will be no operational phase impacts related to foul water management as a result of the proposed development.

6.5.2 Cumulative – Woodbrook

In general, the on-going urbanisation of South County Dublin will lead to habitat loss and loss of open green space and will increase the risk of siltation and pollution of watercourses from wastewater and surface water. The development at Woodbrook (Phase 1) will provide a significant number of new residential units in an area of existing fields. Cumulative impacts may be considered to be significant at a local scale.

There will be loss of habitat, in particular mature tree lines and hedgerows, and a resultant loss of breeding bird habitat and foraging habitat for badgers. A significant portion of the site is to be retained as open space with ecologically sensitive planting, SuDS features and green roofs also featuring.

On completion of construction works, in particular post-implementation of the new landscape planting, these impacts are not considered to be significant.

6.5.2.1 Do-Nothing Impact

Currently, the site is not under any significant threats. The fields were until recently in agricultural use and there are no apparent threats to the fauna that utilise the land, such as badgers and nesting birds. Should no development be undertaken on the site it could be expected that these species would remain. However, the development area is a significant part of the Woodbrook – Shanganagh LAP. As such, development is highly likely to take place at the site, sooner or later.

6.6 Ameliorative, Remedial or Reductive Measures

6.6.1 Construction Stage

No designated conservation areas will be impacted in any way by the proposed development and no mitigation measures are required in this regard. Full details are provided in the accompanying report – Information for Screening for Appropriate Assessment.

In order to ensure that any ecological impacts are minimised and adequately mitigated a number of measures will be incorporated into the development design, as follows:

Habitats

As it is proposed to change the site from an agricultural to an urban character in the case of the Residential Area and from an agricultural to an amenity character in the case of the Golf Development Area, it is not possible to mitigate all of the potential impacts on local ecological receptors.

In order to mitigate the habitat loss, and in order to maximise the biodiversity value of the retained habitat and to ensure that habitat connectivity in the wider area is maintained, significant new planting will be incorporated into the landscape design (Chapter 13: Landscape and Visual Assessment) for the proposed development. This planting will, wherever possible, comprise an appropriate mixture of native trees and shrubs, preferably of local provenance, and including species attractive to pollinators.

The planting will also incorporate a range of species that will attract feeding invertebrates, including moths, butterflies and bees. It will take account of and implement the relevant objectives of the All-Ireland Pollinator Plan 2015-2020.

The planting will, over time, provide replacement habitat of benefit to the bats and birds that will continue to use the site and its boundaries. Connectivity to Shanganagh Park to the north will be maintained.

All site clearance and landscaping works will comply with current legislative requirements and best practice. In particular, trees to be retained will be treated in accordance with British Standard BS5837:2012 *Trees in Relation to Design, Demolition and Construction – Recommendations*, with protective fencing being installed around all trees and hedgerows to be retained, prior to commencement of development. All planting plans and landscaping proposals will further ensure that no invasive species are introduced, either deliberately or inadvertently, to the site.

Fauna

Where feasible and practicable, the removal of trees and other features suitable for use by nesting birds will be undertaken outside the bird nesting season (avoiding the period 1st March to 31st August). Should the construction programme require vegetation clearance between March and August bird nesting surveys will be undertaken by suitably experienced ecologists. If no active nests are recorded, vegetation clearance will take place within 24 hours. In the event that active nests are observed, an appropriately sized buffer zone will be maintained around the nest until such time as all the eggs have hatched and the birds have fledged – a period that may be three weeks from the date of the survey. Once it is confirmed that the birds have fledged and no further nests have been built or occupied, vegetation clearance may take place immediately.

No bat roosts have been recorded at Woodbrook and it will not be necessary to apply for a derogation licence under Regulation 54 or 55 of the European Communities (Birds and Natural Habitats) Regulations 2011-2015.

All mature trees shall be checked for bats by a bat specialist to identify trees with the highest potential prior to felling (this may change between the survey date and felling based on limb damage, storms etc.). From this, trees with the highest roost potential as determined by the bat specialist shall be subjected to a higher level of examination that shall include thorough checking of all suitable crevices, cavities, ivy cover or loose bark. This may require access via a hoist to reach all suitable cavities and crevices.

All mature oak, chestnut and ash are of high value as roost trees but individual trees with cavities, crevices, loose bark etc. may be beneficial regardless of species.

A total of six bat boxes (such as Schwegler 2F) and four bird boxes (such as Schwegler 1B or similar) will be erected, with advice from the project ecologist, on mature trees, within or on the perimeter of the proposed development site.

As described in Section 6.5.1.2, all new lighting for the proposed development at Woodbrook has been designed by Atkins Consulting Engineers taking account of the recommendations of Bat Conservation Ireland (2010), Bat Conservation Trust (2018) and the Institute of Lighting Professionals (2011).

In summary, the following measures are incorporated: -

- No floodlighting will be used – this causes a large amount of light spillage into the sky. The spread of light will be kept below the horizontal.
- Hoods, louvres, shields or cowls will be fitted on the lights if necessary to reduce light spillage if high intensity lighting is required or to protect trees or other potential roosts from light overspill.
- Lights will be of low intensity. Where applicable several low intensity lights will be used rather than one strong light spilling light across the entire area.
- Narrow spectrum lighting will be used with a low UV component and warm (3000K) colour temperature.

The lighting scheme for the proposed development, designed by Atkins, adheres to these lighting design characteristics. In particular, the following measures have been designed: -

- Luminaire selection limits upward light spill.
- Light levels will be reduced late at night.
- The lighting scheme achieves the recommended lux levels in accordance with current regulations and standards.
- The lighting scheme achieves good uniformity throughout the development to ensure good visibility at night.
- Light positions have been coordinated with the landscape Masterplan to ensure light positions do not clash with tree position.

Any ponds present in the fields to be disturbed will be inspected by a suitably experienced ecologist prior to works being undertaken. Should any frog spawn or tadpoles be discovered, a licence to remove frog spawn may be required from NPWS.

The badger sett, which is located outside of but immediately adjacent to the northern boundary of the Phase 1 site (shown in Figure 6.4), will be protected for the duration of the construction phase. Prior to any construction work being undertaken a solid 3m hoarding will be erected along the construction site perimeter to protect the sett from disturbance. Subject to licence and agreement with NPWS, the hoarding, which will be set back as far as possible from the sett, will be augmented with a buried vertical barrier to ensure that badgers are prevented from digging tunnels intro the works area. This buried barrier will be installed outside of the badger breeding season (i.e. outside the period 1st December to 31st June) and under the supervision of an experienced ecologist.

The sett will be subject to regular monitoring throughout the construction phase. The sett protection measures will be retained in place until a new, replacement sett for the badger group has been constructed (see Section 6.5.1.1), unless otherwise agreed with NPWS and Dún Laoghaire-Rathdown County Council. The provision of a replacement sett does not form part of the current planning application.

All mitigation measures will be undertaken under the terms of a licence issued by NPWS, and in consultation with the local Conservation Ranger and the Dún Laoghaire-Rathdown County Council Biodiversity Officer.

Aquatic environment and watercourses

The construction management of the site will take account of the recommendations of the Construction Industry Research and Information Association (CIRIA) guides 'Control of Water Pollution from Construction Sites' and 'Groundwater control - design and practice' to minimise as far as possible the risk of pollution.

Together with the OCEMP (prepared by AWN Consulting) and the measures outlined in Chapter 8: Water, prepared by Atkins Consulting Engineers, the following best practice measures will be adopted: -

- Drainage ditches, nearby streams (i.e. the Crinken/Woodbrook Stream and the newly constructed storm water systems will be protected from ingress of silt, debris and deleterious material during all phases of construction.
- Appropriately designed silt prevention measures will be installed if necessary and will be regularly maintained and retained in situ for the duration of the construction phase, until such time as all proposed permanent surface water protection measures are installed and operational.
- Discharge Licences – It will not be permitted to discharge into any newly constructed storm water systems or watercourse without adhering to the conditions of the discharge licence and agreeing the same with the Site Manager and Local Authority Area Engineer.
- Discharge of surface water from the construction site will be via silt/sediment trap and/or temporary hydrocarbon interceptors and will be monitored to meet any requirements set by the Local Authority/Environmental Protection Agency.
- No discharge will occur where there is a risk of cement or residue in the discharge.
- Concrete Washout – The washing out of concrete trucks on site will not be permitted as they are a potential source of high alkalinity in watercourses. Consequently it is a requirement that all concrete truck washout takes place back in the ready-mix depot.
- Control of spoil and other materials to prevent spillage, and through appropriate handling and selection of spoil/material storage locations.
- Careful siting and bunding of fuel storage facilities and any areas used for the storage of potentially hazardous materials.

- Appropriate construction techniques will seek to ensure that groundwater seepage into excavated areas does not take place.

The strategy for controlling and mitigating potential adverse environmental during construction will also include the following, as appropriate: -

- If required, sampling and testing of excavated spoil in order to assess the suitability of materials for reuse on site: -
- The use of piling systems designed to minimise impacts on the groundwater.
- Dust suppression from soils by the regular use of water sprays during any dry conditions, sheeting of haulage vehicle loads, use of wheel washers.
- Should invasive weeds be found, they will be treated as controlled waste and disposed of off-site at a landfill site that is licensed to receive such material.
- The storage of hazardous liquids (fuels and chemicals) will be avoided in so far as is possible. The handling and storage of any potentially hazardous liquids on site will be controlled and best practice guidance such as that published by the EPA, will be followed. Storage tank/container facilities will be appropriately bunded within designated compound areas and sited as far as possible from any watercourse or surface drain.
- If hazardous liquids escape during the works, the bunds and other protective measures will contain the spillage until remedial action, which will be taken as soon as possible.
- Procedures will be drawn up to control all potentially contaminating materials brought on site.

The implementation and effectiveness of these standard best-practice mitigation measures will be inspected and recorded regularly during the construction period and where deficiencies or faults are identified they will be remedied immediately by the contractor.

6.7 Residual Impact of the Proposed Development

Overall, although the proposed development may have some temporary negative impacts at the local level, these impacts will be fully mitigated over time to be rendered negligible.

It will be possible to retain the badger sett in place as part of the delivery of Phase 1, however the sett will be removed as part of future development plans. Although the loss of the sett would be, if unmitigated, a significant impact at the local level, the provision of an artificial (replacement) sett will reduce this impact to slight or moderate negative over time.

There will be a limited loss of feeding within the site for bats and birds and a loss of nesting areas for birds. Vegetation will establish over time and these losses will be reduced considerably. There will still be less cover for birds following all mitigation. There will be very limited (negligible to slight negative) long-term impact upon bats within the site given the low level of bat activity noted. There will be limited or no loss of roost potential as the site develops and with the provision of bat boxes.

6.8 Monitoring

A Project Ecologist will be retained for the duration of the construction phase, and will ensure that all construction works take place in accordance with the project CEMP and the mitigation measures set out in the EIAR. A programme of reporting and monitoring will be agreed with the Planning Authority prior to the commencement of construction.

The active badger sett, which will be retained until such time as a new artificial sett is provided, will require monitored protection, in line with the conditions of any licence granted by NPWS and in accordance with the parameters set out in best practice guidance including the National Roads Authority's *Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes* (NRA, 2006), for the entire duration of the construction Phase. Should any additional badger setts be discovered within the Phase 1 lands (e.g. that establish at a later stage but prior to construction) it may be necessary to exclude and close these setts, under licence from NPWS. However, to date no such setts have been discovered.

6.9 Reinstatement

The majority of the site area to be removed comprises agricultural fields of no more than Local Importance (Lower Value), and no reinstatement of these features is required. In the main the boundary hedgerows and tree lines that surround the fields at Woodbrook (Local Importance (Higher Value)) are to be retained intact.

Habitat connectivity will be fully maintained between Woodbrook Phase 1 and the wider area, in particular with Shanganagh Park immediately to the north. The majority of the internal hedgerows and tree lines (Local Importance (Higher Value)) will be removed to facilitate the development. It would not be appropriate or feasible to reinstate these features, and mitigation measures, as described in Section 6.6 will be implemented, including the extensive planting of ecologically diverse habitats where appropriate within the open space.

6.10 Difficulties Encountered

No difficulties were encountered in compiling the Biodiversity Chapter of the EIA Report. All surveys were undertaken to an appropriate level given the nature of the site and the proposed development. The bat surveys were undertaken in 2018 and it was not necessary to conduct follow-up dawn/dusk emergence surveys in 2019. This was due to the lack of any roosting on the site and the fact that no significant changes had taken place to the baseline ecological environment. Regardless daytime surveys were undertaken in 2019 to re-check the trees on site for their suitability for use by roosting bats.