February 2024

Ecological Impact Assessment

Large Residential Development (LRD)

Spaglen, Mallow, Co. Cork

On behalf of

O'Flynn Group

MALONE O'REGAN ENVIRONMENTAL

QUALITY
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MALONE O'REGAN ENVIRONMENTAL

Ground Floor – Unit 3
Bracken Business Park
Bracken Road, Sandyford
Dublin 18, D18 V32Y
Tel: +353- 1- 567 76 55
Email: enviro@mores.ie

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Prepared By: Henry Tennyson **Signed:** _____

Checked By: Henry Tennyson **Signed:** _____

Approved By: Dyfrig Hubble **Signed:** _____

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Ecological Impact Assessment

Large Residential Development (LRD)

O'Flynn Group

Spaglen, Mallow, Co. Cork

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1 INTRODUCTION

1.1 Background and Purpose of Report

Malone O'Regan Environmental (MOR) were commissioned by O'Flynn Group ('the Applicant') to undertake an Ecological Impact Assessment (EcIA) to assess the likely significant effects, if any, of the proposed Large-scale Residential Development (LRD) and all associated works ('the Proposed Development') on lands at Spaglen, Mallow, Co. Cork (OSI Reference ITM 556603 599835).

The Proposed Development will be located on a site that is ca.8.12 hectares (ha) in size and is located within the townland of Spaglen, Co. Cork ('the Site'). The Site is shown in Figure 1-1. A proposed Site layout drawing is presented in Appendix A.

Figure 1-1: Site Location

1.2 Purpose of Report

The objective of this EcIA was to survey and assess the land within and adjacent to the Site for the presence of any habitats or species that could present a constraint on or an opportunity for enhancement due to the Proposed Development and assess the potential impact of the Proposed Development on identified ecological receptors. This report and accompanying application will assess the Proposed Development plan comprised of 186No. units.

This report will be submitted as part of the overall LRD planning application for the Proposed Development to Cork County Council. A Natura Impact Statement (NIS) will also be submitted in support of the planning application.

1.3 Statement of Authority

The report was approved by Mr. Dyfrig Hubble, Associate Director - Ecologist. Dyfrig is a full member of the Chartered Institute of Ecology and Environmental Management. Dyfrig has over 15 years' experience working in the ecological consultancy sector, including habitat surveys and appraisals, and specialist protected species surveys.

1.4 Legislation and Planning Policy Context

1.4.1 Legislation Policy Context

Within Ireland, a number of sites of international or national importance to nature conservation, as well as many species of animal and plants are afforded a degree of legal protection, as set out in Box 1 below.

A study of biodiversity related planning policy at both national and local level has been undertaken for the Site and locality in order to highlight any potential conflicts with the relevant legislation and guidance documents.

Box 1 Designated Wildlife Sites and Protected and Otherwise Notable Habitats and Species

The National Parks and Wildlife Service (NPWS) notifies sites in Ireland that are of international or national importance for nature conservation (although some sites that are of national importance for certain species have not been so designated).

Internationally important sites may also be designated as:

- Special Areas of Conservation (SACs) and Candidate Special Area of Conservation (cSACs): the legal requirements relating to the designation and management of SACs in Ireland are set out in the European Communities (Birds and Natural Habitats) Regulations 2011-2021.
- Special Protection Areas (SPAs) and candidate Special Protected Areas (cSPAs): strictly protected sites classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (79/409/EEC), also known as the Birds Directive; and,
- Ramsar sites: wetlands of international importance designated under the Ramsar Convention, to which Ireland is a signatory.

Other statutory site designations relating to nature conservation are:

- Natural Heritage Area (NHAs): these represent examples of some of the most important natural and semi-natural terrestrial and coastal habitats in the country and are afforded protection under the Wildlife (Amendment) Act 2000. NHAs are legally protected from damage and receive protection from the date they are formally proposed for designation; and,
- Proposed Natural Heritage Areas (pNHAs): these sites are not afforded the same protection as NHAs. These sites are proposed by the NPWS but are not statutorily proposed or designated. Prior to statutory designation these are subject to a very limited legal protection. They are, however, sites of significance for wildlife and habitats and are important for the purposes of this EcIA report.

Legally protected species

Many species of animal and plant receive some degree of legal protection. For the purposes of this study, legal protection refers to:

- Species included in the Wildlife (Amendment) Act 2000, excluding species that are only protected in relation to their sale, reflecting the fact that the site disposal will not include any proposals relating to the sale of species; and,
- Species afforded protection under the Flora Protection Order 1999.

Other notable habitat/species categories

- Biodiversity Action Plan (BAP) species: those targeted in local or national BAPs as being of particular conservation concern (priority species);
- Red and Amber List birds: those listed as being of high or medium conservation concern as listed by Birdwatch Ireland [1]; and,
- Other Irish Red Data Book species and Nationally/Regionally/Locally Notable species where appropriate.

1.4.2 National Planning Context

1.4.2.1 Planning Policy Statement

The National Planning Framework - Project Ireland 2040 [2] states the following objectives, in relation to Biodiversity:

National Policy Objective 59:

'Enhance the conservation status and improve the management of protected areas and protected species by:

- *Implementing relevant EU Directives to protect Ireland's environment and wildlife;*
- *Integrating policies and objectives for the protection and restoration of biodiversity in statutory development plans;*
- *Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites; and,*
- *Continued research, survey programmes and monitoring of habitats and species.'*

National Policy Objective 60:

'Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance.'

1.4.2.2 All-Ireland Pollinator Plan 2021-2025

Irish pollinators are in decline and in response, Ireland joined a small number of countries in Europe who have developed a strategy to address pollinator decline and protect pollination services.

The All-Ireland Pollination Plan [3] was developed by a fifteen-member All-Ireland steering group, with the aim to build a foundation to bring about a landscape where pollinators can flourish, revers pollinator losses, help restore populations to a healthy level and make Ireland pollinator friendly.

The plan identifies targets that can incorporated by actions undertaken voluntarily by both public and private landowners to make Ireland more pollinator friendly.

- Increase the area of Council land that is managed in a pollinator-friendly way;
- Make transport corridors more pollinator friendly;
- Organisations with site networks on public land to manage these in a pollinator-friendly way;
- Make local communities more pollinator friendly;
- Make protected land in a pollinator-friendly way where appropriate;
- Manage protected land in a pollinator-friendly way where appropriate;
- Complete policy investigations;
- Strengthen links between the AIPP and other national initiatives;
- Track changes in pollinations on public and private land;
- Increase the number of gardens that are pollinator friendly; and,
- Increase the network of AIPP business supporters.

1.4.3 Local Planning Context

1.4.3.1 Cork County Development Plan 2022 - 2028

Cork County Development Plan 2022 - 2028 (CCDP) contains a number of objectives that relate directly to the protection of biodiversity and natural heritage in the context of development [4]. These include objectives that involve compliance with the EU Habitats

Directives and the Irish Wildlife Acts and that ensure the protection of ecological corridors and habitats [4].

The objectives of the CCDP with regards to the natural environment that are relevant to the Proposed Development are as follows:

Objective BE 15-1: Support and Comply with National Biodiversity Protection Policies

a. Support and comply with the objectives of the National Biodiversity Plan 2017-2021 (and any future National Biodiversity Plan which may be adopted during the period of this Plan) as appropriate.

b. Implement the current County Biodiversity Action Plan and any future updated Plan.

c. Support and comply with biodiversity policy set out in other national and regional documents as appropriate.

Objective BE 15-2: Protect Sites, Habitats and Species

a. Protect all natural heritage sites which are designated or proposed for designation under European legislation, National legislation and International Agreements. Maintain and where possible enhance appropriate ecological linkages between these. This includes Special Areas of Conservation, Special Protection Areas, Marine Protected Areas, Natural Heritage Areas, proposed Natural Heritage Areas, Statutory Nature Reserves, Refuges for Fauna and Ramsar Sites. These sites are listed in Volume 2 of the Plan.

b. Provide protection to species listed in the Flora Protection Order 2015, to Annexes of the Habitats and Birds Directives, and to animal species protected under the Wildlife Acts in accordance with relevant legal requirements. These species are listed in Volume 2 of the Plan.

c. Protect and where possible enhance areas of local biodiversity value, ecological corridors and habitats that are features of the County's ecological network. This includes rivers, lakes, streams and ponds, peatland and other wetland habitats, woodlands, hedgerows, tree lines, veteran trees, natural and semi-natural grasslands as well as coastal and marine habitats. It particularly includes habitats of special conservation significance in Cork as listed in Volume 2 of the Plan.

d. Recognise the value of protecting geological heritage sites of local and national interest, as they become notified to the local authority, and protect them from inappropriate development.

e. Encourage, pursuant to Article 10 of the Habitats Directive, the protection and enhancement of features of the landscape, such as traditional field boundaries, important for the ecological coherence of the Natura 2000 network and essential for the migration, dispersal and genetic exchange of wild species.

Objective 15-6: Biodiversity and New Development

'Provide for the protection and enhancement of biodiversity in the development management process and when licensing or permitting other activities by:

a. Providing ongoing support and guidance to developers on incorporating biodiversity considerations into new development through preplanning communications and the Council's guidance document 'Biodiversity and the Planning Process – guidance for developments on the management of biodiversity issues during the planning process' and any updated versions of this advice.

b. Encouraging the retention and integration of existing trees, hedgerows and other features of high natural value within new developments.

c. Requiring the incorporation of primarily native tree and other plant species, particularly pollinator friendly species in the landscaping of new development.

d. Fulfilling Appropriate Assessment and Environmental Impact Assessment obligations and carrying out Ecological Impact Assessment in relation to development and activities, as appropriate.

e. Ensuring that an appropriate level of assessment is completed in relation to wetland habitats subject to proposals which would involve drainage or reclamation. This includes lakes and ponds, watercourses, springs and swamps, marshes, heath, peatlands, some woodlands as well as some coastal and marine habitats.

f. Ensuring that the implementation of appropriate mitigation (including habitat enhancement, new planting or other habitat creation initiatives) is incorporated into new development, where the implementation of such development would result in unavoidable impacts on biodiversity – supporting the principle of biodiversity net gain.

Objective BE 15-7: Control of Invasive Alien Species

'Implement best practice to minimise the risk of spread of invasive alien species, on Council owned or managed land, and require the development and implementation of Invasive Alien Species Management Plans for new developments where required.'

Objective BE 15-8: Trees and Woodlands

a. Protect tree the subject of Tree Preservation Orders

b. Make use of Tree Preservation Orders to protect important trees or groups of trees which may be at risk or any tree(s) that warrants an order given its important amenity or historic value.

c. Encourage the provision of trees for urban shading and cooling in developments in urban environments and as an integral part of the public realm.

d. Preserve and enhance the general level of tree cover in both town and country. Ensure that development proposals do not compromise important trees and include an appropriate level of new tree planting.

e. Preserve and enhance the general level of tree cover in both town and country. Ensure that development proposals do not compromise important trees and include an appropriate level of new tree planting.

2 METHODOLOGY

2.1 Assessment Methodology for Prediction of Effects

The EcIA process was undertaken in parallel with the proposed development design with a view of minimising the adverse ecological effects of the proposed development and, where possible, delivering benefits for biodiversity. Desk study data collection and field survey work were carried out as part of the EcIA process, with the objective of ensuring that sufficient data was collected to identify the designated sites, habitat areas and species that could be significantly affected by the proposed development. This information then informed the assessment of effects on the potential biodiversity receptors.

The area for which biological data was collected was based on an assessment of the ecological zone of influence of the proposed development and associated activities. The ecological zone of influence is the area that could be affected by the proposed development, within which there is the potential for significant ecological effects. The starting point was that significant effects on designated nature conservation sites were unlikely to occur over 2km from the proposed Site boundary. However, adopting the precautionary principle, all SACs and SPAs within a 15km radius and all nationally designated sites for conservation within a 5km radius of the proposed development Site have been identified and impacts considered. Significant effects on priority habitats and species were considered unlikely at over 1km away. Desk study data were collected for this area (See Section 4.1), whilst field surveys focused on the site of the proposed development (See Section 4.2).

It should be noted that there was the potential for the zone of influence to be redefined during the assessment process in response to new design or environmental information, and / or for the geographical extent of field surveys to be extended to cover a greater extent of the desk study area (e.g., if the desk study identified species occurring off-site that could be significantly affected by the proposed development). In the end, such an increase in the study area was not required for this assessment.

The next stage of the assessment was to determine which, if any, of the sites, habitats, and species within the zone of influence (referred to in this report as 'potential biodiversity receptors') had the potential to be significantly affected by the proposed development (see Section 5). A high level 'scoping' assessment was then undertaken (see Section 5) to differentiate effects that were sufficiently likely to be significant as to merit more detailed assessment, from those that could be assessed at a less detailed level as they were classified as not likely to be significant (referred to as 'scoped-out' effects).

The assessment of how the potential biodiversity receptors would likely be affected by the environmental changes associated with the proposed development was based not only on the results of the desk study and field surveys, but also on published information on the potential biodiversity receptors' status, distribution, sensitivity to these changes, biology, and knowledge of ecological processes and functions, as appropriate

2.2 Consultation

A number of correspondence's have occurred between the Applicant and Cork County Council. These include:

- A section 247 meeting on the 9th September 2021 with regards to the original planning application on the Site for a Strategic Housing Development (SHD);
- The applicant met with Cork County Council on 4th April 2022 with regards to the original planning application on the Site for a Large-scale Residential Development (LRD) (Ref.PPN 21.937);
- A Section 32B meeting was held on the 21st June 2022 for the original planning application on the Site;
- With regard to the Proposed Development, an online Section 32B meeting was held for this application on the 4th December 2023; and,
- Cork County Council issued an opinion letter for the Proposed Development on the 22nd December 2023.

Additionally, a number of informal meetings have been held to discuss aspects of biodiversity on the Site and the opinion letter issued by Cork County Council between Ms. Joy Barry, Executive Planner, and Malone O'Regan Environmental. Ms. Barry also requested that MOR contact the local NPWS conservation officer with regards to bats.

The District Conservation Officer for Kerry – South & West / Cork – South & West – Mr. Declan O'Donnell, was consulted on the 6th January 2024 regarding the Proposed Development and the potential impacts on bats. Based on the information provided regarding the Proposed Development and the survey findings / conclusions from the project bat ecologist, Mr. O'Donnell indicated that a derogation licence would not be required, as no bat roosts were identified within the Site.

2.3 Desk Study

A desk-based review of information sources was completed, which included the following sources of information:

- Review of aerial maps of the Site and surrounding area;
- Cork County Council ePlan Website [5];
- The National Parks and Wildlife Service (NPWS) website was consulted to obtain the most up to date detail on conservation objectives for the Natura 2000 sites relevant to this assessment [6];
- The National Biodiversity Data Centre (NBDC) website was consulted with regard to species distributions within 2km of the Site [7]; and,
- The EPA Envision website was consulted to obtain details about watercourses in the vicinity of the Site [8].

2.4 Field Survey

In order to establish baseline conditions at the Site, an initial Site walkover was undertaken by one (1No.) MOR Ecologist on the 23rd September 2021.

Following the initial baseline survey and consultation with Cork County Council, it was deemed necessary to undertake additional specialist surveys including bat surveys, badger surveys, otter survey, and breeding bird survey / habitat suitability assessment. Bat surveys were undertaken on 23rd September 2021, 27th September 2021, 21st July 2022 and 11th August

2022, a badger survey was undertaken on 24th May 2022, and a breeding bird survey and habitat suitability assessment was undertaken on the 19th August 2022.

2.4.1 Habitat Survey

An initial habitat survey was undertaken on the 21st September 2021, by a suitably qualified and experienced MOR ecologist, to assess extent and the quality of habitats present on the Site and to identify any potential ecological receptors associated with the Natura 2000 sites. Additionally, three (3No.) updated surveys were also undertaken on the 24th May 2022, 3rd August 2022, 18th August 2022, 11th October 2022 and 2nd June 2023 by one (1No.) MOR ecologist. Following the opinion letter issued by Cork County Council on the 22nd December 2023, an additional Site walkover was undertaken on the 9th January 2024 to assess levels of hedgerow / treeline removal and to confirm any other potential changes to the Site since previous Site visits.

The habitat surveys undertaken utilised Fossitt's *Guide to Habitats in Ireland* [9]. The surveys aimed to identify the extent and quality of habitats present on the Site. The assessments were extended to also identify the potential for these habitats to support other features of nature conservation importance, such as species afforded legal protection under either Irish or European legislation.

2.4.2 Protected / Notable Species

The methodologies used to establish the presence / potential presence of faunal species are summarised below. These relate to those species / biological taxa that the desk study and habitat types of present indicated could occur on the Site.

2.4.2.1 Amphibians

The Site was assessed for its potential to provide sheltering, foraging, and breeding habitat for amphibians. These included water bodies suitable for egg-laying, and terrestrial habitats comprising open areas with mixed-height vegetation, such as heathland, rough grassland, open scrub, or water body margins. Suitable well drained and frost-free areas are needed to enable amphibians to survive the winter. An updated assessment was undertaken on the 9th January 2024, following the opinion letter issued by Cork County Council, which requested amphibian survey be undertaken on the Site.

2.4.2.2 Aquatic Species

A specialist biological assessment of the South Caherduggan River was undertaken by Sweeney Consultancy, recognised expert aquatic ecologist on the 5th May 2022. During this survey, the stream habitat quality was assessed, based on its physical nature and ecology. Please see this report attached as Appendix B or further details.

2.4.2.3 Badger

The survey was carried out by two (2No.) MOR Ecologists on the 24th May 2022. on the aimed to identify and examine areas where badgers (*Meles meles*) might occur by noting any evidence of badger activity. This included:

- Mammal paths;
- Badger hairs caught in sett entrances / fences / vegetation;
- Paw prints;
- Evidence of foraging (usually in the form of 'snuffle holes');
- Latrines; and,
- Badger setts.

An additional updated badger survey was undertaken on the 9th January 2024, following the LRD opinion letter issued by Cork County Council on the 22nd December 2023, on the entire Site by a suitably qualified and experienced MOR ecologist.

2.4.2.4 Bats

During the initial field survey, an assessment was carried out during the habitat survey for suitability of the habitats within the Site to support bats roosting, foraging, and commuting. The inspection was undertaken using close-focusing binoculars.

An internal and external inspection of the buildings within the Site was undertaken by 2no. MOR Ecologist on 23rd September 2021 and again on 24th May 2022.

Two (2no.) passive bat detectors, Wildlife Acoustics Song Meter 4 (SM4s), were put out in 2021 and in different locations in 2021.

Dusk emergence and dawn bat surveys were undertaken on 23rd September 2021, 27th September 2021, 21st July 2022, and 11th August 2022.

A bridge inspection of the bridge culverting the South Caherduggan along the southern boundary of the Site was undertaken on the 2nd June 2023, using a Magnusson Inspection Camera.

All surveys were undertaken in accordance with recognised best practice. Full details of the survey methodology are provided in the Bat Report attached as Appendix C.

2.4.2.5 Birds

A breeding bird survey and bird habitat assessment was undertaken on the 18th August 2022 by two (2No.) suitably qualified and experienced MOR ecologists.

Breeding Bird Survey

During this survey all of field boundaries located within the main Site boundary were walked, and all of the open areas were observed for the presence of birds (see Figure 2-1). All birds were recorded using a standard BTO code through sight and sound and optical equipment, such as binoculars, was used to minimise disturbance to birds.

During the survey, the behavioural activity of the recorded birds was noted using the BTO breeding status codes [10]. Birds that displayed non-territorial behaviours were recorded as well (i.e., birds that were foraging and not calling, birds that were loafing, etc.). Birds flying over the Site were not recorded unless the birds were clearly associated with the Site, i.e., had been flushed out.

Birds were classified as non-breeding, possibly breeding, and confirmed breeding based on the behaviours exhibited. The criteria for each classification are described below:

- Non-breeding – Birds that were flying over the Site, birds that were foraging and not calling, birds that were loafing;
- Possible Breeding – Birds observed in suitable nesting habitat and displaying either territorial and / or courtship behaviours, nest building behaviours or observed visiting a possible nest; and,
- Confirmed Breeding – Birds observed either on nest or carrying faecal sac or food, sighting of a nest with eggs / chicks, used nests, eggshells or recently fledged young.

The survey assessed the Site for any evidence of active nests or trace nests to determine the presence of nesting birds that may have utilised the Site earlier in the breeding season. During this assessment, all hedgerows / treelines were surveyed using binoculars to determine if any nests were located within the higher reaches of the habitat, surveyors also manually assessed

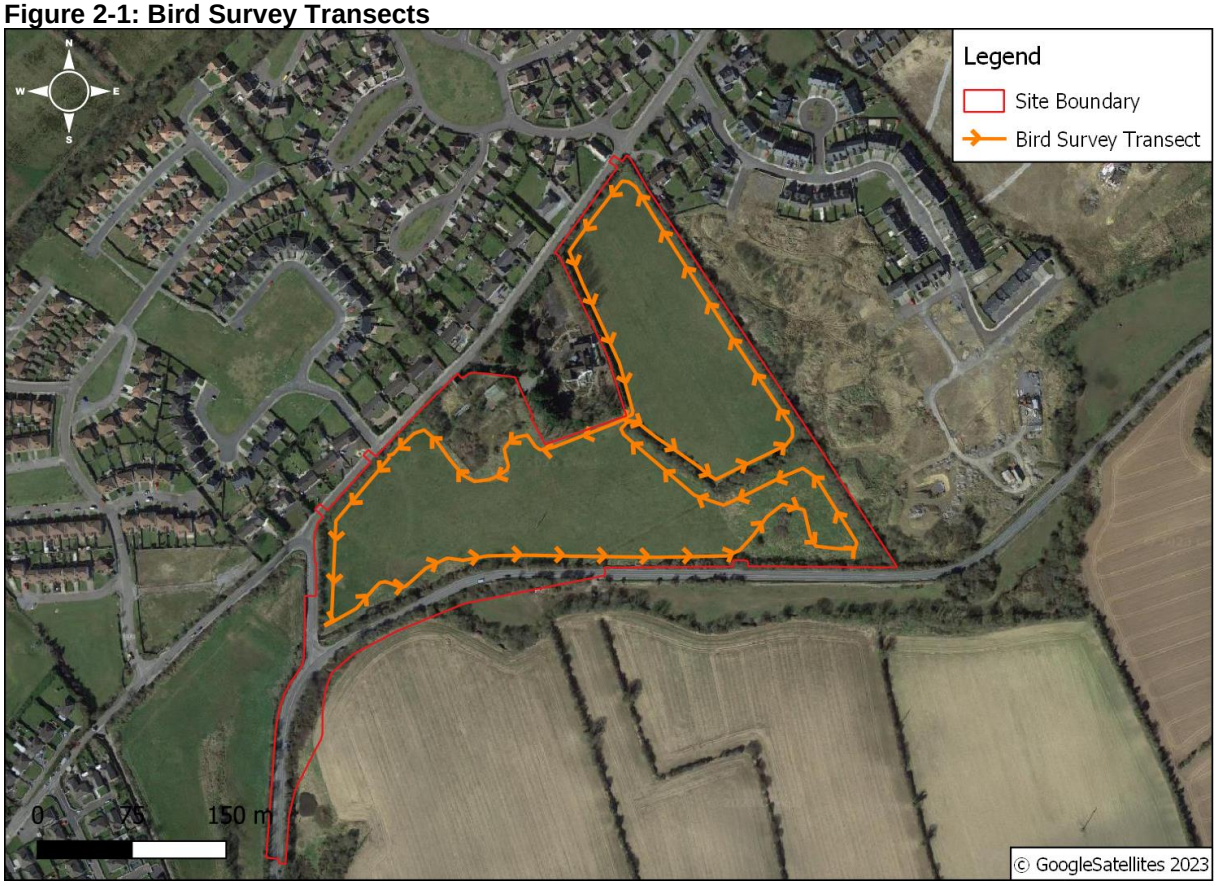
the hedgerows / treelines by going into the hedgerows and carefully looking through the foliage. Areas of tall grass / scrub were surveyed via transects across the area carefully looking for any remnants of ground nesting bird species.

Breeding Bird & Wintering Bird Habitat Assessment

The Site was assessed for its potential to provide nesting habitat for breeding birds, to support important assemblages of wintering birds or support rare or notable species.

During the survey, all field boundaries were walked, and the habitats onsite were fully assessed for their potential to provide suitable nesting habitat. Areas of dense hedging, scrub habitat, wet grassland habitat, tall grassland habitat and onsite water features were noted. The flora species composition of the onsite habitats was noted to determine suitable species for nesting and foraging bird species.

Figure 2-1: Bird Survey Transects



2.4.2.6 Otter

The survey was undertaken on the 19th August 2022 by two (2No.) suitably qualified and experienced MOR ecologists. The survey aimed to identify and examine areas where otter might occur by noting any evidence of otter observed. Evidence of otter searched for included:

- Holts (features log piles, caves, and cavities);
- Slides (flattered areas of mud or vegetation);
- Paw prints;
- Evidence of foraging (usually in the form of feeding remains such as fish scales, shellfish, etc.); and,
- Spraints.

An additional updated otter survey was undertaken on the 9th January 2024, following the LRD opinion letter issued by Cork County Council on the 22nd December 2023, on the entire Site by a suitably qualified and experienced MOR ecologist.

2.4.2.7 Invasive species

The Site was assessed for the presence of any noxious / invasive species such as Japanese knotweed (*Fallopia japonica*) and any other invasive species during the habitat survey on the 24th May 2022 by two (2No.) MOR Ecologists. An additional assessment of the Site was carried out on the 3rd June 2023 by one (1No.) MOR Ecologist.

2.4.2.8 Other Species

In addition, an assessment was carried out of the potential for the Site to support any other species considered to be of value for biodiversity.

2.4.3 Survey Limitations

It should be noted that due to the nature of breeding bird surveys, birds may not have been vocalising or seen in the dense vegetation meaning some birds may have been missed during the survey. However, given the simple nature of the habitats onsite, it is considered that the results of the breeding bird surveys provide an accurate assessment of the ecological value of the Site for breeding birds.

It should be noted that the breeding bird and bat surveys did not cover the section of hedgerow running along the N72 road upgrade works. However, this area was assessed for its potential to support both breeding birds and roosting bats, the details of which are presented in Section 4.2. The requirement for the road upgrade works was identified following the completion of both the breeding bird and bat surveys.

2.5 Methodology

The current assessment Guidelines for Ecological Impact Assessment in the UK and Ireland [11] recognise that an ecological assessment cannot consider in detail every individual species or habitat that may potentially be affected by a proposed development. The EcIA process aims to identify those ecological receptors that could be significantly affected by the Proposed Development i.e., where the effects on the receptor are of sufficient concern that they could influence the planning decision, or for which the development could result in the breach of relevant legislation. The effects of the Proposed Development on these receptors are then assessed, taking into account the sensitive design measures (avoidance measures) and where necessary the mitigation measures incorporated as part of the Proposed Development. The scope of the EcIA is determined iteratively.

2.5.1 Significance Evaluation Methodology

As part of the high-level assessment reported in Section 5.1, the conclusion about whether effects are sufficiently likely to be significant as to merit more detailed assessment is informed by a judgement about whether:

- The Site, habitat or species population is of sufficient quality or size that an effect upon it could be significant; and,
- The environmental changes associated with the development are such that there is the potential for a significant effect to occur (i.e., for the integrity of a site or for the conservation status of a habitat area or species population to be affected).

If the answer to both of these questions is yes, the relevant receptor would be subject to more detailed assessment and the significance of effects would be evaluated based on the methodology that is outlined below.

2.5.1.1 Negative Effects

For biodiversity receptors, an effect is assessed as being significant if the favourable conservation status of the specified biodiversity receptor is compromised by the Proposed Development. Conservation status is defined by CIEEM (2016) as follows:

- "*Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area*;" and,
- "*Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area*."

The decision as to whether the conservation status of the specified biodiversity receptor has been compromised has been made using professional judgement, drawing upon the results of the assessment of how each receptor will be affected by the Proposed Development.

A similar procedure has been used for designated sites that are affected by the Proposed Development, except that the focus is on the effects on the integrity of each site, defined as "the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or the levels of populations of the species for which it was designated."

2.5.1.2 Positive Effects

A positive effect is assessed as being 'significant' if development activities are predicted to cause:

- An improvement in the condition of a habitat / species population from unfavourable to favourable – condition data are only available for some Natura sites, but professional judgement and a review of available literature has been used to apply the same principle to habitats / species elsewhere; or,
- Partial or total restoration of a site's favourable condition.

If a species population, habitat, or site is already in favourable condition, it is still possible for there to be a significant positive effect. There is however no simple formula for determining when such effects are significant, given the complexities of assessing these types of effects. In such cases, decisions about significance have therefore been made on a case-by-case basis.

2.6 Identification of Potential Biodiversity Receptors

The assessment of the ecological zone of influence of the Proposed Development concluded that the development would be likely to result in changes in the extent and / or condition of the existing land cover on the Site, with potential effects on habitats and species on the Site. There is also the potential for effects on any areas that adjoin the Site, where fauna might make use of the land cover onsite.

The potential for off-site changes in noise and dust deposition was also assessed. It was concluded that, with the dust and noise control measures that have been built into the Proposed Development proposals, which are important for avoiding significant effects on people as well as biodiversity, there is no likelihood of significant effects associated with either dust or noise.

In summary, therefore, the ecological zone of influence of the Proposed Development is defined as:

- The Site of the Proposed Development (fauna and flora); and,
- Habitats adjoining the Site (fauna).

In the case of designated sites, a precautionary approach has been taken and the search area extended to identify sites outside of the zone of ecological influence. This information was used to further inform the assessment process and to ensure that the onsite habitats are not of importance for either habitats or species for which these sites have been designated.

As a basis for determining which biodiversity receptors need to be assessed within the zone of influence of the development, CIEEM's guidelines on EcIA recommend that consideration be given to the biodiversity conservation value of the sites, habitats and species that occur within the zone (as appropriate). The guidelines also refer to the need to consider the legal status that is afforded to some species and habitats (See Box 1).

Legal status needs to be considered because all developments must comply with the requirements of the law. By implication, therefore, there cannot be significant effects as a result of non-compliance with the law. However, it should be noted that, notwithstanding legal requirements, there is the potential for some legally protected species to be significantly affected in relation to their biodiversity conservation value.

In relation to biodiversity conservation value, only those designated sites, habitat types and species that fall within one or more of the categories defined in Box 1 are of sufficient importance that they could be significantly affected by the Proposed Development.

Drawing upon the biological data assembled for the purposes of this EcIA (Section 4), the potential receptors in relation to the Proposed Development are discussed in Section 5.

3 DESCRIPTION OF THE PROJECT

3.1 Site Context and Description

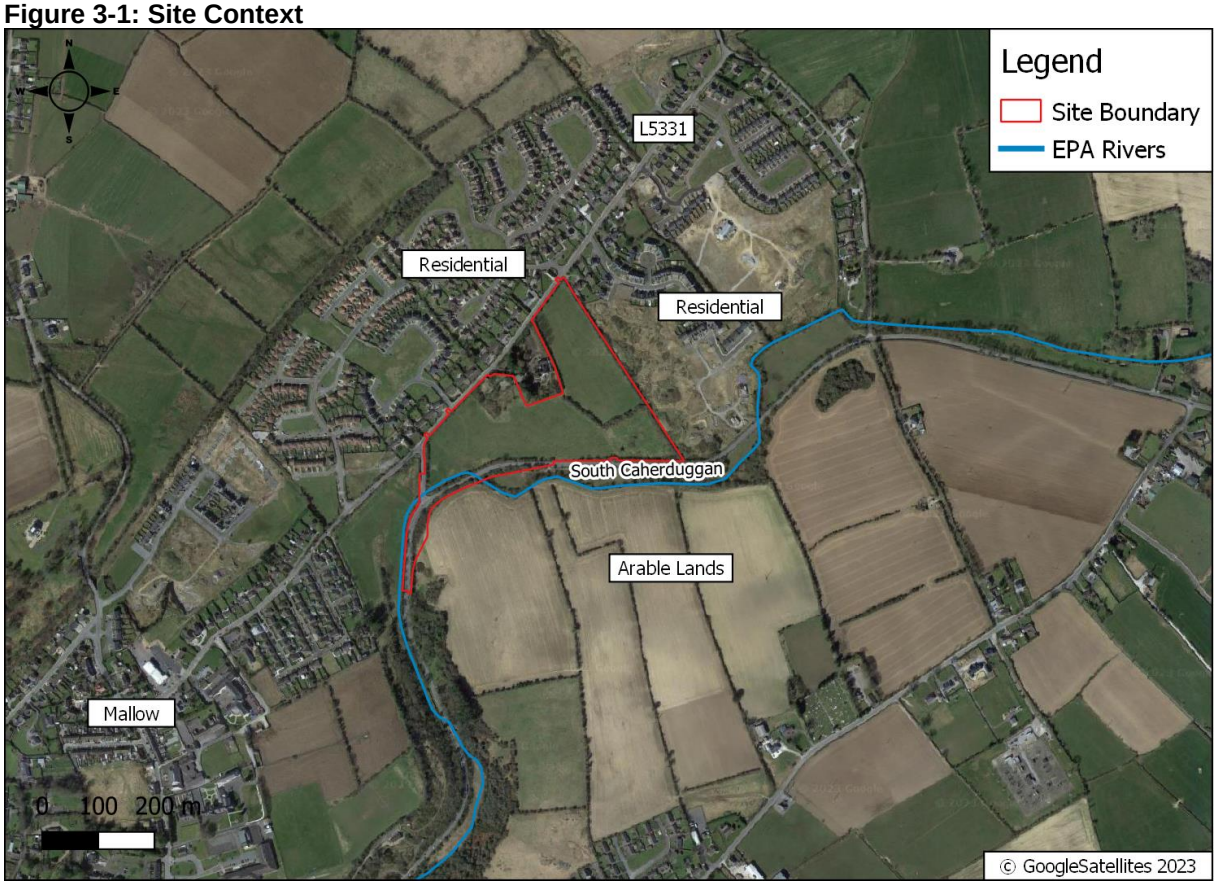
The Site is ca.8.12 ha located within the townland of Spaglen, north-east of Mallow, Co. Cork. The Site is comprised of two agricultural fields and a yard, which is overgrown by vegetation, containing stables and a disused residential property. The Site also contains an area of the N72, as shown in Figure 3-1, to the southeast of the main area of the Proposed Development The surrounding area is largely residential while the greater area is agricultural. The Site is accessed via the L5331 from the N72.

The L5331 local road runs parallel to the western Site, and the N72 national road bords the southern Site boundary. The South Caherduggan river runs along the south-western Site boundary adjacent to a mature hedgerow / treeline. See Table 3-1 and Figure 3-1.

Table 3-1: Adjacent Land Use

Boundary/Direction	Land Use
North	Residential Properties
South	N72 National Road, South Caherduggan stream and Agricultural Land
West	South Caherduggan stream, arable field, and Residential Properties
East	Housing Development and some Residential Properties

Figure 3-1: Site Context



3.2 Watercourses within the Vicinity of the Site

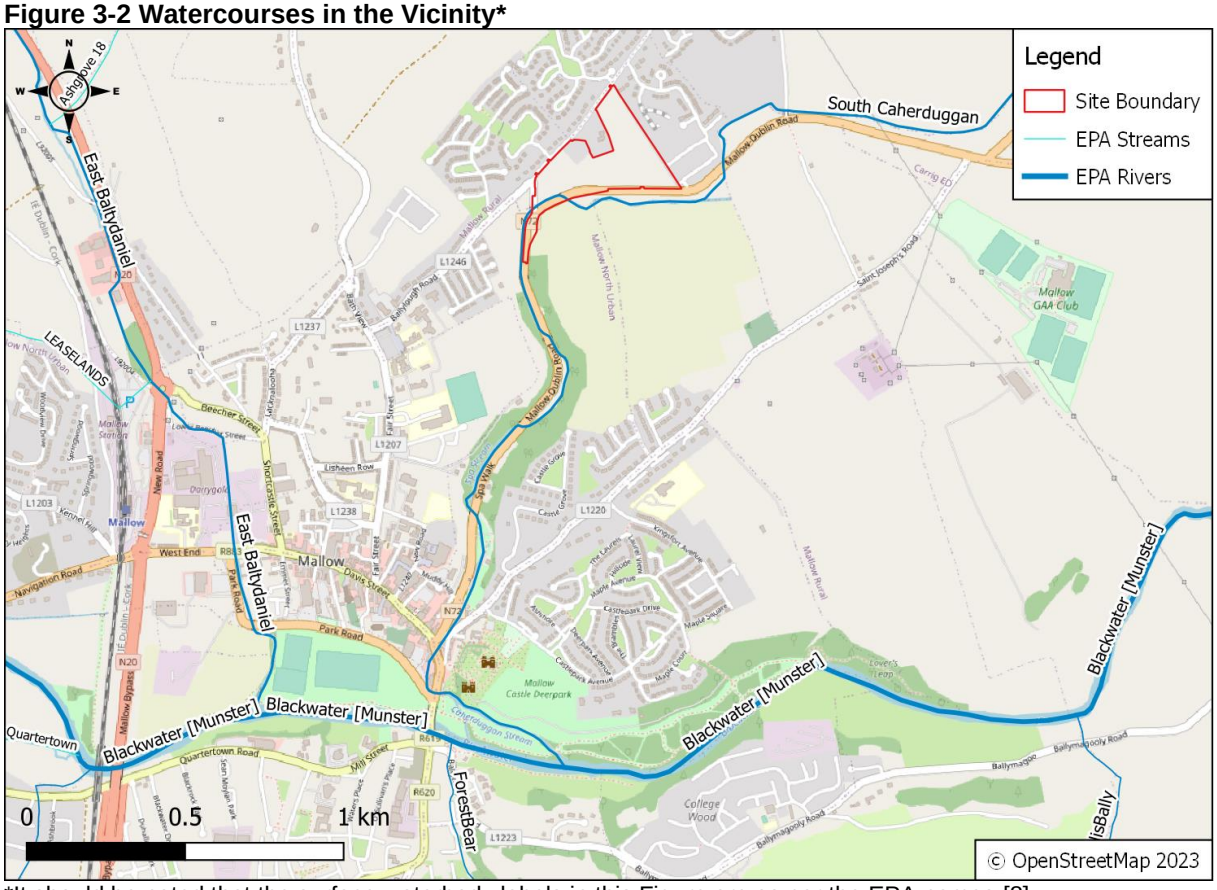
The Site is situated within the Blackwater [Munster] Catchment [Catchement_ID: 18] and the Blackwater[Munster]_SC_090 subcatchment [Subcatchment_ID: 18_21] [12].

There is one (1No.) hydrological feature located onsite, which is the South Caherduggan River and is located in the south-western corner of the Site. The South Caherduggan River is a tributary of the Blackwater River and flows in a southerly direction from the Site ca.2.2km prior to joining it. The discharge point of the South Caherduggan River is part of the Blackwater SAC. The River Blackwater flows in an eastern direction until it reaches Cappoquinn, where it then flows south until it discharges into Youghal Harbour, Co. Cork ca.83km downstream from Mallow, Co. Cork. The Blackwater River also flows through the Blackwater Callows SPA and the Blackwater Estuary SPA.

Under the Water Framework Directive (WFD) 2000/60/EC, as amended, the EPA classifies the status and the risk of not achieving good water quality status for all waterbodies in Ireland [12]. According to the WFD 2016-2021 monitoring events, the most up-to-date data at the time of writing this report, the water quality within the South Caherduggan River is considered to be '*not at risk,'* and the status of this river is considered *'good'* [12].

The location of the key surface water features in the vicinity of the Site are illustrated in Figure 3-2 below.

Figure 3-2 Watercourses in the Vicinity*



*It should be noted that the surface waterbody labels in this Figure are as per the EPA names [8]

3.3 Proposed Development

The Proposed Development is for a Large-scale Residential Development (LRD) at Spaglen (townland), Mallow, Co. Cork, and will comprise of:

- the demolition of existing farmhouse/buildings;
- the construction of 186No. residential units to include:
    - 168no. dwelling houses (comprising a mix of 2, 3 & 4 bed, detached, semi-detached & terraced/town houses); and,

- 18No. 1 bed duplexes/apartments;

- 1No. creche; and,
- All associated ancillary development works including 2No. vehicular access points, footpaths, parking, drainage, landscaping and amenity areas.

A detailed drawing of the proposed site layout can be seen by referring to Appendix A.

3.3.1 Drainage

Surface Water Drainage

The proposed surface water network will include a storm drainage pipe network, attenuation storage structures and several SuDS features, including nature-based features, which will aid the reduction of runoff volumes by slowing surface water flows, providing the opportunity for evapotranspiration and providing the opportunity for infiltration to ground. Both the interception and attenuation storage requirements of GDSDS will be sufficiently met.

The SuDS features that have been identified as for the Proposed Development are as follows:

- Swales;
- Bioretention Areas;
- Dry Basins and Wetlands; and,
- StormTech Attenuation Tanks

The combination of the above measures will provide for minimum (ca. 5mm) amount of interception storage required under the GDSGS. Further to these measures it is proposed that a hydrocarbon interceptor is installed upstream of the StormTech attenuation tank. Additionally, grit sumps will be provided upstream of hydrocarbon interceptors and grit chambers will be provided in all road gullies to capture grit high up in the treatment train.

Please refer to O'Flynn Construction Services Infrastructure Report submitted as part of this planning application for further details.

Foul Water Drainage

Following a Pre-Connection Enquiry, Irish Water (IW) issued a Confirmation of Feasibility, stating that the site can be serviced by its water and wastewater infrastructure network. There is an existing 225mmØ foul sewer located in the N72 road, south-west of the Site and it is proposed to connect foul drainage from the Proposed Development to this existing sewer at two locations as shown on Drawing No's. 22201-JBB-XX-XX-DR-CD-00024, 00025, 00026 & 00027 submitted in support of this planning application.

The confirmation from Irish Water shows that the connection is feasible subject to upgrade works of Mallow WWTP, which are due to be completed by Q3 of 2023.

The wastewater collection system is designed to ensure self-cleansing velocities will be achieved on all pipe runs. The proposed designs are in accordance with Irish Water's Code of Practice for Wastewater Infrastructure and were submitted to Irish Water for review and consideration for design acceptance as per the requirement of the LRD process.

3.3.2 Flood Risk Assessment

The Flood Risk Assessment (FRA) concluded that the footprint of the Proposed Development does not require mitigation. Part of the Site, where the South Caherdugan River is located (outside of footprint) is at risk of flooding and recommendations are made to protect against flood risk in this area. For more details, please see the FRA conducted by ARUP, submitted as part of this planning application.

3.3.3 Landscaping

A Landscape Plan will be submitted as part of the overall planning application.

As part of the Proposed Development, ca.553m of hedgerow will be removed, the majority of which will be to improve sightlines south of the N72. Therefore, throughout the construction phase of the Proposed Development, there will be ca.1,157m of existing hedgerow / treeline that will be protected and retained from any damage. In addition, the retained hedgerow / treeline's on the Site, there will be ca.1,293m of hedgerow to be planted around the Site, as shown in the LMP.

Additionally, the following will also be planted around the Site:

- 554m^2 of species rich dry meadows;
- 2,2707m^2 species rich wet and dry meadow planting;
- 3,194m^2 of Biodiversity Woodland Planting (wet woodland and mixed woodland); and,
- 461m^2 of Street Tree Planting with base hedges.

All of the remaining hedgerows / treelines will be retained and protected. The Landscape Plan has been designed to maintain a degree of connectivity to the wider landscape (where possible) with the retained hedgerows / treelines onsite and additional planting. Full details of the landscape plan are present in Appendix D.

3.3.4 Site Access

The Site will be accessed from the existing L5331. It is proposed to include cycle routes through the development, with public road crossings located to suit Cork County Councils Active Travel / Greenway Plans in the area. It is also proposed to improve the adjacent N72 junction to include a right turn lane, which is bounded to the Site from the south.

3.4 Demolition and Construction Procedures

During the demolition and construction phases of the Proposed Development potential environmental effects will be short-term and localised. Nonetheless, all works will comply with the relevant legislation, construction industry guidelines and best practice in order to reduce potential environmental impacts associated with the works. Where remaining potential impacts have been identified, additional mitigation measures will be employed to reduce, as far as practicable potential impacts.

A Construction Environmental Management Plan (CEMP) has been prepared as part of this planning application. The following guidance has been referred to and will be followed during the demolition and construction phases of the project to prevent water pollution that may occur within the area:

- C741 - Environmental Good Practice on Site (4th edition) (CIRIA, 2015);
- C698 - Site Handbook for the Construction of SUDS (CIRIA, 2007);
- C697 – The SUDS Manual (CIRIA, 2007);
- C532 – Control of Water Pollution from Construction, Guidance for Consultants and Contractors [13];
- Guidance for the Treatment of Badgers Prior to the Construction of National Road Schemes [14];
- Guidance for the Treatment of Bats Prior to the Construction of National Road Schemes [15];

- Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads [16]; and,
- All works will be undertaken in accordance with the 'Requirements for the Protection of Fisheries Habitat during Construction and Development' [17].

A construction compound and site offices will be set up at the proposed lay-by on the eastern boundary of the Site.

Please refer to the CEMP that has been prepared as part of this Planning Application for further details.

For traffic and transport please refer to assessment undertaken by O'Flynn construction, submitted as part of this planning package.

For demolition and waste management please refer to assessment undertaken by O'Flynn construction, submitted as part of this planning package.

3.5 Duration of Works

Works will be limited to 08:00 – 18:00 hours Monday to Friday inclusive and Saturday mornings, subject to any conditions set down by Local Authority

Working hours will generally be agreed in advance with the Planning Authority. Should construction work be required outside of these hours, they shall be subject to agreement with the Local Authority. Refer to the CEMP submitted with the planning application for further details.

3.6 Monitoring

An Ecological clerk of works (ECoW) will inspect the Site in advance of construction works commencing and will undertake site inspections as required during the works, to ensure that they will be completed in line with the mitigation measures detailed within this EcIA, the NIS, Biodiversity Management Plan and the CEMP.

In addition, the ECoW will either deliver or provide the resident engineer with sufficient environmental information to deliver a Site induction to all personnel working onsite.

4 STUDY RESULTS

4.1 Desk Based Study

Prior to conducting any Site surveys, a desk-based review of information sources was completed. This baseline information provided a valuable insight into the types of flora and fauna that may occur onsite and allowed for the identification of features / habitats located off-site that may require further assessment.

4.1.1 Statutory Nature Conservation Sites

In accordance with the European Commission Methodological Guidance [18] and Objective HE 2-1, HE 2-2 and HE 2-3 of the CCDP [4], a list of European sites that could be potentially impacted by the Proposed Development has been compiled. Guidance for Planning Authorities prepared by the Department of Environment Heritage and Local Government [19] states that defining the likely zone of impact for the screening and the approach used will depend on the nature, size, location, and the likely effects of the project. The key variables determining whether or not a particular Natura 2000 site is likely to be negatively affected by a project are: the physical distance from the project to the site; the presence of impact pathways; the sensitivities of the ecological receptors; and the potential for in-combination effects. Adopting the precautionary principle, all SAC and SPA sites within a 15km radius of the Site have been considered (Refer to Figure 4-1).

Two (2No.) Natura 2000 designated sites were identified within 15km of the Site (Figure 4-1 and Table 4-1).

Figure 4-1 Natura 2000 Sites within 15km

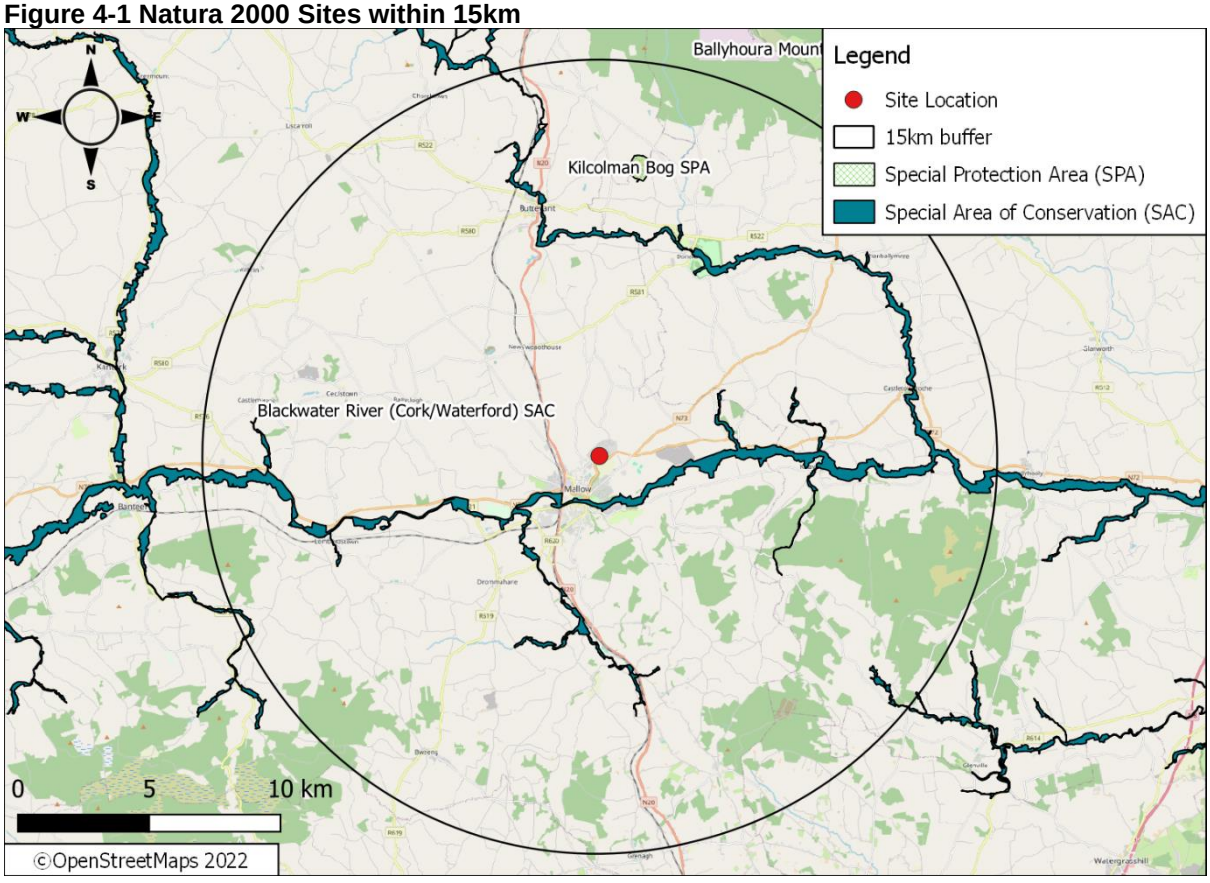


Table 4-1: Designated Natura 2000 Sites within 15km of the Site

Site Name	Site Code	Distance (km)	Direction from the Site
Special Area of Conservation (SAC)			
Blackwater River (Cork / Waterford) SAC	002170	1.5km	S
Special Protection Area (SPA)			
Kilcolman Bog SPA	004095	10.5km	N

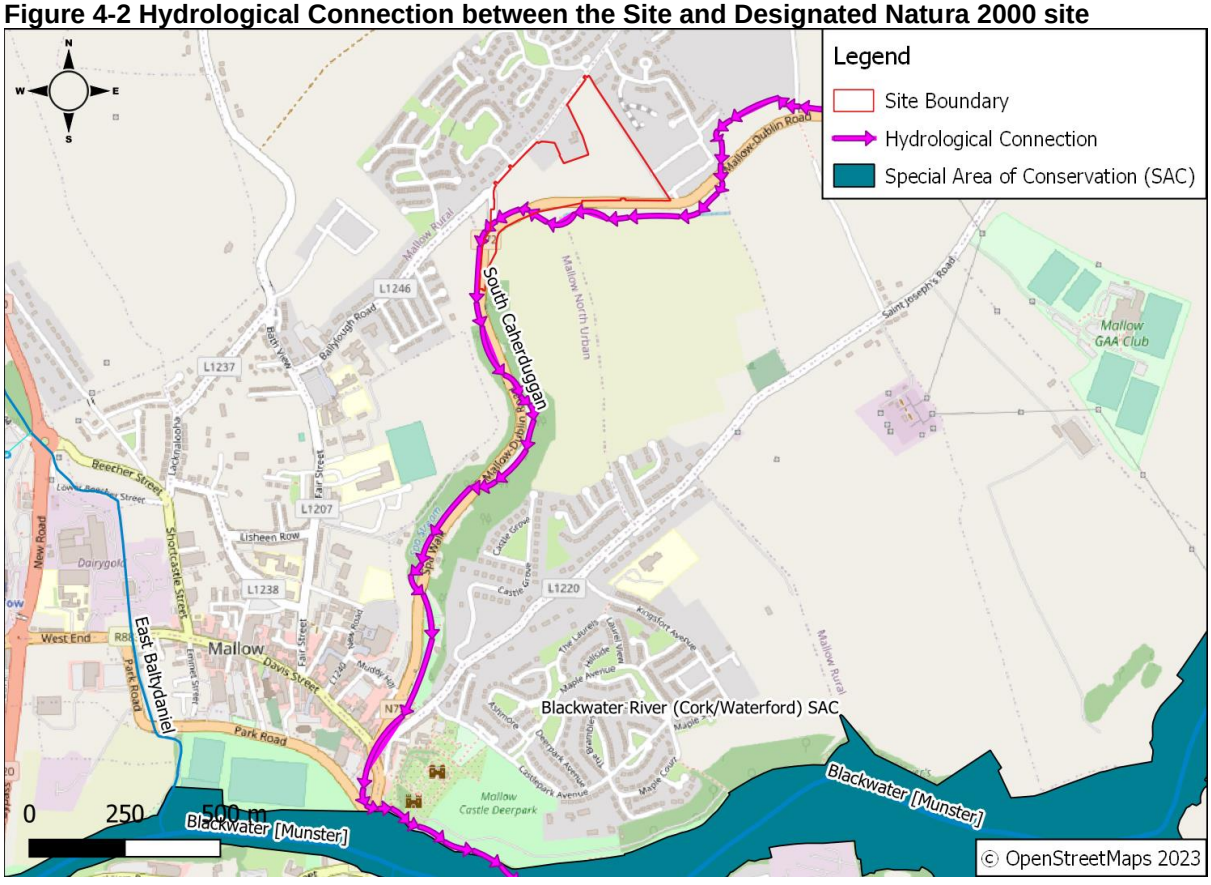
One (1No.) SAC and one (1No.) SPA are located within 15km of the Site.

There is a hydrological connection between the Site and the Blackwater River (Cork/ Waterford) SAC ca.2.2km downstream of the Site via the South Caherduggan River (refer to Figure 4-2).

The Blackwater Callows SPA, ca.32km from the Site, and Blackwater Estuary SPA, ca.77km from the Site, are hydrologically linked to the Site; however, given the intervening distance between the Site and the SPAs, these Natura 2000 sites have been screened out. The Kilcolman Bog SPA has also been screened out due to lack of impact pathways and intervening distance.

Therefore, further consideration has been given to Blackwater River (Cork / Waterford) SAC, to assess potential adverse effects resulting from the Proposed Development (please refer to the NIS submitted in support of this planning application).

Figure 4-2 Hydrological Connection between the Site and Designated Natura 2000 site



4.1.2 Nationally Designated Conservation Sites

Nationally designated conservation sites within 5km of the Site were investigated as per Objective HE 2-1, HE 2-2 and HE 2-3 of the CCDP [4]. No Natural Heritage Areas (NHA) or proposed Natural Heritage Areas (pNHA) are located within 5km of the Site.

4.1.3 Protected / Notable Species

Table 4-2 provides a summary of records of legally protected or otherwise notable species that occur within a 2km grid square of the Site boundary (Grid Squares utilised in this study include: W59P, R50Q, W59U) [7].

Table 4-2: NBDC Species within 2km of the Site*

Common Name	Scientific Name	Date of last record	Designation
Bird Species			
Rock Pigeon	*Columba livia*	22/05/2016	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I Bird Species Birds of Conservation Concern Green List
Spotted Flycatcher	*Muscicapa striata*	05/08/2022	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Mammal Species			
West European Hedgehog	*Erinaceus europaeus*	21/05/2022	Wildlife Acts 1976 / 2000
Invasive Species			
Butterfly-bush	*Buddleja davidii*	13/08/2023	Invasive Species: Medium Impact Invasive Species
European Rabbit	*Oryctolagus cuniculus*	18/03/2015	Invasive Species: Medium Impact Invasive Species
Indian Balsam	*Impatiens glandulifera*	04/10/2015	Invasive Species: High Impact Invasive Species
Japanese Knotweed	*Fallopia japonica*	16/04/2021	Invasive Species: High Impact Invasive Species
Sycamore	*Acer pseudoplatanus*	13/08/2023	Invasive Species: Medium Impact Invasive Species

* This table only includes records of protected species recorded within the last 10 years
** Invasive species included are those regulated under S.I.477 (Ireland)

4.2 Field Survey

4.2.1 Habitats

The following section provides details of the field-based assessment that was undertaken for the Site on the 24th May 2022, 11th October 2022, 2nd June 2023 and 9th January 2024. A

description of the habitats and features of ecological significance are outlined below and illustrated in Figure 4-3.

Improved Agricultural Grassland (GA1)

This is the dominant habitat type within the Site boundary and comprises of one large field, and a smaller field to the east. These fields are primary utilised for animal fodder (hay and silage). There is a mixtures of common grass species present throughout the field such as Yorkshire fog (*Hoolcus lanatus*), creeping bent grass (*Agrostis stolonifera)*, perennial ryegrass (*Lolium perenne)*, false brome (*Brachypodium sylvaticum)*, cocksfoot (*Dactylis glomerata),* timothy *(Phleum pratense)* and false oat-grass *(Arrhentherum elatius)*. Other species found during the Site walkover include silverweed (*Argentina anserina)*, creeping buttercup (*Ranunculus repens)*, horseweed (*Conyza canadensis)*, ribwort plantain (*Plantago lanceolata)*, germander speedwell (*Veronica chamaedrys*), vetch spp. (*Vicia spp*.), broad-leafed dock (*Rumex obtusifolius)* and ragwort (*Jacobaea vulgaris)*.

Recolonising bare ground (ED3)

An area of recolonising bare ground is present in the northern section of the Site, in the area that was previously used as a yard. Within in this area there is three (3No.) buildings present and several sycamore trees (*Acer pseudoplatanus*). This area is primarily made up of ribwort plantain, ragwort, stinging nettles (*Urtica dioica*), bramble (*Rubus fruticosus)*, ivy (*Hedera helix)*, black poplar (*Populus nigra)* and bindweed (*Convolvulus spp.)*.

Buildings and Artificial Surfaces (BL3)

There are three (3No.) disused buildings located in the northern section of the Site within the area of recolonising bare ground. An uninhabited dwelling is adjacent to the road running along the north-western boundary. To the south of the uninhabited dwelling house is a row of stables without a roof that are disused. A hay barn is located to the east of the dwelling house which on the north-western side is covered in ivy. Within the hay barn is farming machinery that is not in use.

Hedgerows (WL2) / Treelines (WL1)

The hedgerows and treelines form the majority of the Site boundary and the perimeter of the improved agricultural field. A mature hedgerow and treeline enclose perimeter of the improved agricultural grassland and sections off the other field. These hedgerows contain common species such as sycamore, hawthorn (*Crataegus monogyna),* black poplar (*Populus nigra),* elder *(Sambucus nigra),* common ash (*Fraxinus excelsior*), blackthorn (*Prunus spinosa*) and beech (*Fagus sylvatica*). The understorey and narrow field margins around the improved agricultural field contained species such as bramble*,* stinging nettle, silverweed, broad-leafed dock, bull thistle (*Cirsium vulgare*), prickly sow thistle (*Sonchus asper*), hogweed (*Heracleum sphondylium*), ladysthumb (*Persicaria masculosa*), dog rose (*Rosa* canina), and meadow buttercup (*Ranunculus acris*)*.*

Sections of mature treeline run along the northern section of the improved agricultural field consisting of species such as sycamore, black poplar, hawthorn, common ash and beech.

It should be noted that a section of ca.30m of hedgerow / treeline was removed in the northwest corner of the Site since the initial suite of surveys. It is understood that this work was carried out by Cork County Council for road upgrade works.

Scrub (WS1) / Grassy Verges (GS2)

A small area of scrub is located along the south-eastern boundary of the Site. There is a mixture of common species present here including bramble*,* bull thistle, prickly sow thistle, stinging nettle, dog rose, meadow buttercup, and broad-leafed dock*.*

South Caherduggan River (FW1)

The only waterbody onsite is the South Caherduggan River. The aquatic survey of the South Caherduggan River in November 2021 determined that the where the river is crossed by the N72 road, before flowing into the Site, it forms a deep pool with a back-eddy. Immediately downstream of the pool, there is fast-flowing riffle over a stony substratum which continues to the stream's exit point from the Site.

At the time of the ecological survey, an area of pooling water was noted at the N72 culvert, however, there was no discernible flow of water. There was limited botanical growth within the pooling area, only water dropwort (*Oenanthe crocata*) was identified. Furthermore, the gravel riverbed crossing through the Site only had small areas of pooling water. The river was densely overgrown with brambles, willow saplings and elder sapling. Along the margins of the river were stinging nettle, bindweed, hogweed and false oatgrass.

Figure 4-3: Habitat Map

4.2.2 Fauna

4.2.2.1 Amphibians

The NBDC does not hold records for amphibians within 2km of the Site within the last 10 years [7], and no evidence of amphibians was identified onsite.

The South Caherduggan was assessed for Amphibian suitability on the 18th of August 2022. Parts of the river retained a slow flow, with other parts of the river pooling, and some parts of the river being dry. The aquatic survey identified the section of the South Caherdugan in the Site is of '*moderately polluted status'*, therefore the watercourse onsite is deemed sub-optimal for amphibians.

Although, the grassy areas around along the South Caherduggan have potential to support the terrestrial life stage of native amphibians, no suitable waterbodies for breeding amphibians were identified during the Site visit on the 9th January 2024. Therefore, these areas were not considered suitable for the survival of amphibians over the winter months. Additionally, the area of scrub in the southeast corner was not deemed suitable for amphibians.

4.2.2.2 Aquatic Species

The Ballyviniter Housing Ecological Assessment of Watercourses report concluded:

- The section of the South Caherdugan Stream in the Site is '*not of ecological significance*' and '*moderately polluted status'*;
- The biological water quality indicated the watercourse is in '*unsatisfactory poor condition'*;
- The steep weir at the upstream end of the culvert would prevent the spread of white-clawed crayfish, salmonids, and otter; and,
- The water quality was deemed too poor to support lampreys and freshwater pear mussel.

See Appendix B for further details.

4.2.2.3 Badgers

The NBDC holds no records of badgers within 2km of the Site in the last 10 years [7]. There was one record of badger activity (badger scat) recorded during the initial habitat survey. During the 2023 and 2024 Site visits, there was evidence of badgers, in the form of badgers scat and prints, utilising areas to the south of section of the Site south of the N72. However, these were located outside the Site boundary. Additionally, no other evidence of badgers, in the form of feeding remains, snuffle holes or sett entrances recorded north of the N72 during the 2023 or 2024 Site visits.

The N72 is a national road which connects County Waterford to County Kerry through northern County Cork. No badger setts were identified within the Site boundary, north or south of the N72 and it is considered unlikely that badgers would construct a sett within the hedgerows of the Site boundary along the N72, given the high amount of road traffic and high level of human activity surrounding the Site.

4.2.2.4 Bats

The NBDC does not hold records for any of the nine (9No.) species of bats present in Ireland within 2km of the Site over the past 10 years [7]. However, as per the NBDC landscape suitability metric, the western half of the Site and surrounding area is considered to be of moderate-high suitability for bats (Landscape Suitability Metric Scire: 28-36) and the eastern

half of the Site and the surrounding area is considered an area of moderate suitability for bats (Landscape Suitability Metric Scire: 21-28) [7].

Bats are known to follow linear features as they commute through the landscape. Therefore, the hedgerows / treelines bordering and transecting the Site are suitable for this purpose. The arable field and improved grassland are also suitable habitats for foraging bat species.

The buildings and seven (7No.) trees were identified as having potential bat roost features (PBFs). However, the endoscope surveys and the dusk emergence and dawn re-entry bat surveys did not identify any bat roosts within these trees or the buildings on Site.

During the bat surveys undertaken at the Site, three (3No.) of bat species were recorded onsite, Common pipistrelle, Soprano pipistrelle and Lesser noctule. These species were identified commuting and foraging onsite. The overall bat activity onsite was considered to be low-moderate.

Full details of the bat surveys completed can be found in Appendix C.

4.2.2.5 Birds

Breeding Bird Survey and Habitat Assessment

The breeding bird survey undertaken at the Site did not identify any active or trace nests within any of the onsite hedgerows / treelines or within the scrub area.

In total twelve (12No.) species of birds were recorded onsite.

- Eleven (11No.) were green-listed species – blue tit, blackbird bullfinch, buzzard, dunnock, hooded crow, long-tailed tit, magpie, rook, woodpigeon and wren; and,
- one (1No.) amber-listed species was recorded – barn swallow.
- Of the species recorded none were classified as confirmed breeding. Furthermore, no active or trace nests were identified within the Site. However, thirteen (13No.) species were classified as possibly breeding and twelve (12No.) species were classified as non-breeding.

Of the species recorded none were classified as confirmed breeding. Furthermore, no active or trace nests were identified within the Site. However, only two (2No.) species were classified as possibly breeding and the remaining ten (10No.) species were classified as non-breeding (see Table 4-3).

Therefore, based on the onsite habitats and the species that were recorded during the bird surveys, it is considered that the hedgerow / treeline habitats are suitable for nesting birds. While the scrub area may be considered suitable for ground nesting bird species, no evidence of trace nests was identified, not ground nesting bird species were recorded during the survey, and no records are held for ground nesting bird species within 2km of the Site.

It should be noted that the habitats located adjacent to the N72, including hedgerow / treelines, agricultural grassland and scrub habitat, are not considered optimal for nesting birds. This is conclusion is based on the fact that the hedgerow / treeline is located adjacent to N72 that is consistently used by traffic and as such is exposed to traffic noise emissions. Studies have shown that traffic noise can result in acoustic interference or masking of bird songs, which is a reduction in the distance over which bird songs can be detected by conspecifics [20]. Therefore, the masking of bird songs can make it more difficult for birds to establish and maintain their territories, attract potential mates, and maintain pair bonds, all of which can result in decreased breeding success [20]. Overall, it has been shown that bird abundance, occurrence and species richness are reduced near roads and have the largest reductions when traffic levels are high [21, 22].

Therefore, these sections of habitat adjacent to the N72 may have potentially suitable habitat for breeding birds, including nesting habitat within the hedgerow / treelines and scrub and foraging habitat within the scrub and grassland; however, given the traffic noise emissions the Site is subjected to from the nearby N72, it can be concluded that these areas are of *low* ecological value to breeding birds. Overall, the Site is not considered to be a site of importance to any breeding bird species.

Table 4-3: Breeding Bird Survey Results

BoCCI Status	Common Name	Latin Name	No. Recorded	Behaviour Activity	Breeding Classification
Green	Blue Tit	*Cyanistes caeruleus*	7	Individuals recorded foraging and perching in hedgerows / treelines	Non-breeding
	Blackbird	*Turdus merula*	2	Individuals calling in the hedgerow / treelines	Possibly Breeding
	Bullfinch	*Pyrrhula pyrrhula*	2	Individuals perching in the hedgerow / treeline.	Non-breeding
	Buzzard	*Buteo buteo*	1	An individual hunting over the Site.	Non-Breeding
	Dunnock	*Prunella modularis*	1	An individual foraging within the Site.	Non-breeding
	Hooded Crow	*Corvus cornix*	6	Individuals perching along the hedgerows / treelines and foraging within the fields.	Non-Breeding
	Long-tailed tit	*Aegithalus caudatus*	7	Two (2No.) adult individuals and five (5No.) juvenile birds perching and calling in the hedgerows / treelines and foraging within the field margins.	Possibly Breeding
	Magpie	*Pica pica*	2	Individuals foraging in the fields.	Non-breeding

	Rook	*Corvus frugilegus*	4	Individuals foraging in the fields.	Non-breeding
	Woodpigeon	*Columba palumbus*	2	Individuals perching along the hedgerows / treelines.	Non-breeding
	Wren	*Troglodytes troglodytes*	5	Individuals perching and foraging along the hedgerows / treelines.	Non-breeding
Amber	Barn Swallow	*Hirundo rustica*	19	Individuals foraging over the fields.	Non-breeding

Winter Bird Habitat Assessment

The onsite habitats are comprised primarily of agricultural grassland, hedgerows / treelines, small areas of scrub and the South Caherduggan River.

Although the agricultural grassland has the potential to provide suitable foraging habitat for wintering bird species, the NBDC does not hold records for any waterbirds onsite or within 2km of the Site [7]. Furthermore, the South Caherduggan River was heavily overgrown at the time of the survey and therefore it is considered that this watercourse would not be suitable for larger waterbirds such as geese or swans. Additionally, given the inland nature of the Site is considered unlikely that wintering waterbirds would utilise the Site as there is an abundance of suitable habitat within close proximity to the coastline.

It is considered that the Site may be suitable for wintering farmland bird species, given the onsite agricultural grassland habitat. However, this habitat is common within the wider area.

Overall, it is considered that the Site is not a site of importance for any wintering bird species.

4.2.2.6 Otter

The NBDC holds records for otters within 2km of the Site [7]. During the Site walkover the only watercourse identified onsite was the South Caherduggan River; however, given the low flow of water through the river, the poor water quality, high cover of vegetation and the absence of suitable prey species, this part of the South Caherduggan River is unlikely to be utilised by otters. No evidence of otter was identified onsite during the Site surveys.

During the aquatic assessment it was noted that there is the presence of a metal grid downstream which would obstruct the movements of otters and it is therefore unlikely that otters will utilise this area. Therefore, the Site is not considered to be of value to otters.

4.2.2.7 Invasive Species

The NBDC holds records of Japanese knotweed [7] within 2km of the Site. However, no invasive species were recorded onsite during the surveys.

4.2.2.8 Other Species

Evidence of fox (scat) and rabbit (scat and burrows) were identified onsite. These species are common throughout Ireland and are typical for a rural landscape. Hedgehogs have been recorded within 2km of the Site in the desk-based survey [7]. No other notable or protected species were identified on the Site during the surveys.

5 CHARACTERISTICS AND POTENTIAL IMPACTS OF THE PROPOSED WORKS AND MITIGATION MEASURES

5.1 Sensitive Design

Specialist ecological input was a key element of the proposed design, to ensure that the design of the proposed works was sensitive to valued ecological features that occur or may occur within the Site and the surrounding landscape. This is in line with policies Objective HE 2-3 and HE 2-5 of the CCDP [4].

In order to minimise the potential for adverse effects on biodiversity as a result of the Proposed Development, the following measures have been incorporated into the project:

- All boundary hedgerows and hedgerows / treelines that are to be retained will be protected from unnecessary damage during the construction phase, refer to Section 5.1.3.2;
- A sensitive lighting strategy will be implemented as part of the Proposed Development to avoid potential disturbance to nocturnal species, refer to Section 5.3.2.2;
- Prior to the removal of vegetation along the N72 to improve the sightlines and for safety reasons, the proposed advanced nursery planting in this section will be planted 12 months in advance to allow the hedgerow / treeline to establish and maintain an ecological corridor south of the N72.
- An ecological corridor has been incorporated into the design running north-south connecting Meadowbrook to the southern boundary, this will also be planted at the initial phase of the Proposed Development to provide an ecological. Additionally, an ecological corridor along the eastern boundary with the Hazelbrook housing development will also be bolstered and no lighting will be associated with this section of the Site; and,
- A green corridor will be maintained and enhancement along the south boundary of the Site, which includes additional planting of trees, an area of wet meadow, wet woodland and mixed species woodland, as outlined in the Landscape Management Plan and shown in Figure 5-1.

Figure 5-1: Proposed Landscaping around the main body of the Site.

5.2 Potential Impacts

Based on the methodology that is set out in Section 2, Table 5-1 sets out the findings of the evaluation of important and legally protected receptors. Each receptor is assessed and a scoping justification for each receptor is provided for the construction and operational phases of the Proposed Development.

Table 5-1: Valuation of Potential Ecological Receptors

Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Protected Sites				
Natura 2000 Sites	European Communities (Natural Habitats) Regulations 1997 (as amended)	Internationally designated sites for conservation.	A Natura Impact Statement (NIS) has been prepared as part of the overall planning application in line with Objective BE 15-1 of the CCDP [4]. The NIS concluded that the Proposed Development would not cause any adverse effects on any European designated sites or any of their designated features of interest provided the mitigation measures incorporated within the NIS for the protection of water quality are adhered to (see Section 5.3.1.1 & Section 5.3.2.1) and that progression to Stage 3 of the Appropriate Assessment process (i.e., Assessment of Alternatives Solutions) was not considered necessary.	Natura 2000 sites have been scoped out from further consideration in the EcIA
Nationally Designated Sites	Wildlife Act 2000 (as amended)	Nationally designated sites for conservation.	There are no NHAs or pNHAs within 5km of the Site. Therefore, it is concluded that no impacts will occur to any NHA or pNHA.	Natural Heritage Areas have been scoped out from further consideration.
Habitats				
Recolonising bare ground (ED3)	N/A	Low Local Value	This habitat is of low value and has previously been disturbed. Therefore, it is concluded that this habitat provides limited ecological value. This habitat is not of significant conservation value and its loss is not considered to be significant.	This habitat has been scoped out from further consideration.
Improved Agricultural Grassland	N/A	Low Local Value	This a common and widespread habitat across Ireland that provides limited ecological value due to agricultural practices. This habitat is one of the main habitats that will be lost. The loss of this habitat is not considered to be significant given the context of the surrounding agricultural environment.	This habitat has been scoped out from further consideration.

Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Hedgerows (WL2) / Treelines (WL1)	Wildlife Act 2000 (as amended)	Low Local Value	As part of the sensitive design for the Site layout, the majority of treelines / hedgerows bordering the Site are to be maintained and protected as part of the proposed works in line with Objective BE 15-6 of the CCDP [4]. Subsequently, mitigation measures are required to protect the retained vegetation onsite, refer to Section 5.3.1.2 below. There is a total of ca.556m of hedgerow / treeline that will be removed as part of the Proposed Development. Sections of hedgerow / treeline are required to be removed to facilitate public health and safety for sightlines and development. In order to offset against this loss of hedgerow and to compensate for hedgerow / treeline loss in the northwest corner of the Site due to road upgrades, a detailed landscape plan has been developed for the Site. This includes the planting of ca.841m of hedgerow around the Site, 6,916m^2 of mixed / wet woodland planting along the southern boundary of the Site and 281No. trees to planted throughout the Site. Full details of the landscape plan are present in Appendix D.	This habitat has been scoped in for further assessment.
Scrub (WS1) / Grassy Verges (GS2)	N/A	Low Local Value	This is a common and widespread habitat across Ireland and is closely linked and influenced by the agricultural practices within the Site. This habitat has the potential to support foraging and commuting species. This habitat will be lost as part of the Proposed Development to facilitate sightlines for the N72 and will be replaced with advanced nursey stock, as outline in the landscape management plan, see Appendix D.	This habitat has been scoped in for further assessment.
Eroding / Upland Rivers (FW1)	European Union Water Framework Directive 2000 (WFD) Directive (2006/118/EC) on the protection of groundwater against pollution and deterioration, Directive (2008/105/EC) on environmental quality standards in the field of water policy	Low Local Value	The South Caherduggan River is considered to be of low ecological value, due to the fact that the water level within this river was low and stagnant and the drain was overgrown by dense vegetation. Data from the biological water quality sampling indicated poor ecological condition also. However, to ensure that the Proposed Development does not have an impact on the South Caherduggan River or the Blackwater River, water mitigation measures will be implemented to prevent any impacts on water quality within the local watercourse and downstream of the Site. Refer to Section 5.3.1.1 and 5.3.2.1 below. No works will take place within 10m of the river. In addition, swales and bioretention areas have been included within the landscape design which will enhance opportunities for species that may utilise this area.	This habitat has been scoped in for further assessment.
Flora and Fauna				
Flora	N/A	N/A	No plant species protected under the Flora Protection Order were noted onsite. Overall, the impact of the Proposed Development on both habitats and flora is considered unlikely to be significant.	Flora has been scoped out from further consideration.

Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Amphibians	Wildlife Act 2000 (as amended) EU Habitats Directive Annex V	Low Local Value	The NBDC does not hold records for amphibians within 2km of the Site within the last 10 years [6], and no evidence of amphibians was identified onsite. The onsite habitats are considered suboptimal for these species. If any amphibians are discovered onsite during the construction works, all works within the affected area will cease and the project ECoW will be consulted in line with Objective HE 2-2 of the CCDP [4]. However, given the sub-optimal nature of the habitats onsite for amphibians, pre-construction surveys and specific mitigation regarding amphibians was not considered necessary.	This receptor has therefore been scoped out from further consideration.
Bats	Wildlife Act 2000 (as amended) EU Habitats Directive Annex IV	Low Local Value	The bat surveys undertaken did not identify any bat roosts onsite within the hedgerow / treeline. The overall bat activity recorded onsite was considered to be low-moderate. Full details of the bat activity and assessment onsite can be found in Appendix C. The habitats onsite are considered suitable for foraging and commuting bats, and bats were recorded commuting and foraging within the survey area. Therefore, a sensitive design and lighting strategy will be implemented as part of the Proposed Development. These mitigation measures will ensure that effects on potential bats that may utilise the retained hedgerows / treelines for commuting and foraging purposes are minimised. Refer to Section 5.3.2.2 below. In addition to the sensitive lightening design for the Proposed Development, a landscape plan has been developed to maintain and enhance connectivity throughout the Site and provide suitable foraging, commuting and roosting habitat around the Site. Furthermore, given the vagrant nature of bats, mitigation measures will be implemented to ensure that no impacts occur to bats during the construction phase or operational phase, see Sections 5.3.1.4 and 5.3.2.2, respectively.	Bats have been scoped in for further consideration.
Badgers	Wildlife Act 2000 (as amended)	Low Local Value	The badger survey did not identify any setts within the Site. However, given the presence of mammal paths onsite, a badger scat and the potential for the Site to be utilised by foraging and commuting badger, appropriate measures to prevent or minimise impacts on badger and other terrestrial mammals are required. Therefore, taking a precautionary approach, measures will be implemented during the construction works, refer to Section 5.3.1.5 below. This is in line with Objective BE 15-2 of the CCDP [4].	Badgers have been scoped in for further consideration.
Birds	Nesting Birds Wildlife Act 2000 (as amended)	Low Local Value	Disturbance It is not considered that the Proposed Development will have a significant impact on birds given the nature of the habitats present on Site as well as the type of farming activities being undertaken onsite. However, birds may be subject to some temporary disturbance during construction; however, this is not considered likely to be significant. Birds are highly mobile	Breeding birds have been scoped in for further consideration.

Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
			and therefore will move away from disturbances. It can therefore be concluded that should any birds be disrupted during any of the works they will move to a suitable area elsewhere. <u>Breeding Birds</u> Although no birds were confirmed breeding onsite, some species exhibited behaviours that indicated they may be possibly breeding. Furthermore, the onsite trees, treelines and hedgerows are considered to provide suitable nesting habitat for breeding bird species, and the agricultural and arable fields are considered to have the potential to provide suitable foraging habitat for most common countryside bird species. The Proposed Development will require the removal of ca.466m of hedgerow, which could provide suitable nesting and foraging habitat. During the removal of these hedgerows, mitigation measures will be implemented in order to ensure no disturbances to any nesting birds onsite. Furthermore, in order offset against this loss of habitat a detailed landscape plant has been development, which includes the planting of ca.500m of hedgerow and 0.6ha of trees and the creation of wildflower strips. Full details of the landscape plan are present in Appendix D. This detailed landscape plan will be implemented as part of the development and will provide suitable nesting habitats for bird species, in line with Objective BE 15-2 of the CCDP [4]. <u>Winter Birds</u> The Site is not considered a site of importance for wintering bird species. The agricultural grassland onsite is considered to potentially provide foraging habitat for wintering bird species; however, this habitat is abundant within the wider area. In addition, it is considered unlikely that designated bird species would utilise the Site to overwinter given the distance of the Site from the nearest SPA and the lack of records held for these species within 2km of the Site. Overall, it is considered that no significant impacts will occur to wintering birds as a result of the Proposed Development.	
Otter	Wildlife Act 2000 (as amended)	Low Local Value	The NBDC holds records of otter within 2km of the Site [7]; however, no signs of otters were noted during the field survey. The South Caherduggan River is considered to be suboptimal for foraging and commuting otters given the poor water quality and absence of suitable prey species. Therefore, the Site is not considered to be of value for otter. It should be noted that the general mitigation measures that will be implemented onsite in relation to water quality, will ensure that there are no potential impacts on otters that may be utilising the wider river network. No species-specific mitigation is required.	Otters have been scoped out from further consideration.

Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Other Species	N/A	N/A	Given the presence of suitable habitats onsite and within the wider area for terrestrial mammals, standard protection measures for these species will be incorporated into the construction works in compliance with Objective BE 15-2 of the CCDP [4], refer to Section 5.3.1.5. As outlined in Table 4-3, the NBDC does not contain any records of notable or protected aquatic species within 2km of the Site [23]. However, as there is a hydrological connection between the Site and the Blackwater River there is potential for species within the river network to be affected by water quality impairment without the implementation of appropriate mitigation measures (see Section 5.3.1.1 and Section 5.3.2.1). Taking the above into account, mitigation measures will be implemented during the construction and operational phase of the Proposed Development to ensure no adverse effects on water quality arise, refer to Section 5.3.1 and 5.3.2. This is in line with Objective BE 15-2 and 15-6 of the CCDP [4]. It is considered that the Proposed Development will not give rise to any significant impacts to other fauna, given the nature of the habitats that will be impacted by the Proposed Development. In addition, that the majority of trees / hedgerows onsite will be retained, and the proposed open areas incorporated within the landscape plan will ensure that areas for foraging and commuting fauna remain alongside connectivity to the wider landscape.	This receptor has been scoped in for further consideration
Invasive Species	N/A	N/A	No high impact invasive species or plant species listed on the Third Schedule of the 2011 European Communities (Birds and Natural Habitats) Regulations (i.e., species of which it is an offense to disperse, spread or otherwise cause to grow in any place) were noted onsite during the field surveys. The only medium impact invasive species identified onsite was sycamore, which are currently unregulated and do not require an invasive species management plan. However, in order to ensure no invasive species are introduced to the Site during the construction phase standard measures will be implemented (see Section 5.3.1.6). This is in compliance with Objective BE 15-7 of the CCDP [4].	This receptor has been scoped in for further consideration.

5.3 Mitigation Measures

5.3.1 Construction Phase

During the construction phase, all works will comply with all relevant legislation and best practice to reduce any potential environmental impacts. A CEMP has been prepared as part of this planning.

The following mitigation measures will be incorporated and adhered to in order to ensure that the proposed works do not result in any contravention of wildlife legislation:

- All activities will comply with all relevant legislation and best practice to reduce any potential environmental impacts. The mitigation measures detailed within this EcIA, the CEMP and the NIS will be fully adhered to;
- The ECoW will either deliver or provide the resident engineer with sufficient environmental information to deliver a Site induction to all personnel working onsite. All personnel working onsite will be trained and made aware of the mitigation measures detailed within this EcIA and the NIS;
- An ECoW will inspect the Site in advance of works commencing and will undertake Site inspections as required during the works to ensure that they will be completed in line with the mitigation measures detailed within this EcIA, the NIS and the CEMP; and,
- If protected or notable species are encountered during operations at the Site, the ECoW will be contacted for advice.

5.3.1.1 Protection of Water Quality during Construction

Suspended Solids, Cementitious Materials, Silt and Hydrocarbon Leaks / Spills

Potential pollutants resulting from the construction works include suspended solids, cementitious materials, silt and hydrocarbon leaks or spills.

Sediment and silt have the potential to clog fish gills, degrade spawning habitats and cover / smother aquatic vegetation and therefore, these pollutants could directly affect species within the South Caherduggan River or downstream of the Site in the Blackwater River and indirectly affect aquatic, avian species within the rivers or along their margins by changing the populations of their food supply. In addition, hydrocarbons have the potential to change the chemical balance of a waterbody which can prove toxic to fish and other wildlife such as wetland and waterbirds. Wetland and estuarine habitats are also vulnerable to sediment mixing and contamination through these pollutants.

In order to ensure that the works do not have an impact on the Blackwater River, its associated SAC and the wider river network in line with Objective BE 15-2 and 15-6 of the CCDP [4], the following surface water mitigation measures will be implemented during the construction phase of the Proposed Development:

- Storm discharge during the construction works will be directed through hydrocarbon interceptors and grit sumps prior to reaching the storm water attenuation tank;
- All construction works associated with the storm drainage infrastructure onsite will be completed, cleaned and inspected in advance of connecting into the existing stream network;
- The proposed storm drainage system will be inspected following construction to ensure no cross connection exists between the proposed foul and surface water networks;

- Prior to any works commencing, all equipment required for construction will be checked to ensure that they are mechanically sound, to avoid leaks of oil, fuel, hydraulic fluids, and grease;
- Fuels, lubricants, and hydraulic fluids for equipment used on the construction site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to current best practice;
- Diesel tanks, used to store fuel for the various items of machinery, will be self-contained and double-walled;
- Refuelling will be carried out offsite or within a designated hardstanding area and will not be left unattended. All pumps, hoses etc will be checked regularly;
- Adequate spill kits including absorbent booms and other absorbent material will be maintained onsite;
- All contractor workers will be appropriately trained in the use of spill kits;
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the Site and properly disposed of;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Site for disposal or recycling;
- Any spillage of cementitious materials will be cleaned up immediately;
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the Site and properly disposed of; and,
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Site for disposal or recycling.

Dust Impacts on Water Quality

The proposed works have the potential to temporarily elevate dust levels which could have an impact on local water quality should the dust be displaced to South Caherduggan River or Blackwater River or enter the runoff discharging to this waterbody. Therefore, to ensure dust emissions will have no significant impacts on water quality during the construction phase, the following mitigation measures will be adhered to:

- Any temporary Site roads will be surface dressed in crushed rock;
- In the event that the public road becomes soiled, the contractor will have available a sweeper to remove soil and debris promptly;
- Work areas and stockpiles will be sprayed during periods of dry weather in order to suppress dust mitigation from the Site;
- Wheel washing facilities will be installed close to the Site entrance to prevent mud from construction operations being transported on to adjacent public roads during major earthworks;
- Dusty materials will be transported appropriately e.g., sheeting of vehicles carrying spoil and other dusty materials;
- Material handling systems and Site stockpiling of materials will be designed and laid out to minimise exposure to wind; and,
- Loading and unloading will only be permitted in designated hard standing areas.

5.3.1.2 Protection for Trees, Hedgerows and Treelines

A number of individual trees and hedgerow / treelines onsite are to be retained and protected from unnecessary damage in line with Objective BE 15-8 of the CCDP [4]. During construction, care will be required to protect trees from both direct and indirect disturbance. The following protection measures will be adhered to during the works:

- Protection should be afforded the remaining hedgerows, with fit for purpose barriers. These barriers to be 1.8m high steel Heras fencing fixed in place during the construction period;
- Once the protective barrier has been erected onsite and prior to any works commencing, the consulting arboriculturist shall inspect the Site to ensure the root protection zone has been established correctly;
- If it is deemed appropriate to trim back retained trees to provide adequate access to approved construction works, all tree works should be undertaken by a competent and suitably qualified tree surgeon;
- Care will be required to prevent disturbance to root systems – if required, excavation within the protected area will be done by hand and backfilled as soon as possible. No roots exceeding 25mm will be cut / damaged;
- Where machinery access has to encroach areas within close proximity to the retained hedgerows / treelines, a Root Protection Area (RPA) will be established, and suitable ground protection will be put in place to prevent any significant soil compaction or root damage. This should take the form of suitable strength ground protection mats or cellular confinement system capable of supporting the appropriate weight;
- When tree removal is required in close proximity to retained trees, felling must be carried out in small sections to avoid damage to adjacent trees;
- Trench digging or other excavation works for services etc. will not be permitted within close proximity to retained trees and hedgerows unless approved and supervised using methods outlined in NJUG Volume 4: Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees;
- No materials, equipment or machinery will be stored within close proximity to retained hedgerows and trees. No discharge of potential contaminants should occur within 10m of any tree onsite or where there is a risk of run off into a Root Protection Area (RPA);
- In order for treeline protection measures to work effectively, all personnel associated with the operation of heavy plant machinery must be familiar with the above principles for the protection of treelines;
- Care will be taken when planning site operations to ensure that wide or tall loads or plant with booms, jibs and counterweights can operate without coming into contact with retained trees. Such contact can result in serious damage to them and might make their safe retention impossible. Proposed locations and routes on and off the Site should be supplied to the project arboriculturist;
- Notice boards, wires, etc. will not be attached to any trees. Site offices, materials and contractor parking will all be outside the Construction Exclusion Zone; and,
- The retained trees will be assessed following the completion of the construction works by a suitably qualified arborist.

For more information regarding the tree survey, refer to the report undertaken by South of Ireland tree surveys. that has been submitted as part of the overall application.

A Landscape Plan has been designed and submitted as part of the overall application by DMN Architects to maintain a degree of connectivity to the wider landscape (where possible) through the retention of hedgerows / treelines onsite and additional planting. There is ca.553m of hedgerow due to be removed as part of the Proposed Development. Further details are outlined in Section 5.3.1.7 and in the Landscape Management Plan, see Appendix D.

5.3.1.3 Measures for Breeding Birds

In order to ensure no impacts, occur to breeding birds as a result of the Proposed Development, the following mitigation measures will be put in place:

- Any vegetation clearance required will take place outside of the nesting bird season (1st March to 31st August), as per Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000;
- In the event that works need to be undertaken within the main breeding season, this would be undertaken in consultation with NPWS and under the supervision of the project ECoW;
- Prior to the vegetation removal the ECoW will inspect the Site and the management and removal of vegetation at the Site will be undertaken under the direction of the project ECoW in a systematic way to ensure that retained areas of vegetation are not damaged by the works; and,
- Should birds nest within the active working area during the construction phase, works within the area will stop within the area and the project ECoW will be consulted.

Birds may be subject to temporary minor disturbances during construction. However, as birds are a highly mobile species, should any birds be impacted, these birds will move away from the disturbance to a more suitable area, therefore, this is not considered likely to be significant.

It should be noted that the Proposed Development provides opportunities to enhance the local area for common breeding bird species. The following measures will be included:

- The Proposed Development will include the establishment of vegetation for breeding and foraging birds; and,
- Birds boxes will be placed on suitably mature trees throughout the Site. The number and locations of birds boxes will be determined on the advice of the project ECoW

5.3.1.4 Measures for Bats

In order to ensure that the works in relation to the Proposed Development do not have significant impacts on bats, the following construction procedures and mitigation measures should be implemented. These measures are in line with the NRA (now TII) Guidance for Bats:

- No bats were confirmed to be roosting within the structures onsite, but due to the numerous access points and vagrant nature of bats, it is required to confirm that no bats have since began roosting within the structure since the 2022 summer surveys took place. Therefore, immediately prior to works on the roof structure / partial demolition of the buildings, an external and internal building inspection will be required to confirm the presence / absence of roosting bats within these buildings.
- If bats are identified to be roosting within the structures during this updated building inspection or the vegetation clearance works, then all works must cease and the project ecologist and NPWS will be consulted;
- No bats were confirmed to be roosting in the seven (7No.) trees with Potential Roost Features (PRF) to be removed. Due to the vagrant nature of bats, it is required to confirm that no bats have since began roosting within the trees since the 2022 summer

surveys took place. Therefore, prior to their removal, an updated tree inspection, and if deemed necessary updated emergence / re-entry surveys, will be required to confirm the presence / absence of roosting bats within the two trees. If bats were found to be roosting within the trees after updated surveys, then further measures may need to be considered in order to protect bats against any disturbance. The NPWS will be consulted for advice and a derogation licence will be obtained if required;

- Prior to the vegetation removal south of the N72 National Road and following the establishment of the proposed planting as outlined in the LMP, bat surveys will be undertaken to assess activity levels along the N72 and the proposed planting. The findings of these surveys will be submitted to the Planning Authority;
- Where possible, the PRF trees and buildings which are to be removed, should be felled on mild days during the autumn months of October – November or during spring months of February-March (felling during the spring or autumn avoids the periods when bats are most active and without young);
- Following the installation of the lighting for the Proposed Development, a suitably qualified Ecologist should undertake a further Site inspection in order to check the lighting patterns and lux levels along the Site boundaries to ensure there are no impacts to bats or other nocturnal species.

5.3.1.5 Measures for Terrestrial Non-volant Mammals

Given the presence of onsite habitats with features that have the potential to support sheltering, foraging and commuting mammals, and in order to ensure that the works in relation to the Proposed Development will not have significant impacts on mammals, general construction procedures and mitigation measures which are in line with the NRA (now TT) guidance for badgers, will be undertaken:

- Should construction works be required outside of daylight hours, the appointed project ECoW will be consulted as required;
- Where deep excavations will be required onsite, appropriate measures to protect mammals from ingress will be installed; and,
- If unidentified burrows are identified within the works area during construction, the project ECoW will be contacted for advice.

5.3.1.6 Biosecurity Measures for Invasive Species

To mitigate against the unintentional introduction of invasive species during construction, the following biosecurity measures will be implemented. These measures are in line with NRA (now TII) Guidance for the Management of Noxious Weeds and Non-Native Invasive Plant Species [16]:

- All vehicles, machinery and any other equipment used for the works will be washed prior to its use at the Site to prevent the import of plant material or seeds;
- Before machinery or equipment is unloaded at the Site, equipment will be visually inspected to ensure that all adherent material and debris has been removed;
- Any vehicles and machinery that are not clean will not be permitted entry to the Site;
- All materials to be imported to the Site including additional planting will be sourced from a reputable supplier and records of all material and supplies will be maintained; and,
- In advance of works, all site personnel will receive a toolbox talk with regards to invasive species.

5.3.1.7 Landscape Management Plan

A landscape management plan (LMP) was prepared by DMN Architects as part of the planning application. As shown in the LMP, there will be areas of ecological enhancement throughout the Site along with use of Sustainable Drainages Systems (SuDS). The LMP shows ca.553m of hedgerow that is due to be removed as part of the Proposed Development, this will primarily along the northwest boundary of the Site, bisecting the Site and south of the N72. Throughout the construction phase of the Proposed Development, there will be ca.1,157m of existing hedgerow / treeline that will be protected and retained from any damage. In addition the retained hedgerow / treeline's on the Site, there will be ca.1,293m of hedgerow to be planted around the Site, as shown in the LMP.

Additionally, the following will also be planted around the Site:

- 554m^2 of species rich dry meadows;
- 2,2707m^2 species rich wet and dry meadow planting;
- 3,194m^2 of Biodiversity Woodland Planting (wet woodland and mixed woodland); and,
- 461m^2 of Street Tree Planting with base hedges.

The above planting will help connect the north and south of the Site, by providing ecological corridors for species to follow through the Site, as shown in Figure 5-1. Additionally, these will be planted early in the construction phase to allow them to establish and provide suitable links throughout the construction phase.

The hedgerow / treeline to be planted south of the N72 will be planted 12 months in advance of the vegetation being removed. These works are required to improve the sightlines as part of the N72 road upgrade works for health and safety reasons. The hedgerow / treeline will also be planted with advanced nursery stock trees and shrubs to establish and provide suitable ecological corridor in place prior to the removal of the vegetation along the N72. This will ensure that connectivity between the Spaglen woodland to the southwest of the Site and the wider area is maintained.

5.3.2 Operational Phase

Operational phase impacts for the Proposed Development relate only to water quality and nocturnal species (i.e., bats and nocturnal mammals).

5.3.2.1 Protection of Water Quality during Operation

Due to the additional infrastructure onsite, there will be increased areas of hardstanding with the potential to generate increased storm water runoff. The design of the drainage system will ensure that storm water flows will be restricted to greenfield runoff rates in and there will be no potential for the impairment of water quality due to increased storm water runoff through the instalment of an attenuation tank and hydrocarbon interceptors with silt collection features. This is in compliance with Objective BE 15-2 and 15-6 of the CCDP [4].

5.3.2.2 Sensitive Lighting Plan for Nocturnal Species

Bats are averse to excessive lighting, subsequently, impacts could occur as a result of an inappropriate lighting strategy. Therefore, it is important that lighting installed for the proposed development will be completed with sensitivity for local wildlife while still providing the necessary lighting for human usage.

The lighting to be installed as part of the Proposed Development will be for safety and maintenance. Nevertheless, the lighting strategy has been designed to mitigate against any potential impacts on nocturnal species in line with BSI Standards Publication [24] which follows the Bat Conservation Trust (BCT) Guidelines on '*Bats and Artificial Lighting in the UK'* [25].

The following measures have been taken into consideration during the lighting layout design:

- All luminaires will not lack UV elements when manufactured. Metal halide, fluorescent sources will not be used;
- LED luminaires will be used due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- A warm white spectrum (300K) will be adopted to reduce blue light component;
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill;
- Column heights have been carefully considered and are to 6M heights throughout;
- Luminaires with an upward light ratio of 0% and with good optical control will be used (accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed;
- Any external security lighting will be set on motion-sensors and short (1min) timers; and,
- Streetlights can be located so that the rear shields are adjacent to habitats or optics selected that stop back light thereby directing light into the task area where needed.

5.4 Analysis of 'In-Combination' Effects

The Habitats Directive requires competent authorities to make an appropriate assessment of any plan or project which is likely to have a significant effect alone or in-combination with other plans and projects.

As described above, the proposed work alone is unlikely to have any direct or indirect adverse effects on any of the Natura 2000 sites located with 15km of the Site.

A review of the Cork County Council Planning (Cork County Council, 2022) ePlan website did not identify any current or previous granted plans or projects in the immediate vicinity that are considered likely in-combination with the Proposed Development to result in significant impacts on Natura 2000 sites.

However, the following planning applications listed in Table 5-2 are currently being assessed by the Council / ABP within the planning system, all which are located in close vicinity of the Site.

Table 5-2: Active Planning Applications within the vicinity of the Site

Application Ref	Decision & Date	Description	Supporting Documentation
CCC Ref: 214127 Applicant: Greenstone Properties Ltd.	Granted 15/07/2021	*Construction of a two-storey house and all associated site works.*	N/A
CCC Ref: 195078 Applicant: Irish water	Granted 13/01/2020	*The alteration of Mallow Sewerage Scheme to remove combined sewer overflows from the network.*	Environmental Impact Assessment Screening Report and NIS completed with this application.
CCC Ref: 195389 Applicant: A. Buckley	Granted 05/09/2019	*Retention of (1) Conversion of attic space for the purpose of storage space. (2) Installation of two roof-lights to the rear roof of*	N/A

Application Ref	Decision & Date	Description	Supporting Documentation
		dwellinghouse for natural light to attic space. (3) Installation of access staircase to attic space.	
ABP Ref: 300549 Applicant: Greenstone Properties Ltd.	Granted 20/07/2018	*135 no. residential units comprising a mix of 2,3 and 4 bed terraced, semi-detached and detached units and 12 no. apartments and crèche*	AA Screening Report
CCC Ref: 166949 ABP Ref: 301221-18 Applicant: O'Flynn Construction Co. Limited	Granted 21/03/2018	*1) The construction of 108 no. dwelling houses, 2) A crèche of 380sq.m of single/two storey construction, including 11 carparking spaces and associated works; 3) The provision of a 1.2m diameter culvert within the development. This leads to an open water course which is to be provided in lieu of the existing pipework's along the western boundary of the site; 4) All associated site development works.*	Environment Primary Report and Ecologist Primary Report received with this application.
CCC Ref: 174928 Applicant: O'Flynn Construction Co. Limited	Granted 18/07/2017	*Retention of an advertising sign 2.4 metres wide by 6 metres high, relocated from the northern to the southern entrance into the Clonmore Housing Development.*	N/A
CCC Ref: 124373 Applicant: P. Galvin	Granted 29/05/2012	*Demolition of existing flat roofed structure (kitchen/garage) attached to side of dwellinghouse, construction of new extension and alterations to dwellinghouse incorporating kitchen-living area, footpaths, and all other related ancillary works*	N/A

6 CONCLUSIONS

Based on the findings of a detailed desk-based study, a review of all the ecological information available for the Site and wider area and a field survey by MOR Ecologists, it is considered reasonable to conclude the following:

- The Site itself is currently considered to be of low local ecological value;
- The Site is currently zoned as '*MW-R-03'* within the mallow environs. The Site is located in an area predominantly made up of agricultural grassland;
- The Site is not considered to be of high suitability or a site of importance for any Annex I or Annex II species or Red listed birds; and,
- The Proposed Development will not result in any significant impacts on ecological receptors identified both onsite and in the surrounding area following the implementation of appropriate mitigation measures and ecological enhancements around the Site.

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APPENDICES

APPENDIX A

SCHEDULE OF UNITS
TOTAL 186 UNITS

Unit Type		Terraced	Semi-Det	Duplex	Total
A	4 BED 140.6 sq.m.		15		15
A1	3 BED 115.2 sq.m.		16		16
A2	4 BED 152.0 sq.m.		1		1
B	3 BED 114.5 sq.m.		40		40
C	3 BED 110.1 sq.m.	16			16
D	3 BED 103.4 sq.m.	3			3
D1	3 BED 104.4 sq.m.	29			29
E	2 BED 82.2 sq.m.	48			48
F	1 BED 52.1 sq.m.			8	8
F1	1 BED 60.0 sq.m.			8	8
G	1 BED 53.5 sq.m.			1	1
G1	1 BED 60.5 sq.m.			1	1
TOTALS		96	72	18	186

FOR PLANNING

Rev	DETAIL	DATE	BY
07	ISSUED FOR PLANNING APPLICATION	01.02.24	MOK
06	ISSUED FOR PREPLANNING	17.10.23	MOK

Stage Abbreviations:
SU-Survey, SK-Sketch, PP-Preplanning, PA-Planning Application, FI-Further Information, AP-Appeal, RC-Response To Conditions, TE-Tender, FC-Fire Cert/, LE-Contract / Legal, CO-Construction, AB-As Built, MM-Marketing Material

D M N A Architects
Doyle McDonogh Nash Landscape Architects
21 Patrick's Hill, Cork. T: 0214518371 E: info@dmnarchitects.ie

CLIENT:
O'FLYNN CONSTRUCTION UNLIMITED COMPANY

JOB TITLE:
RESIDENTIAL DEVELOPMENT AT SPA GLEN, MALLOW, CO. CORK

DRG. TITLE:
SITE LAYOUT OVERALL

Drawn By:	Checked By:	Job No:	Drawing Number:	Revision:	Stage:
KM	MO'K	20006	1000	07	PA

SCALE: 1:1,000@A0

APPENDIX B

Ballyviniter Housing
Ecological Assessment of Watercourses

November 2021

Prepared by:
Sweeney Consultancy,
Rahan,
Mallow
Co. Cork.
Tel. 022/26780

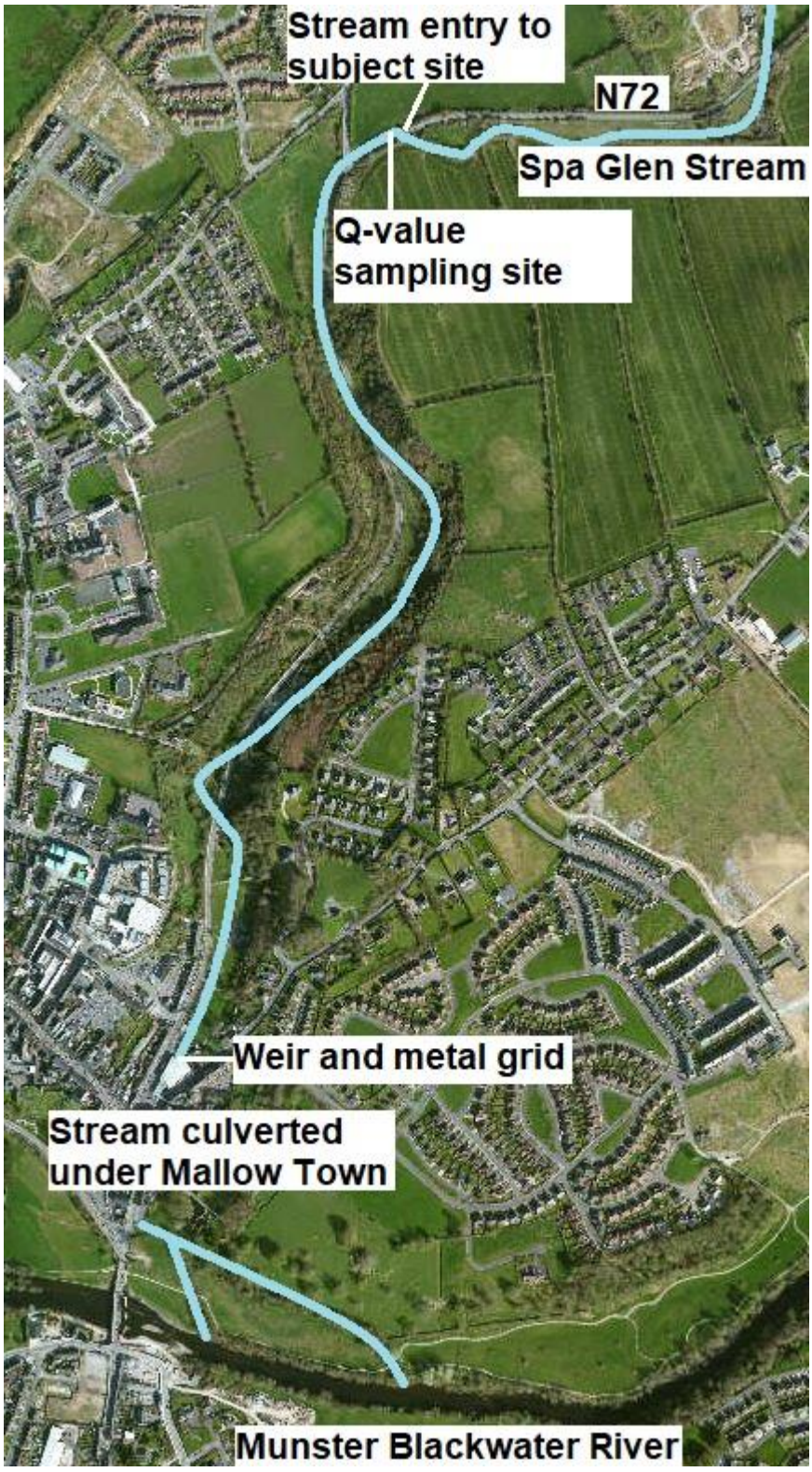
TABLE OF CONTENTS

1. INTRODUCTION

A short section of a stream flows just inside the southwestern boundary of a site proposed for a new housing development at Ballyviniter, Mallow, Co. Cork (Figure 1). This watercourse, known mainly as the the Spa Glen Stream, but sometimes referred to as the Caherduggan Stream, flows to the Munster Blackwater River, entering in two channels downstream of Mallow Bridge c. 2km downstream (Figure 2). Sweeney Consultancy was contracted to assess the aquatic ecological condition, biological water quality and presence of protected aquatic species.

Figure 1. Proposed Housing Development, showing stream in SW corner

Figure 2. Spa Glen Stream



2. METHODOLOGY

Physical Habitat: On 05 November, 2021, the watercourse within the subject site and at several points downstream were visited. Grid reference of photographs were recorded using a hand-held GPS device and photographs (Appendix 1) were taken with a digital SLR camera. Notes and photographs from previous surveys of the Spa Glen Stream and the Munster Blackwater, undertaken by Sweeney Consultancy were also reviewed.

Biological Water Quality: The biological water quality at a point close to where the stream enters the subject site (Figure 2) was assessed following the most recent EPA Standard Operational Procedure for the Q-value methodology (EPA 2021). Invertebrates were identified on the bankside to the lowest taxonomic level possible with the naked eye.

White-clawed Crayfish (*Austropotamobius pallipes*): The habitat quality for was assessed, based on the criteria outlined by Holdich (2003). Available records on the distribution of this species were checked. A licensed survey (C15/2021) was carried out within the subject site by the standard methodology of Peay (2003), using a Perspex-bottomed viewer.

Salmonids (*Salmo salar* and *Salmo trutta*): The habitat quality for salmonids was assessed, based on the criteria outlined by Kennedy (1984), Crisp (1996), Bardonnet and Baglinière (2000) and by Hendry and Cragg-Hine (2003) for the physical instream requirements of these species for spawning, nursery and adult habitat. Available records on the distribution of these species were also checked.

Lampreys (*Lampetra planeri*, *Lampetra fluviatilis* and *Petromyzon marinus*): The habitat quality for the three species of lamprey, the brook lamprey, river lamprey, and sea lamprey was assessed, based on the criteria outlined by Maitland (1980) and by Johns (2002) for the physical instream requirements of these species for spawning, nursery and adult habitat. Available records on the distribution of these species were also checked.

Otter (*Lutra lutra*): The presence of the was checked for by a survey of the riverbank for holts or couching sites and an examination of hard bankside surfaces for the presence of spraints and bankside mud/sand for imprints. The habitat quality for this species was

assessed, based on the criteria outlined by Chanin (2003). Available records on the distribution of these species were also checked.

Freshwater pearl mussel (*Margaritifera margaritifera*): Visual assessment of the habitat quality is based on the criteria outlined by Skinner et al. (2003). Available records on the distribution of this species were also checked.

3. RESULTS

3.1. Physical Habitat

The Spa Glen Stream is crossed by the N72 road at ITM 556515 599747 and enters the proposed development site, where it forms a deep pool with a back-eddy (Photo 1). Immediately downstream of the pool, there is fast-flowing riffle over a stony substratum (Photo 2), which continues to the stream's exit point from the site (Photo 3) and farther downstream until the channel widens and the flow slows on flatter land at the Spa House site (Photo 4). At ITM 556200 598477, there is a steep weir, with a metal grid at the upstream end of a culvert (Photo 5). The culvert runs for over 300m under Mallow Town, with the downstream end at ITM 556125 598178 (Photo 6). The stream then forks at ITM 556183 598165 (Photo 7), with the main longer main channel (Photo 8) entering the Munster Blackwater at ITM 556534 597970 and the shorter, smaller channel (Photo 9) entering the Munster Blackwater at ITM 556230 598031. Downstream of the Spa Glen Stream confluences, the Munster Blackwater (Photo 10) consists mainly of fast glide over gravel, cobble and bedrock.

3.2. Biological Water Quality

Data on the physical conditions at the biological water quality sampling site and a list of macroinvertebrate taxa identified to the level required for the Q-scheme and the relative abundance of each taxon are presented in Appendix 2. With no Group A species present, Group B only poorly represented and Group D in abundance in a riffle site which should support a much better fauna, Q2-3 is assigned, indicating that the Spa Glen Stream is in unsatisfactory poor ecological condition and moderately polluted status.

In 2020 EPA biological monitoring results for the Munster Blackwater River showed satisfactory good ecological quality (Q4) at Station 1800, c. 3.5km downstream of the Spa Glen Stream confluence.

3.3. White-clawed Crayfish

Within the Munster Blackwater catchment, Demers *et al.* (2005) reported the presence of crayfish only in the River Awbeg. Following a few sightings of crayfish in the main channel by the author and others, a detailed survey carried out in 2015 revealed that crayfish had

spread in two sections of the Blackwater, one downstream of the Awbeg confluence and the second, with suspected human involvement, upstream of Mallow Town (Sweeney & Sweeney, 2017). Since then, the crayfish population of the river has spread further, filling the gap. A considerable number of mostly young crayfish was caught and translocated by Sweeney Consultancy at a pipeline crossing location just downstream of Mallow Bridge in September 2021.

No crayfish were found in the survey undertaken in the Spa Glen Stream at the subject site. The steep weir at the upstream end of the culvert would obstruct any upstream spread of crayfish in this stream.

3.4. Salmonids

While the physical habitat of the Spa Glen Stream is suitable for salmonid spawning and juvenile nursery, the water quality is too poor. Salmon need EPA Class A water: Q4 to Q5 (Curtis *et al.*, 2009). Furthermore, the weir at the upstream end of the culvert would obstruct any upstream spawning migration. No salmonids were seen in the Spa Glen Stream. Salmon and trout are plentiful in the Munster Blackwater (*pers. obs.*).

3.5. Lampreys

While the physical habitat of riffle stretches of the Spa Glen Stream is suitable for lamprey spawning and the silted slow flow at the Spa House stretch could support ammocoetes, the water quality is too poor. Furthermore, the weir at the upstream end of the culvert would obstruct any upstream spawning migration. Lamprey species are plentiful in the Munster Blackwater (*pers. obs.*).

3.6. Otter

No evidence of otter presence was found along the Spa Glen Stream. The metal grid at the upstream end of the culvert would obstruct upstream otter movement. Otters are plentiful in the Munster Blackwater (*pers. obs.*).

3.7. Freshwater Pearl Mussel

The Spa Glen Stream is is too small for the freshwater pearl mussel and the water quality is too poor.

The distribution of the mussel population in the main channel Munster Blackwater River reflects the water quality recorded by EPA over a long period, with most of the mussels occurring upstream of Mallow. A survey of the mussel population in the Blackwater River near Mallow was carried out in 2008, as part of the EIS for the N20 Road Scheme. A map of the distribution of mussels found in this survey is shown in Appendix 3. From downstream the Mallow railway viaduct to Ballymagooly, only a single mussel was found. This mussel is thought to have been washed down from the mussel beds upstream of Mallow, as occasional mature mussels are carried downstream in floods and settle in deep water, but are probably unlikely to successfully reproduce (Evelyn Moorkens *pers. comm.*). Even upstream of Mallow, the population is not reproducing and is composed entirely of aged adults with no evidence of recruitment for at least 20 years (NS2 Project, 2010). Farther downstream, some mussels have been recorded in the past, such as four live freshwater pearl mussels at Fermoy in 2011 (Sweeney Consultancy, 2011), where the debris from the broken Fermoy Weir has since deposited. No mussels were found in a survey carried out by Sweeney Consultancy in May 2021 from Mallow Bridge to 100m downstream of the confluence of the first confluence of the Spa Glen Stream.

4. CONCLUSIONS

The Spa Glen Stream is not of ecological significance, with poor water quality and no protected aquatic species found. The main concern from an aquatic ecology perspective is potential impacts on the Munster Blackwater River, c. 2km downstream of the subject site.

APPENDIX 1

PHOTOGRAPHS

Photo 1: Entry point of Spa Glen Stream to subject site.

Photo 2: Riffle at pool outler. Q-value site

Photo 3: Downstream end of Spa Glen Stream within subject site

Photo 4: Slow flow in widened channel at Spa House

Photo 5: Weir and metal grid at upstream end of culvert

Photo 6: Downstream end of culvert

Photo 7: Spa Glen Stream dividing into two channels

Photo 8: Spa Glen Stream main channel upstream of Blackwater confluence

Photo 9: Spa Glen Stream minor channel upstream of Blackwater confluence

Photo 10: Blackwater downstream at first Spa Glen Stream confluence

APPENDIX 2
Biological Water Quality 05/11/21

2a
Sampling Site Details

Photo No.	2
Location	Upstream end of riffle after pool where stream emerges from N72 bridge.
Grid Ref. (ITM)	556507 599749
Wet Width (m)	3.5
Sampling Depth (m.)	0.1
Substrate (in order of occurrence	Gravel Cooble Sand Silt
Flow Type	Riffle: 100%
Shade	Moderate
Instream vegetation (%)	*Apium nodiflorum*: 1 *Oenanthe crocata*: 3

2b

Macroinvertebrate Community Composition

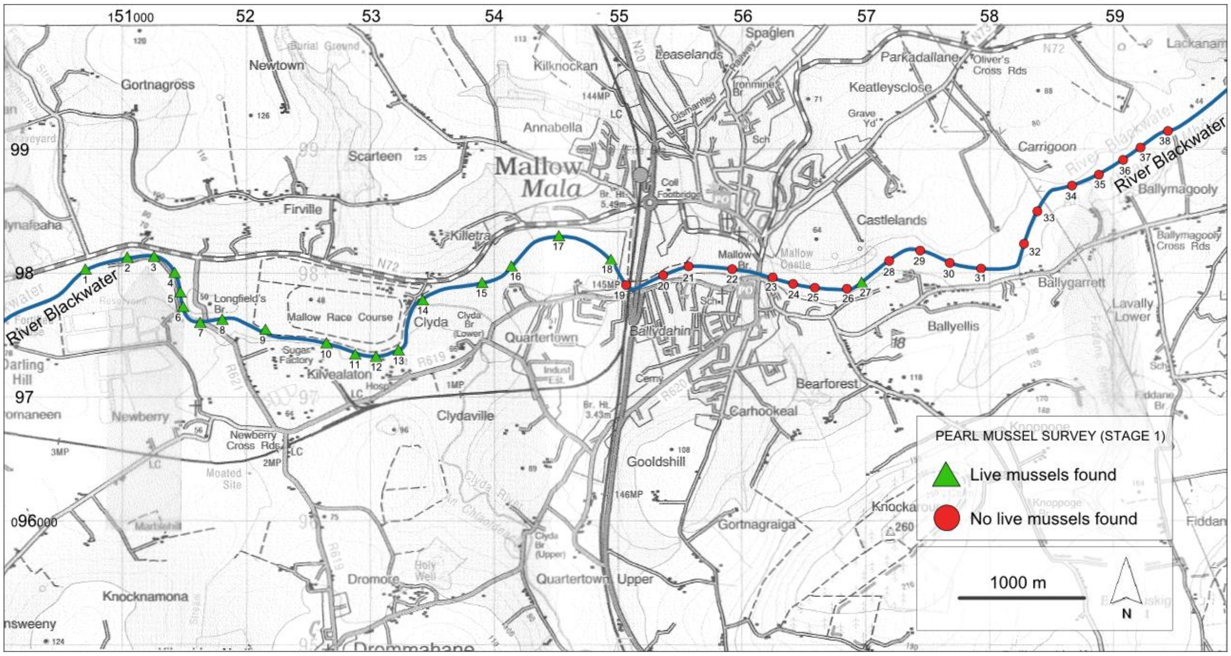
Relative abundance expressed as E: Excessive; D: Dominant; N: Numerous; C: Common; F: Few; SS: Single Specimen

Group A (Sensitive) – None recorded	
TAXON Group B (Less Sensitive)	
Sericostomatidae	F
Limnephilidae	SS
Group C (Relatively Tolerant)	
Gammarus sp.	N
Bathyomphalus contortus	SS
Baetis rhodani	F
Rhyacophila sp.	SS
Elmis aenea	F
Ceratopogonidae	F
Group D (Very Tolerant)	
Radix balthica	C
Erpobdella sp.	F
Glossiphonia sp	F
Asellus aquaticus	N
Group E (Most Tolerant)	
Tubificidae	F
Q-Value	**Q2-3**

APPENDIX 3

2008 *Margaritifera* DISTRIBUTION AT MALLOW

From a survey carried out by Ecoserv for the N20 road scheme NIS


PEARL MUSSEL SURVEY (STAGE 1)
Live mussels found
No live mussels found
1000 m
N
River Blackwater
Mallow
Mala
Clyda
Mallow Race Course
Kilvealaton
Quartertown
Ballydahin
Castlelands
Ballygarrett
Ballyellis
Bearforest
Gooldshill
Gortnagraiga
Dromore
Quartertown Upper
Knocknamona
Newberry
Newtown
Gortnagross
Scarteen
Firville
Annabella
Kilknockan
Carrigoon
Keatleysclose
Parkadallane
Spaglen
Leaselands
Clydaville
Carhookeal
Ballymagooly

APPENDIX 2

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APPENDIX C

February 2024

Bat Survey Report

Large Residential Development (LRD)

Spaglen, Mallow, Co Cork

On behalf of

O'Flynn Group

MALONE O'REGAN ENVIRONMENTAL

QUALITY
I.S. EN ISO 9001:2015
NSAI Certified

MALONE O'REGAN

Form ES - 04

MALONE O'REGAN ENVIRONMENTAL

Ground Floor – Unit 3
Bracken Business Park
Bracken Road, Sandyford
Dublin 18, D18 V32Y
Tel: +353- 1- 567 76 55
Email: enviro@mores.ie

Title: Bat Survey Report, Large Residential Development (LRD), Spaglen, Mallow, Co Cork O'Flynn Group

Job Number: E1884

Prepared By: Henry Tennyson **Signed:**_____

Checked By: Dyfrig Hubble **Signed:**_____

Approved By: Dyfrig Hubble **Signed:**_____

Revision Record

Issue No.	Date	Description	Remark	Prepared	Checked	Approved
01	09/02/24	Report	Final	HT	DH	DH

Bat Survey Report

Large Residential Development (LRD)

O'Flynn Group

Spaglen, Mallow, Co Cork

Contents

FIGURES

TABLES

PLATES

1 INTRODUCTION

1.1 Background

This Bat Survey Report has been prepared by Malone O'Regan Environmental (MOR) on behalf of O'Flynn Group ('the Applicant'), to present the findings of bat surveys undertaken at the site for the proposed large-scale residential development and all associated works ('the Proposed Development') on lands at Spaglen, Mallow, Co. Cork (OSI Reference ITM 556603 599835).

The baseline ecological survey of the Site highlighted the potential for bat roosts to occur within some of mature trees and derelict buildings onsite. It was therefore deemed necessary for further survey work to be carried out to determine whether or not any bat roosts occur within the mature trees or buildings to be removed as part of the Proposed Development.

The location of the Proposed Development ('the Site') is shown in Figure 1-1.

Figure 1-1: Site Location

1.2 Relevant Legislation

All Irish bat species are protected by law under the Wildlife Act 1976 and its subsequent amendments. They are afforded full protection under this act, which makes it a criminal offence for anyone without a licence to:

- Kill, injure or handle a bat;
- Possess a bat (whether alive or dead);
- Disturb a roosting bat; and,

- Damage, destroy or obstruct access to any place used by bats for shelter, whether they are present or not.

In addition to domestic legislation, bats are also protected under the EU Habitats Directive (92/43/EEC). All Irish bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat is further listed under Annex II, which make it an offence to:

- Deliberately capture, injure, or kill any bat; or,
- Deliberately disturb a bat, in particular any disturbance which is likely;
    (a) To impair their ability:
        (i) To survive, to breed or reproduce, or to rear or nurture their young; or,
        (ii) To hibernate or migrate.
    (b) To significantly affect the local distribution or abundance of the bat species; or,
- Damage or destroy a breeding site or resting place of a bat.

Therefore, the destruction, alteration or evacuation of a known bat roost is a notifiable action under current legislation and a derogation license must be obtained from the National Parks and Wildlife Service (NPWS) before works can commence.

Furthermore, it should also be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a license to derogate from Regulation 23 of the Habitats Regulations 1997, (which transposed the EU Habitats Directive into Irish law) issued by NPWS.

1.3 Statement of Authority

This report was checked and approved by Dyfrig Hubble, Associate Director - Ecologist. Dyfrig has a B.Sc. (Hons) in Tropical Environmental Science and an M.Sc. Environmental Forestry. Dyfrig is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Dyfrig has over 15 years' experience working in the ecological consultancy sector including habitat appraisals and specialist species specific surveys. Dyfrig has extensive experience in undertaking surveys for bats and in the preparation of survey reports for various projects within both the UK and Ireland.

1.4 Species Background

There are eleven recorded bat species in Ireland, nine (9No.) of which are considered resident and two (2No.) which are considered vagrants (Please see Table 1-1 below).

Table 1-1: Status of Irish Bat Species

Bat Species		**Irish status**	**European Status**
Common Name	**Scientific Name**		
Resident Bat Species			
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Least Concern	Least Concern
Brown Long-eared Bat	*Plecotus auritus*	Least Concern	Least Concern
Common Pipistrelle	*Pipistrellus pipistrellus*	Least Concern	Least Concern
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	Least Concern	Least Concern

Bat Species		Irish status	European Status
Common Name	**Scientific Name**		
Resident Bat Species			
Whiskered Bat	*Myotis mystacinus*	Least Concern	Least Concern
Daubenton's Bat	*Myotis daubentonii*	Least Concern	Least Concern
Lesser Noctule	*Nyctalus leisleri*	Least Concern	Least Concern
Nathusius' Pipistrelle	*Pipistrellus nathusii*	Least Concern	Least Concern
Natterer's Bat	*Myotis nattereri*	Least Concern	Least Concern
Vagrants			
Brandt's bat	*Myotis brandtii*	Data Deficient	Least Concern
Greater Gorseshoe Bat	Rhinolophus ferrumequinum	Data Deficient	Near Threatened

1.4.1 Types of Bat Roosts

Bats were originally cave and tree dwelling animals, but many now use buildings to roost within. Buildings are highly important as roosting sites for all Irish bat species as they use buildings for all roost types. Most significant in terms of roosts in buildings are maternity roosts, but cellars and attics can serve as hibernation sites for bats. Roosts within buildings can far exceed the numbers encountered in trees, bridges, caves or cliffs and roosts of over 1,000 bats have been recorded in buildings [1].

Bats are social animals, and most species congregate in large colonies during the later spring / summer. These colonies consist mostly of females, with some juvenile males from the previous year. Male bats normally roost individually or in small groups meeting up with the females in the late autumn, when it is time to mate. In summer, bats seek warm dry buildings in which they can give birth and suckle their young. In winter, they seek out places with a constant low temperature and high humidity where they can become torpid and hibernate during adverse weather conditions. However, bats do not hibernate continuously during winter and will awake and hunt during mild nights when there are insects available, and it is energetically advantageous to forage [2].

One purpose of daytime tree or building inspections is to determine the potential of bat roosts within the survey area. Due to the transient nature of bats and their seasonal life cycle, there are a number of different types of bat roosts. Where possible, one of the objectives of the surveys is to be able to identify the types of roosts present, if any.

Table 1-2 below defines the various types of bat roosts and which time of year they are utilised.

Table 1-2: Types of Bat Roosts [2]

Roost Type	Definition	Time of Survey
Day Roost	A place where individual bats or small groups of males, rest or shelter in the daytime but are rarely found by night in the summer.	Anytime of the year
Night Roost	These are roosts which are used as resting places for bats between foraging bouts. They also provide retreats for bats from	Anytime of the year

Roost Type	Definition	Time of Survey
	predators or during inclement weather conditions. They also function as feeding perches and may be important for socialising. May be used by a single bat on occasion or it could be used regularly by the whole colony.	
Feeding Roost	A place where individual bats or a few bats rest or feed during the night but are rarely present by day.	Anytime of the year
Transitional Roost	A place used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.	Outside the main maternity and hibernation periods.
Mating Site	Most bat species mate in late summer / autumn but pregnancy does not occur until the following spring. During this time males will take possession of a cavity in a building, tree, bridge, cave or mine and attract females to these sites to establish a harem. Male bats call both from a perch and in flight in much the same manner that male birds sing.	Late Summer into Autumn
Maternity Site	Maternity roosts are the most significant roosts, and they are predominantly all female aggregations that are formed from late May onwards and remain as a relatively cohesive unit until late August. Not all female bats give birth annually. These females that do bear young in a given year avail of a suitable roosting site within a building, tree and sometimes cave (or equivalent). The young are flightless for several weeks and hence are vulnerable to dangers such as tree felling and restoration, reinforcement or demolition of structures such as buildings and bridges.	Summer Months
Hibernation Site	Bats have a high metabolic rate and in temperate countries, such as Ireland, flying insects are not available in sufficient numbers during winter to sustain bats. Therefore, bats 'hibernate' during winter. In hibernation sites, bats are often completely inactive for several days and are extremely vulnerable to disturbance by human activities due to the time taken for them to become sufficiently active to allow escape. Hibernation may extend from November to the end of March, during which time bat activity will take place sporadically.	Winter Months in cold weather conditions
Satellite Roost	An alternative roost found in close proximity to the main nursery colony and is used by a few individuals throughout the breeding season.	Summer Months

1.5 Purpose of Survey Work

The implication of these legislative policies is that the proposed large-scale residential development needs to take account of the potential effects on bats. Survey work is necessary to establish whether the species are currently present in areas where suitable habitat exists and in areas where bats have previously been recorded. Survey work also enables appropriate mitigation measures to be incorporated into the design of the project and ensures that there are no adverse effects on the conservation status of the species.

Survey work was deemed necessary based on desktop surveys and suitable habitat being identified during the initial walkover of the site.

2 METHODOLOGY

The methodologies used to establish the presence / potential presence of bats are summarised below.

2.1 Desk-Based Studies

A desk-based study was undertaken to identify records of bats within the survey area. The following sources of information were reviewed:

- The National Parks and Wildlife Service (NPWS) website was consulted to obtain the most up to date details on conservation objectives for the Natura 2000 sites relevant to this assessment [3];
- Aerial mapping was reviewed to identify any habitats and features likely to be used by bats. Maps and images of the Site and general surrounding landscape were examined for suitable foraging or commuting habitats including woodlands and forestry, hedgerows, treelines and watercourses;
- The National Biodiversity Data Centre (NBDC) website was consulted with regard to bat species distributions and bat habitat suitability index [4]; and,
- An Arboricultural Assessment and Tree Survey Report by South of Ireland Tree Surveys [5].

2.2 Field Based Studies

The survey design was informed by previous experience and the following publications:

- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* [1];
- *A Conservation Plan for Irish Vesper Bats* Irish Wildlife Manual No. 20 [6];
- *Bat Mitigation Guidelines for Ireland*. Irish Wildlife Manuals, No. 25 [7] a publication by the NPWS; and,
- *Bat Surveys for Professional Ecologists - Good Practice Guidelines* (3rd ed.). London: The Bat Conservation Trust [2].

2.2.1 Tree Inspection

An Arboricultural assessment of the trees within the Site was undertaken on the 14th February 2022, and updated on the 20th October 2022 by a qualified arboriculturist, Owen O'Callaghan, of South of Ireland Tree Surveys [5]. A visual inspection was carried out from ground level, measurements taken, and observations noted.

Figure 2-1: Bat Potential Tree Locations

A walkover of the Site was undertaken by two (2No.) MOR Ecologists on 21st September 2021. An updated walkover was then carried out on the 24th May 2022 due to an extension of the redline. This walkover included a tree inspection. A final hedgerow / treeline inspection was undertaken on the 11th October 2022 to include an additional area of trees to the south of the N72 Mallow – Dublin Road (See Figure 2-1).

The tree inspection aimed to identity potential ecological constraints in relation to bats from the proposed development design. As part of the inspection, the trees to be removed within the Site were assessed for the presence of features that could be utilised by roosting bats, using close-focusing binoculars. The following criteria were used:

- Presence of natural cavities, splits, cracks, loose bark and rot holes in the trunk or boughs of the tree;
- Presence of dense and woody ivy (*Hedera helix*) growth that could be used by bats for roosting;
- Evidence of bat droppings, which may also be seen as a black streak beneath holes, cracks, branches, etc;
- Presence of smooth edges with dark marks and urine stains at potential entrances to roosts;
- Adjoining habitat which are likely to be important to bats, including the river corridor, and hedge / treelines within the survey area that offer a variety of potential foraging, roosting and commuting opportunities for bats; and,

- Adjoining potential roosts / known roosts identified. This raises the likelihood of a tree being of benefit as bats may move roosts if the roost becomes too hot or cold during roosting and a nearby alternative roost is highly desirable.

All trees within the Site that are to be removed as part of the Proposed Development that were identified as having potential roost features (PRFs) were subject to emergence and re-entry surveys. See Figure 3-1 and Table 2-1 below for more details.

2.2.2 External and Internal Building Inspection

An internal and external inspection of the derelict buildings onsite was undertaken by two (2No.) MOR Ecologists on 21st September 2021 and again on 24th May 2022.

The inspection aimed to assess these buildings for the presence of features suitable for roosting bats. These features include:

- Evidence of bat droppings / urine splashes;
- Bat specimens (live or dead);
- Evidence of feeding remains, (insect wings on the floor); and,
- Evidence of fur-oil staining.

Assessment criteria for evaluating the potential suitability of the Proposed Development for bats was done in concurrence with 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed)' [2].

Table 2-1: Assessment guidelines for assessing the potential suitability of proposed development sites for bats [2]

Suitability	Description of 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	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 conditions1 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). 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 potential2	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e., not very well connected to the surrounding landscape by another habitat. 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.

[1] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.
[2] This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

Suitability	Description of Roosting Habitats	Commuting and Foraging Habitats
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[1] and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	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. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.
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[1] and surrounding habitat.	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. 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. Site is close to and connected to known roosts.

The farm outbuildings were determined to have moderate bat roost suitability due to cracks and crevices within the structure, while the Site and its surrounding habitats were determined to have moderate commuting and foraging suitability due to the presence of hedgerow / treelines, farmland, and watercourses.

2.2.3 Dusk Emergence Survey

Dusk emergence surveys were undertaken by two (2No.) MOR Ecologists on 23rd September and 27th September 2021. These surveys focused on the farm outbuildings and adjacent areas of scrub. The surveyors were positioned at pre-determined vantage points (VP1 and VP2) to capture the areas within the Site that were identified as having bat roost potential during the 2021 Site walkover (See Figure 2-1).

A follow up dusk emergence survey was undertaken on 21st July 2022, by four (4No.) MOR Ecologists. Two (2No.) MOR Ecologists covered the same vantage points (VP1 and VP2) previously surveyed in 2021 to ensure that bat activity in this area remained unchanged to that recorded during the 2021 surveys. Two (2No.) additional surveyors were positioned in VP3 and VP4 to capture 2No. mature trees, previously un-surveyed, within the extended Site boundary that require removal as part of the proposed works. VP3 provides a vantage of the hedgerow / treeline along the northeast boundary of the Site and VP4 focuses on the hedgerow / treeline within the central portion of the Site, refer to Figure 2-2 for context.

These surveys commenced 15 minutes before sunset and ended 2 hours after sunset, therefore encompassing the typical emergence times of Irish bat species. The surveys were designed to incorporate all trees and buildings identified as having bat roosting potential during the tree / building inspections that have the potential to be affected by the proposed works. The trees / buildings were surveyed so that they could be monitored for bat emergence. Vantage point surveys were conducted for 1 hour and 15 minutes and then pre-designated transects (T1, T2, T3 and T4) were walked within the survey area for the second hour (See Figures 2-2). The transects were designed to capture bat activity levels within the wider survey area and to determine what areas within the Site are important for bats.

A combination of visual observation and listening to ultrasonic bat calls using frequency division bat detector (Batbox Duet) and Echo Meter Touch2 Pro (Apple IOS) were used throughout the emergence survey. Bat calls were recorded digitally using Edirol Roland R-05 recorder and Echo Meter Tough2 Pro and analysed using appropriate software (KaleidoscopePro) to aid the identification of bat species present.

2.2.4 Dawn Re-Entry Survey

The dawn re-entry survey took place on 22nd August 2022 by five (5No.) MOR Ecologists. The dawn survey utilised the same vantage points (VP1, VP2, VP3 and VP4) as the dusk emergence surveys. An additional vantage point (VP5) was added to this survey to get an alternative view of the bat potential tree surveyed at VP3 and to assess the level of activity along the Ballylough Local Road (L1246) to the north of the Site, refer to Figure 2-2 for context.

The dawn survey commenced 2 hours before sunrise and finished 15 minutes after sunrise. The dawn survey was conducted using a similar methodology as the dusk emergence surveys, however, in accordance with the guidelines, the transect surveys were conducted for 1 hour followed by 1 hour and 15 minutes of vantage point surveys. The vantage points and transect locations were the same as the 2022 emergence survey (See Figure 2-2).

Figure 2-2: Bat Survey Locations and Transects

2.2.5 Bridge Inspection

A summer bridge inspection survey was undertaken on the bridge that culverts the South Caherduggan River (see Figure 2-3) under the N72 National Road on the 2nd June 2023. A close and systematic inspection of all cracks, crevices and voids suitable for roosting bats was undertaken on the bridge using a Magnusson Inspection Camera (endoscope with 4 LED lights and adjustable brightness). As bats can crawl into crevices, cracks and voids their

presence can be hard to determine, therefore cracks, crevices and voids were also inspected for the presence of any droppings and oil-staining.

This survey was undertaken by two (2No.) MOR Ecologists with experience in bat surveys and elevated and ground level tree / building inspections.

2.2.6 Static Monitoring (SM4)

Two (2No.) passive bat detectors, Wildlife Acoustics Song Meter 4 (SM4s), were utilised during the 2021 and 2022 survey seasons. The passive static bat monitors are equipped with ultrasonic microphones and were left in specific locations for a specified period of time. The SM4 is effectively used as a bat activity data logger as there is no surveyor physically present. Bats which pass near enough to the SM4 unit are recorded and their calls are stored for analysis post monitoring period. This results in a far greater sampling effort over a shorter period of time.

In 2021, one (1No.) SM4 was placed near the existing farm outbuildings to be removed and one (1No.) SM4 was placed within the northwest hedge for a period of static monitoring from 23rd September – 13th October 2021. It should be noted that the Site boundary at the time of the 2021 surveys covered a smaller area and therefore, the second SM4 was placed in a hedgerow that was not identified as having bat roost potential but instead was placed within the Site to track general bat activity.

In 2022, two (2No.) SM4s were placed within the central hedgerow of the updated Site boundary for a period of static monitoring from 21st July – 2nd August 2022. This hedgerow will be removed to facilitate the Proposed Development.

The SM4s and the ultrasonic microphones were positioned away from any close objects or thick vegetation so there would be no interference during the monitoring period. The SM4 bat logger utilises real time recording as a technique to record bat echolocation calls. The sonograms of these bat calls (2-D sound graphs) are digitally stored in the SD cards within the SM4s. Post monitoring, these sonograms are downloaded for analysis by a specific software (Kaleidoscope Pro) which can aid in the identification the recorded bat calls.

These results are depicted in a table showing the number of bat passes per species / per hour / night. Each bat pass does not correlate to an individual bat but is representative of the bat activity levels within the area. For example, some species of bats such as pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar timeframe could be the same pipistrelle bat. However other bat species, such as lesser noctules, tend to travel through an area quickly and therefore an individual bat pass is more indicative of the actual number of individual bats.

All sound file data downloaded from the SM4s is analysed using Kaleidoscope Pro Software. This software can automatically sort sound files that contain only noise (non-bat) from sound files that contain bat passes. The software can also auto i.d. each call with a potential species identification. This approach allows identification of bats to genus level for Myotis species, and to species level for other bats found in Ireland. Separation of Myotis species is complicated by the high degree of overlap between call characteristics and therefore species level identification is not possible.

Figure 2-3: Bridge Inspection Location and SM4 Locations 2021 / 2022

Figure 2-4: SM4 Locations at the Site and Linear corridors.

2.3 Survey Conditions

Bat surveys are a snapshot of the bat activity within an area at the time of surveying. Therefore, it is important that a number of surveys are undertaken to provide as much information on the bat usage of the area in question. Subsequently, a combination of surveys was used to determine the importance of the survey area on local bat populations.

All survey work was conducted in accordance with the most up to date best practice guidelines at the time of the surveys. However, it should be noted that more up to date guidance has been released after these surveys were undertaken – *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition)* [8]. All of the surveys were undertaken when there was no rain or wind, and the temperature was above 10°C. In these weather conditions, bats will not have been deterred from flying and no survey limitations were encountered.

Table 2-2: Bat Survey Metadata

Date	Survey Type	Sunset / Sunrise	Survey Times (Start-End)	Weather	Temperature (°C) Start - End
2021 Surveys					
23/09/2021	Dusk	19:24	19:10 -21:15	Dry, no wind	17°C - 14°C
27/09/2021	Dusk	19:21	19:05 -21:20	Dry, no wind	13°C - 11°C
2022 Surveys					
21/07/2022	Dusk	21:42	21:30 - 23:45	Dry, no wind	15°C - 13°C

22/08/2022	Dawn	6:12	4:30 – 6:27	Dry, no wind	13°C - 13°C

2.4 Survey Limitations

The bat surveys undertaken in 2021 were completed near the end of the optimal survey season for bats. However, bats were recorded commuting and foraging during both of these surveys as weather conditions for this time of year were mild and appropriate for bats. Bats continued to be recorded at moderate levels on the SM4 units until early October, further supporting that weather conditions were mild for this time of year and were appropriate for bat surveys.

It should be noted that the bat surveys did not cover the section of hedgerow running along the N72 road upgrade works. The requirement for the road upgrade works was identified following the completion of both the bat surveys.

No other survey limitations were encountered.

3 RESULTS

3.1 Desk-Based Results

Prior to conducting the field surveys, a desk-based review of information sources was completed.

There NBDC does not hold any records for the nine (9No.) bats species present in Ireland within a 2km radius of the Site over the last 10 years [4].

Table 3-1 provides details of the habitat suitability index for the Site [4]. The habitat suitability index identifies the geographical areas that are suitable for individual species. The index ranges from 0 to 100, with 100 being the most favourable to bats. The index presented is for all species combined, in addition to the individual species indices within the study area.

From the indices, it can be concluded that the study area has an overall moderate habitat suitability index range of 28.11 to 36.44. All the Irish bat species have high or moderate habitat suitability index for the area, with the exception of Lesser Horseshoe bats and Nathusius' pipistrelle as outlined in Table 3-1. Therefore, all of the other listed species in Table 3-1 are likely to occur within the area.

Table 3-1: Habitat Suitability Index

Bat Species	Suitability Index Range	Suitability Index Level
All Bat Species	28.11 – 36.44	Moderate to High
Soprano Pipistrelle *(Pipistrellus pygmaeus)*	46 – 64	High
Brown Long-eared Bat (*Plecotus auritus)*	50 – 79	High
Common Pipistrelle (*Pipistrellus pipistrellus)*	48 – 72	High
Lesser Horseshoe Bat (*Rhinolophus hipposideros)*	0 – 4	Very Low
Whiskered Bat *(Myotis mystacinus)*	32 – 44	Moderate to High
Daubenton's Bat *(Myotis daubentonii)*	30 – 38	Moderate to High
Lesser Noctule *(Nyctalus leisleri)*	47 – 71	High
Nathusius' Pipistrelle *(Pipistrellus nathusii)*	0 – 4	Very Low
Natterer's Bat *(Myotis nattereri)*	37 - 48	Moderate to High

3.2 Field Based Results

3.2.1 Tree Inspection

The tree inspection surveys conducted onsite identified seven (7No.) trees that are to be removed that have features considered suitable for roosting bats.

3.2.2 N72 Hedgerow / Treeline inspection

A hedgerow / treeline inspection along the N72 identified hawthorn, bramble, creeping thistle, cocksfoot, nettles, wild carrot, dog rose, and ivy. No features were identified along this hedgerow / treeline that had bat roost potential. Furthermore, due to the high level of traffic along the N72 causing noise and vibration and the light pollution on this hedgerow / treeline

this linear habitat is considered to be suboptimal for roosting bats. However, this hedgerow / treeline has the potential to be used as a corridor for commuting bats, but again the proximity of the hedge to the busy N72 further reduces the suitability of this hedge for this purpose.

3.2.3 Building Inspection

There are three (3No.) buildings to be removed within the Site. Two (2No.) of the buildings are one-storey structures with pitched rooves. One (1No.) of the buildings used to be a residential dwelling whilst the other was used as a stable. The third structure to be removed is a metal roofed hay barn.

During the external inspection of the building, multiple potential access point for bats to enter into the one-storey buildings by gaps under the soffit, and cracked windows were identified (See Figure 3-1). Due to the presence of alcoves and the surrounding habitats, the two (2No.) one-storey buildings were determined to have moderate bat roost potential as outlined in Table 3-3 (refer to Section 2.2.2 above for assessment guidelines). However, no suitable roosting spaces were identified within the hay barn.

Table 3-2: Building Inspection Results

Building	PRFs	Bat Suitability
Metal Hay Barn	• Heavy Ivy Growth on	Very Low
Dilapidated Dwelling	• Gaps in Roof • Cracks under the soffit.	Moderate
Dilapidated Farm Stable	• Gaps in Roof • Cracks under the soffit.	Moderate

No evidence of bat activity was found during the external or internal inspection of the buildings. However, all potential access points to buildings with moderate roost suitability features were subject to dusk emergence and dawn re-entry surveys.

Figure 3-1: Bat Survey Locations

Plate 3-1: Visible gap in the farm stable roof

3.2.4 Emergence and Dawn Re-entry Survey Results

No bats were observed emerging from or re-entering any of the trees or buildings surveyed. The survey identified bats commuting along treelines / hedgerows within the survey area. (See Figure 3-2). Low-moderate levels of bat activity was recorded within the Site during dusk emergence surveys in 2021. Low levels of bat activity were recorded during the surveys in 2022.

3.2.4.1 Dusk Emergence 2021

The two (2No.) dusk emergence surveys in September 2021 did not identify any bats roosting within the buildings or trees surveyed.

23rd September 2021

The first bat recorded at VP1 was a common pipistrelle at 19:30 (soon after sunset). This common pipistrelle was observed foraging above the yard near the buildings for a few passes before flying out of sight. At 19:53, two (2No.) pipistrelles were observed foraging above the same area for the next 20 minutes. At 20:15 these two (2No.) bats flew out of sight of VP1 and after this point there were no further visuals on bats. However, common pipistrelle, soprano pipistrelle and the occasional lesser noctules were detected on recorders along T1 during the walking transects until the end of the survey at 21:15.

The first bat recorded at VP2 was a common pipistrelle at 19:55. This bat was observed flying overhead for three (3No.) passes before heading towards VP1. A few common pipistrelle and soprano pipistrelles were recorded flying overhead for the next 20 minutes. At 20:12 a common pipistrelle and soprano pipistrelle were observed and recorded foraging above VP2 for 30 minutes. Around 20:40 it became too dark for the surveyor to see the bats foraging, but the recorder continuously picked up common and soprano pipistrelles' calls until the end of the survey at 21:15.

27th September 2021

During this survey, a common pipistrelle was recorded soon after sunset at 19:31 and again at 19:32 from VP1 but there was no visual on the bat. At 19:34 common pipistrelle was observed flying near heavy ivy growth on a semi-mature tree that has grown up onto the corner of the hay barn. Where this bat flew from was not seen. This common pipistrelle continued to fly around this ivy-covered tree at the corner of the haybarn for the next 10 minutes before flying out of sight.

The first bat call recorded form VP2 was a common pipistrelle at 19:36, the bat was not seen. A lesser noctules was recorded soon after at 19:41, but this bat was also not observed. Occasional common and soprano pipistrelle calls were recorded for the next 10 minutes.

Common and soprano pipistrelle foraging / commuting calls were detected from 19:52 to 20:09 from both VP1 and VP2. During the transects, foraging and commuting calls for common pipistrelle, soprano pipistrelle and the occasional lesser noctules continued to be detected from VP1 and VP2 on recorders until the end of the survey at 21:10.

3.2.4.2 Dusk Emergence 2022

The dusk emergence survey conducted on 21st July 2022 did not identify any bats roosting within the buildings or trees surveyed.

As outlined in Section 2.2.3, two (2No.) additional surveyors, vantage points (VP3 and VP4) and transects (T3 and T4) were utilised to survey two (2No.) mature trees within the wider Site that will be removed as part of the Proposed Development. VP1, VP2, T1 and T2 were revisited during this survey. Particular attention was given to the dense ivy-covered area by the haybarn utilised by common pipistrelle close to sunset during the 2021 survey.

Buildings / Haybarn

The first bat recorded at VP1 was a soprano pipistrelle coming from the west soon after sunset at 21:34. This soprano pipistrelle was observed continuously foraging above the yard near the buildings until 21:47. At 21:50 another soprano pipistrelle flew above VP1 and foraged for a minute. At 21:55 two (2No.) common pipistrelles came from the west and foraged above the yard until 22:00 before flying southeast away from VP1. Common and

soprano pipistrelles were recorded every few minutes foraging or commuting above VP1 until 22:32. Several lesser noctule passes were also recorded during this time.

The first bat recorded at VP2 was a soprano pipistrelle at 21:39. From 21:49 until 21:56, up to four (4No.) pipistrelle bats were observed foraging over the clearing and surrounding trees near VP2.

At the start of the transects at 22:45, bat activity began to slow at both VP1 and VP2. At VP1 common pipistrelle, soprano pipistrelle and lesser noctule were recorded as single passes every 5-10 minutes until the end of the survey at 23:45. There was also one brown long eared bat call recorded at 22:58. VP2 recorded even lower numbers with common pipistrelle, soprano pipistrelle and lesser noctule recorded as single passes every 10 minutes until the end of survey at 23:45.

Hedgerow / Treelines within the Wider Site

There was low bat activity recorded at VP3 and VP4 during the dusk survey. The first recording at VP3 was a single pass by a common pipistrelle at 21:53. This bat was not identified visually. Until 22:18 there were only four (4No.) other common pipistrelles recorded as single passes from VP3. At 22:19 a common pipistrelle was observed foraging along the northern hedgerow before flying east from VP3.

The first bat recorded from VP4 was a lesser noctule at 21:49 seen flying over the hedgerow within the eastern corner of the Site. The next bat recorded was a common pipistrelle seen foraging along the hedge for about a minute at 21:58. At 22:08, a soprano pipistrelle was seen foraging along the hedge which was joined by two (2No.) more pipistrelles at 22:10. These three (3No.) pipistrelles were observed for 3 minutes. At. 22:14, a lesser noctule was recorded flying high over VP4. For the next 10 minutes, soprano pipistrelles were recorded every few minutes foraging along and above the hedgerow. By 22:25 activity began to slow considerably, with no activity recorded until 22:45 when a lesser noctule was passed overhead.

Minimal bat activity was recorded during the transects with common and soprano pipistrelles recorded in very low numbers.

3.2.4.3 Dawn Re-entry 2022

The dawn re-entry survey conducted on 11th of August 2022 did not identify any roosting bats within the buildings or trees surveyed.

As outlined in Section 2.2.4, one (1No.) additional surveyor, vantage point (VP5) and transect (T5) was utilised to assess the level of bat activity along the Ballylough Local Road (L1246) to the north of the Site and to gain an alternative view of the bat potential tree surveyed at VP3. All previous vantage points were revisited during this survey.

There was low activity recorded at all of the VP locations during the dawn survey.

Buildings / Haybarn

During the transect portion of the survey there was low activity at both VP1 and VP2. Common pipistrelle and soprano pipistrelle were recorded commuting / foraging intermittently and one (1No.) brown long eared bat was recorded commuting over VP2.

During the vantage point portion of the survey, no bats were recorded re-entering into the buildings or trees and overall activity was very low. A soprano pipistrelle was observed foraging between VP1 and VP2 from about 05:37-05:45 before flying east into a neighbouring garden. A few lesser noctules were also recorded from both VPs commuting overhead. The last bat recorded at VP1 was a common pipistrelle commuting at 05:47 and the last bat recorded at VP2 was a common pipistrelle commuting at 06:00. No other bats were picked up from 06:00 to the end of the survey at 06:27.

Hedgerows / Treelines within the Wider Site

During the transects, VP3 recorded more foraging / commuting activity then VP4. Along the transect for VP4, a common pipistrelle was recorded at 04:36. Another bat was not recorded along the transect until 05:05, when a single pass of a soprano pipistrelle was noted. Another soprano pipistrelle single pass was recorded at 05:14.

The first bat recorded along the transect for VP3 was a soprano pipistrelle at 04:33. Soprano pipistrelles were recorded commuting / foraging along the transect every 5-10minutes from 04:52 until the end of transects at 05:20.

During the transect at VP5, very low bat activity was recorded. The first bat recorded along T5 was a common pipistrelle with two (2No.) passes picked up at 04:34. A single pass of a soprano pipistrelle was noted a few minutes later at 04.38. Between 04:44 and 04:59, 4 passes of a common pipistrelle were recorded. No other bats were recorded during the transect survey.

During the vantage point portion of the survey, no bats were recorded re-entering into the trees and overall activity was very low. VP4 recorded two bat calls during the vantage point survey, with a common pipistrelle recorded commuting at 05:29 and a *Myotis spp.* recorded commuting at 05:59. VP3 recorded seven (7No.) bat calls in total, with common pipistrelle, soprano pipistrelle and lesser noctule recorded commuting as single passes. The last recording from VP3 was a *Mytosis spp.* at 6:09am. No bat activity was recorded at VP5 during the vantage point surveys.

3.2.4.4 Conclusions

No bats were found to be roosting within any of the trees or buildings onsite that were identified as having bat roost potential. However, as bats were recorded soon after dusk during the emergence surveys in 2021, it is likely that bat roosts are present within the local area surrounding the Site.

Common pipistrelle, soprano pipistrelle, lesser noctule and *Myotis spp.* bats were recorded foraging and commuting within the survey area, refer to Figure 3-2. Based on the levels of activity and movement of the bats recorded during the dusk and dawn surveys in 2021 and 2022, it is considered that the Site is of low-moderate value for foraging and commuting habitats for bats in the local area, particularly for soprano and common pipistrelles.

Figure 3-2: Bat Activity Map within the Survey Area

3.2.5 Bridge Inspection

No bat species or evidence of roosting bats in the form of bat droppings or oil-staining in any cracks, crevices or voids in the bridge were identified during the bridge inspection survey. However, a number of active bird nests were identified during the bridge inspection.

Plate 3-2: Bridge culverting the South Caherduggan under the N72

3.2.6 SM4 Analysis

The following Tables 3-3 to 3-5 summarise the results recorded on the SM4 units deployed in 2021 and 2022 within the survey area.

The total number of bat passes recorded per night divided by the number of hours of recording provides a figure for this analysis. The bat activity levels were determined as follows:

- None – 0 passes
- Low = 1 - <10 passes per hour
- Moderate = >10 - < 50 passes per hour
- High = > 50 passes per hour

Please note the following abbreviations relate to Table 3-3 below: SP = Soprano Pipistrelle, CP = Common Pipistrelle, NP = Nathusius' Pipistrelle, LN = Lesser Noctule, BLE = Brown Long Eared Bat, and MYO = Myotis *spp*.

N = None (White), L = Low (Green), M = Moderate (Yellow), H = High (Pink)

Table 3-3: Results of Static Bat Detector deployed within the Survey Area from 23rd September 2021 – 6th October 2021 – Along Northwest Hedgerow / Treeline

Survey Period	Night	CP	SP	NP	LN	BLE	MYO
23rd September – 6th October 2021 (14 nights total)	23/09/21	M	L	L	L	L	None
	24/09/21	M	M	L	L	L	L
	25/09/21	M	M	None	L	L	None

	26/09/21	M	M	L	L	L	L
	27/09/21	M	M	None	None	L	L
	28/09/21	L	M	None	None	None	None
	29/09/21	L	M	None	None	None	None
	30/09/21	M	M	None	L	L	L
	01/10/21	M	M	None	None	L	L
	02/10/21	M	M	None	None	None	None
	03/10/21	M	M	None	None	None	L
	04/10/21	L	M	None	None	None	L
	05/10/21	L	M	None	L	L	L
	06/10/21	M	M	None	L	L	L

Table 3-4: Results of Static Bat Detector deployed within the Survey Area from 23rd September 2021 – 6th October 2021 – Beside Buildings

Survey Period	Night	CP	SP	NP	LN	BLE	MYO
23rd September – 6th October 2021 (14 nights total)	23/09/21	L	L	L	L	L	None
	24/09/21	M	L	L	L	None	None
	25/09/21	M	L	None	L	None	None
	26/09/21	L	L	None	L	None	None
	27/09/21	L	L	None	L	None	L
	28/09/21	L	L	None	L	None	None
	29/09/21	L	L	None	L	None	None

Survey Period	Night	CP	SP	NP	LN	BLE	MYO
	30/09/21	L	L	None	L	None	None
	01/10/21	M	L	None	L	None	L
	02/10/21	L	L	None	L	None	L
	03/10/21	L	L	None	L	None	None
	04/10/21	M	L	None	L	None	L
	05/10/21	M	L	None	L	None	None
	06/10/21	L	L	None	L	None	None

Table 3-5: Combined Results of 2No. Static Bat Detectors deployed within the Survey Area from 21st July – 2nd August 2022 – within the Central Hedgerow / Treeline to be Removed

Survey Period	Night	CP	SP	NP	LN	BLE	MYO
21st July – 2nd August 2022 (13 nights total)	21/07/22	L	L	L	L	None	None
	22/07/22	M	L	L	L	L	L
	23/07/22	L	L	None	L	L	L
	24/07/22	M	L	L	L	L	L
	25/07/22	M	L	None	L	None	L
	26/07/22	L	L	None	L	None	L
	27/07/22	M	L	None	L	None	L
	28/07/22	M	L	None	L	None	L
	29/07/22	L	L	None	L	None	L
	30/07/22	L	M	L	L	L	L

Survey Period	Night	CP	SP	NP	LN	BLE	MYO
	31/07/22	M	L	None	L	L	L
	01/08/22	L	L	L	L	None	L
	02/08/22	M	L	None	L	L	L

3.2.6.1 2021 SM4 Results Near Buildings and Northwest Hedgerow / Treeline

Common pipistrelle and soprano pipistrelle were the only species recorded with moderate levels of activity on the SM4 units in 2021. There were low levels of lesser noctule, common pipistrelle, and soprano pipistrelle recorded consistently across the two weeks of static monitoring in both 2021 and 2022. The SM4 units also picked up the following species at very low levels: brown long eared, Nathusius' pipistrelle and *Myotis spp*. These species were confirmed to be utilising the survey area, albeit in very low numbers.

Both SM4 locations picked up foraging and commuting activity. The SM4 located in the northwest hedge picked up greater foraging activity for common pipistrelle, soprano pipistrelle, lesser noctules and *Myotis spp.* than the SM4 located near the buildings. This indicated that this hedgerow / treeline is consistently being used by these species as a commuting and foraging route.

3.2.6.2 2022 SM4 Results in Hedgerow / treeline to be removed

Common pipistrelle and soprano pipistrelle were the only species recorded with moderate levels of activity on the SM4 units in 2022. However, soprano pipistrelles only recorded moderate activity levels for one night during the static monitoring period. There were low levels of lesser noctule, common pipistrelle, and soprano pipistrelle recorded consistently across the two weeks of static monitoring in 2022. The SM4 units also picked up the following species at very low levels: brown long eared, Nathusius' pipistrelle and *Myotis spp*. These species have been confirmed to be utilising the survey area, albeit in very low numbers.

Both SM4 locations picked up foraging and commuting activity, indicating this hedgerow / treeline is of some importance to common pipistrelle, soprano pipistrelle, lesser noctules and *Myotis spp.* for commuting / foraging.

3.2.6.3 Conclusions

The most frequently occurring species for both 2021 and 2022 during the static monitoring on the SM4 Units were common pipistrelle and soprano pipistrelle, followed by lesser noctules and *Myotis spp.* Nathusius' pipistrelle and brown long eared bats had the lowest number of recordings onsite. Both pipistrelle species were recorded at moderate levels on the SM4s. Common pipistrelles had the highest overall passes/hr. It should also be noted that pipistrelles will continuously fly around a habitat and therefore, it is likely that a series of bat passes within a short timeframe could have been the same pipistrelle bat.

This indicates that moderate numbers of common pipistrelle and soprano pipistrelle and low numbers of lesser noctule bats and *Myotis spp.* are utilising the survey area for repeated foraging and commuting purposes.

4 IMPACT ASSESSMENT AND MITIGATION

The following bat species have been recorded during the bat surveys and static monitoring events: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, lesser noctule, brown long eared bats and *Myotis spp*. All bat species recorded during the bat surveys are Annex IV species under the EU Habitats Directive and all have a favourable status in Ireland.

Bat species within the survey area will be affected by both the construction phase and operational phase of the Proposed Development. This impact assessment and resulting mitigation measures will be undertaken in relation to all the bat species recorded within the survey area.

4.1 Potential Impacts on Bats

The buildings will be fully demolished and some existing vegetation onsite will be removed as part of the Proposed Development.

Principal impacts of the Proposed Development, in general, on bat fauna may be summarised as follows:

4.1.1 Loss of Habitat

The surveys did not identify any bat roosts onsite. The surveys did identity bats commuting and foraging habitats within the Site and surrounding area.

The improved agricultural grassland fields within the Site boundary will be the main area cleared for the proposed large-scale residential development. These fields are currently utilised for the production of animal fodder (i.e., hay and silage) and contain very little biodiversity as noted during the Site walkover. Due to this, the amount of flying insects for bats to prey on would be limited and therefore, the loss of this habitat is not considered to be significant.

Low-moderate levels of bat activity were recorded along all the hedgerows / treelines throughout the Site. In total ca.553m of hedgerow / treeline will be removed onsite, this includes the central hedgerow / treeline, the northwest and northeast hedgerow / treelines, and a section of hedgerow / treeline along the N72 road to facilitate the Proposed Development. The southern, eastern and hedgerows / treelines surrounding Meadowbrook will be retained as part of the Proposed Development. In addition, there will be ca.1,293m of hedgerow planted throughout the Site including bolstering along the eastern boundary to provide a north-south ecological corridor. There will also be a treeline established bisecting the Site and connecting Meadowbrook with the southern boundary. Additionally, hedgerow / woodland areas will be planted along the southern and eastern boundaries of the Site as part of the overall landscape plan, which will provide suitable foraging, commuting and roosting habitats for bats.

As part of the road upgrades in the northwestern corner of the Site, a section of ca.30m of hedgerow was removed, additional planting along this section will replace the hedgerow loss due to these works.

As part of the Proposed Development, it is required that a section of hedgerow / treeline will be removed along the N72. Studies have found that levels of noise associated with traffic have been shown to negatively affect overall bat activity at least 20m from the noise source [9]. Therefore, given the high levels of noise associated with traffic along the N72 National Road and the close proximity of the hedgerow / treeline to the road, it is considered likely that this habitat is within the zone of influence for negative effects on bats arising from traffic. As part of the Proposed Development, a new section will be planted in advance of this removal to maintain connectivity between the Spaglen Woods and wider area. Advanced nursey stock trees and shrubs will be planted ca.20m back from the road.

The creation of these ecological corridors will be established during the initial stages of the Proposed Development construction phase to maintain the north-south linkages on the Site. Further details can be found in the Landscape Management Plan, submitted as part of the overall application.

These ecological corridors and enhancements will provide suitable habitats for overall bat activity around the Site. Therefore, it is considered that with appropriate mitigation and enhancements to the Stie, the Proposed Development would have a short-term negligible impact on bat species and an overall medium / long-term positive impact on bat species once the Landscape Management Plan has been successfully implemented.

4.1.2 Lighting of the General Area (street lighting, security lighting etc.)

Lighting for the Proposed Development will potentially impact on bat species in relation to commuting and foraging potential within the Site and the wider area. Common pipistrelles and soprano pipistrelles will tolerate low levels of lighting while brown long eared bats and Myotis species are very sensitive to lighting and require the light levels to be below 1lux.

As Myotis species and brown long eared bats were recorded within the survey area, it is important to ensure that the lighting is directional and that there are buffer zones or screen plantings established to reduce light spillage onto the mature treelines.

In the absence of an appropriate lighting scheme, it is considered that the Proposed Development could have a Negative Impact on foraging and commuting bats.

4.2 Mitigation Measures

The following mitigation measures are recommended to reduce the potential impact of the proposed development on local bat populations:

4.2.1 Landscape Plan

A Landscape Plan has been developed for the Site and submitted as part of the overall application by DMN Architects. This Landscape Plan seeks to maintain a degree of connectivity to the wider landscape (where possible) through the retention of hedgerows / treelines onsite and additional planting.

As outlined above, ca.553m of hedgerow / treelines will be removed as part of the Proposed Development. In order to compensate for this loss of vegetation, the Landscape Plan includes for the planting of the following:

- 1,293m of hedgerow:
- 554m^2 of species rich dry meadows;
- 2,2707m^2 species rich wet and dry meadow planting;
- 3,194m^2 of Biodiversity Woodland Planting (wet woodland and mixed woodland); and,
- 461m^2 of Street Tree Planting with base hedges.

The above planting will help connect the north and south of the Site, by providing ecological corridors for species to follow through the Site. Additionally, these will be planted early in the construction phase to allow them to establish and provide suitable links throughout the construction phase.

The planting proposed south of the N72 will be planted 12 months in advance of the vegetation being removed to improve the Sightlines and for health and safety reasons. This will be also the advanced nursery stock to establish and to have a suitable ecological corridor in place prior to the removal of the vegetation along the N72.

It is considered that bats will be able to continue to use the Site for commuting and foraging with the implementation of the proposed Landscape Plan.

In addition, it is recommended that the use of chemicals (weed killers etc) are avoided within the development zone. Herbicides and pesticides can have unintended consequences on both flora and fauna. Where possible, the use of herbicides and pesticides should be avoided, and other methods of pest control should be used.

4.2.2 Lighting Plan

Bats are averse to excessive lighting, subsequently, impacts could occur as a result of an inappropriate lighting strategy. Therefore, it is important that lighting installed for the proposed development will be completed with sensitivity for local wildlife while still providing the necessary lighting for human usage.

The lighting to be installed as part of the Proposed Development will be for safety and maintenance. Nevertheless, the lighting strategy has been designed to mitigate against any potential impacts on nocturnal species in line with BSI Standards Publication [10] which follows the Bat Conservation Trust (BCT) Guidelines on '*Bats and Artificial Lighting in the UK'* [11].

The following measures have been taken into consideration during the lighting layout design:

- All luminaires will not lack UV elements when manufactured. Metal halide, fluorescent sources will not be used;
- LED luminaires will be used due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- A warm white spectrum (300K) will be adopted to reduce blue light component;
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill;
- Column heights have been carefully considered and are to 6M heights throughout;
- Luminaires with an upward light ratio of 0% and with good optical control will be used (accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed;
- Any external security lighting will be set on motion-sensors and short (1min) timers; and,
- Streetlights can be located so that the rear shields are adjacent to habitats or optics selected that stop back light thereby directing light into the task area where needed.

4.2.3 Monitoring

In order to ensure that the works in relation to the Proposed Development do not have significant impacts on bats, the following construction procedures and mitigation measures should be implemented. These measures are in line with the NRA (now TII) Guidance for Bats:

- No bats were confirmed to be roosting within the structures onsite, but due to the vagrant nature of bats, it is required to confirm that no bats have since began roosting within the structure since the 2022 summer surveys took place. Therefore, immediately prior to works on the roof structure / partial demolition of the buildings, updated bat surveys will be required to confirm the presence / absence of roosting bats within these buildings;

- If bats are identified to be roosting within the structures during this updated building inspection or the vegetation clearance works, then all works must cease and the project ecologist and NPWS will be consulted;
- No bats were confirmed to be roosting in the seven (7No.) trees with Potential Roost Features (PRF) to be removed. Due to the vagrant nature of bats, it is required to confirm that no bats have since began roosting within the trees since the 2022 summer surveys took place. Therefore, prior to their removal updated surveys will be required to confirm the presence / absence of roosting bats within the two trees. If bats were found to be roosting within the trees after updated surveys, then further measures may need to be considered in order to protect bats against any disturbance. The NPWS will be consulted for advice and a derogation licence will be obtained if required;
- Prior to the vegetation removal south of the N72 National Road and following the establishment of the proposed planting as outlined in the LMP, bat surveys will be undertaken to assess activity levels along the N72 and the proposed planting. The findings of these surveys will be submitted to the Planning Authority.
- Where possible, the PRF trees and buildings which are to be removed, should be felled on mild days during the autumn months of October – November or during spring months of February-March (felling during the spring or autumn avoids the periods when bats are most active and without young); and,
- Following the installation of the lighting for the Proposed Development, a suitably qualified Ecologist should undertake a further Site inspection in order to check the lighting patterns and lux levels along the Site boundaries to ensure there are no impacts to bats or other nocturnal species.

5 CONCLUSIONS

The bat surveys undertaken for the Proposed Development included a walkover of the lands within the survey area, tree inspections, building inspections, dusk emergence surveys, a dawn re-entry survey and static monitoring. The walkover, building inspections and tree inspection identified seven (7No.) trees with features suitable for roosting bats and potential access points into the onsite buildings. These trees and building access points were subject to dusk emergence and dawn re-entry surveys; however, no bats were observed roosting within these trees or buildings.

Based on the bat activity within the survey area shortly after sunset and right before sunrise, it is considered likely that there are bats roosting within the locality of the Proposed Development. The surveys identified bats commuting and foraging along sections of the treelines / hedgerows and scrub areas within the Site and within the wider area. There was moderate bat activity recorded for common pipistrelles and soprano pipistrelles during both the dusk survey and SM4 surveying events. However, low bat activity was recorded during the dawn survey for all bats.

The Proposed Development will result in some loss of commuting / foraging habitats for bats by the removal of a hedgerow/treeline, mature trees, scrub, and agricultural fields. However, a detailed landscape plan has been prepared by DMN Architects with input from MOR, which aims to retain and protect hedgerows / treelines where possible and also includes extensive landscape planting to maintain a degree of connectivity to the wider landscape. The proposed planting comprises a mix of native species and wildflower strips. The hedgerow species are known to support high insect diversity and are considered suitable for foraging bats. The new plantings and enhancement plantings will ensure connectivity remains at existing levels and improve linear habitats south of the N72.

Overall, the survey area is considered to be of low-moderate importance for commuting and foraging bats within the local area as the majority of the Site is dark at night and contains good commuting and foraging habitats for bats. However, it is considered that if the mitigation measures presented within this report are followed, the potential impacts on bats will be reduced and the overall impact from the Proposed Development on bats in the medium / long-term will be slight positive.

6 REFERENCES

[1] National Roads Authority, "Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes," 2006.

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[6] McAney, K. et al., "A conservation plan for Irish vesper bats, Irish Wildlife Manual No.20," National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland, 2006.

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[8] J. Collins, "Bat Surveys for Professional Ecologists - Good Practice Guidelines (4th edition)," The Bat Conservation Trust, London, 2023.

[9] D. Finch, H. Schofield and F. Mathews, "Traffic noise playback reduces the activity and feeding behaviour of free-living bats," *Environmental Pollution,* 2020.

[10] B. S. Publication, "Design of Road Lighting," BSI Standards Limited, 2020.

[11] "Bats and Artificial Lighting in the UK," Bat Conservation Trust / Institution of Lighting Professionals, 2018.

APPENDIX D

20No. Quercus 'robur' / Common Irish Oak 18-20cm girth, Rootballed double staked low, incorporated into hedgerow at 9m centres
18No. Quercus 'robur' / Common Irish Oak 18-20cm girth, root balled double staked low, planted on sloped bank at 9m centres in a double staggered row
Robust Low-Maintenance Grassland Seed mix to use a selection of hard wearing low growing grass species from indigenous sources such as Fescue (Festuca spp.)
Remove 368.73m of existing sod & stone walling and hedgerow vegetation in late winter preferably and not in the period March 1 to August 31 when it is illegal to interfere with hedgerow vegetation
367.34m / 2000no. Proposed new hedgerow with native mix composed of: 60% Crataegus monogyna, 10% Corylus avellana, 05% Malus sylvestris, 05% Prunus padus, 10% Sambucus nigra 05% Viburnum opolus, 05% Ilex aquifolium, 120-150cm height, bareroot double staggered row 6/m (127 linear m)
Maintenance of the hedgerow shall take place only in late winter to allow for berries to be foraged by fauna. No vegetation is to be interfered with from March 1 to August 31 inclusive as stipulated in Section 40, Wildlife Act 1976 & Wildlife (Amendment) Act 2000 & the Heritage Act 2018.
Hedgerows are to be grown to 6metre height. Annual inspections will be undertaken for the 5years following planting to ensure tree health & and establishment. Tree that fail to become established within 5years of planting will be replaced by trees of similar size & species within the next planting season.
All newly planted hedgerows will be lightly managed/pruned year 2 with the existing hedgerows cut on a 2-3 year cycle, with no more than 1/3 of their length cut in any one year.
All pruning management should take place outside the bird nesting and breeding season.
EXTENDED PLAN INSET @ 1:500
OVERALL SITE LAYOUT
EXTENDED PLAN INSET
KEY PLAN @ 1:2,500
91.6m length existing sod and stone walls with native species mix hedgerow plantings to be removed.
11No. Quercus robur 'Fastigiata Koster', standard, WRB, 20/25cm girth, double staked low.
Retain existing sod and stone walls with native species mix hedgerow plantings. Maintenance of the hedgerow shall take place only in late winter to allow for berries to be foraged by fauna. No vegetation is to be interfered with from March 1 to August 31 inclusive as stipulated in Section 40, Wildlife Act 1976 & Wildlife (Amendment) Act 2000 & the Heritage Act 2018.
LANDSCAPE INDEX.
KEY TO SURFACES / SYMBOLS.
Surface
Name
Trees
Hedge
Shrub & Ground Cover
Public Lawn
Private Lawn
Footpath
Shared Surface
Gravel / Bredon Gravel
Bicycle Path
Paving Sets
Roadway
Parking / Drives
Water
Playing Field Pitch
Vegetation
17No. Acer campestre 'Elsryk' standard, WRB 14/16cm girth
02No. Crataegus monogyna standard, bareroot, 12/14cm girth, staked low.
38No. Quercus petraea standard, BR 14/16cm girth to form treeline on open space areas
09No. Acer platanoides 'Cleveland' standard, WRB 14/16cm girth staked
02No. Crataegus monogyna standard, bareroot, 12/14cm girth, staked low.
09No. Acer campestre 'Elsryk' standard, WRB 14/16cm girth
Proposed Bicycle & Pedestrian trail - 0.9KM long & 3m wide.
05No. Prunus padus standard, BR 12/14cm girth, staked low.
600m sq. swales & filtration beds incorporated into open space areas are to be planted with species rich grasses and wild flowers & will be maintained in accordance with the All Ireland Pollinator Plan 2021-2025
Infill Planting to gaps in existing hedgerow Make good to sod and stone wall & replant as required at a rate of 6no plants per metre length to form native mix hedgerow using: 60% Crataegus monogyna, 10% Corylus avellana, 05% Malus sylvestris, 05% Prunus padus, 10% Sambucus nigra 05% Viburnum opolus, 05% Ilex aquifolium, 120-150cm height, bareroot double staggered row 6/m (127 linear m)
09No. Acer platanoides 'Cleveland' standard, WRB 14/16cm girth staked
06No. Quercus robur 'Fastigiata Koster', standard, WRB, 20/25cm girth, double staked low.
02No. Crataegus monogyna standard, bareroot, 12/14cm girth, staked low.
177m length existing sod and stone walls with native species mix hedgerow plantings to be removed.
09No. Acer campestre 'Elsryk' standard, WRB 14/16cm girth
03No. Crataegus monogyna standard, bareroot, 12/14cm girth, staked low.
103m length existing sod and stone walls with native species mix hedgerow plantings to be removed.
04No. Crataegus monogyna standard, bareroot, 12/14cm girth, staked low.
67.5m Length Proposed new sod and stone wall with 405no. native mix hedgerow with: 60% Crataegus monogyna, 10% Corylus avellana, 05% Malus sylvestris, 05% Prunus padus, 10% Sambucus nigra 05% Viburnum opolus, 05% Ilex aquifolium, 120-150cm height, bareroot double staggered row 6/m (127 linear m)
03No. Crataegus monogyna standard, bareroot, 12/14cm girth, staked low.
18No. Acer platanoides 'Cleveland' standard, WRB 14/16cm girth staked
Retain existing sod and stone walls with native species mix hedgerow plantings.
04No. Quercus petraea standard, BR 14/16cm girth
Retain existing sod and stone walls with native species mix hedgerow plantings.
15no. Mix Tree Group with: 03no. Quercus petraea/ Common Oak, 04no. Crataegus monogyna/Hawthorn 04no. Malus sylvestris/Crab Apple, 04no. Prunus avium /Wild Cherry 10-12cm girth, bareroot, staked Maintain space as a species rich meadow while trees remain small.
14No. Prunus avium standard, BR 12/14cm girth, staked low.
07No. Acer campestre 'Elsryk' standard, WRB 14/16cm girth
Bench Seat
mown turf grass
Attenuation ponds / Bio - diversity space
51.5m Length Proposed new sod and stone wall with 310no. native mix hedgerow with: 60% Crataegus monogyna, 10% Corylus avellana, 05% Malus sylvestris, 05% Prunus padus, 10% Sambucus nigra 05% Viburnum opolus, 05% Ilex aquifolium, 120-150cm height, bareroot double staggered row 6/m (127 linear m)
Maintenance of the hedgerow shall take place only in late winter to allow for berries to be foraged by fauna. No vegetation is to be interfered with from March 1 to August 31 inclusive as stipulated in Section 40, Wildlife Act 1976 & Wildlife (Amendment) Act 2000 & the Heritage Act 2018.
Retain Spa Stream watercourse as existing
Retain existing sod and stone walls with native species mix hedgerow plantings.
60No. Wetwoodland Mix Trees with: 20no. Salix caprea, 20no. Betula pendula, 20no. Alnus glutinosa, 120-150cm height, bareroot, no staking Under plant with 60no. Ilex aquifolium 2L container
Retain existing Acer pseudoplatanus / Sycamore tree
5m Long Proposed new sod and stone wall with native species mix hedgerow planting to infill existing gate
Retain existing Fraxinus excelsior Common Ash tree
Retain existing sod and stone walls with native species mix hedgerow plantings.
Retain existing sod and stone walls with native species mix hedgerow plantings. Maintenance of the hedgerow shall take place only in late winter to allow for berries to be foraged by fauna. No vegetation is to be interfered with from March 1 to August 31 inclusive as stipulated in Section 40, Wildlife Act 1976 & Wildlife (Amendment) Act 2000 & the Heritage Act 2018.
12no. Mix Tree Group with: 04no. Malus sylvestris/Crab Apple, 04no. Prunus avium /Wild Cherry 04no. Prunus padus/ Bird Cherry 10-12cm girth, clear stem, bareroot, stake, planted into proposed hedge.
21no. Mix Tree line integrated with low hedge: 05no. Malus sylvestris/Crab Apple, 05no. Prunus avium /Wild Cherry 05no. Prunus padus/ Bird Cherry 06no. Sorbus aucuparia / Rowan Ash 10-12cm girth, clear stem, bareroot, stake, planted into proposed hedge.
O'FLYNN CONSTRUCTION
FOR PLANNING
IMPORTANT TO BE READ
D M N A Architects
Doyle McDonogh Nash Landscape Architects
O'FLYNN CONSTRUCTION UNLIMITED COMPANY
RESIDENTIAL DEVELOPMENT AT SPA GLEN, MALLOW, CO. CORK
SITE LAYOUT LANDSCAPE MASTERPLAN
1:500@A0
20006
4000
02
PA