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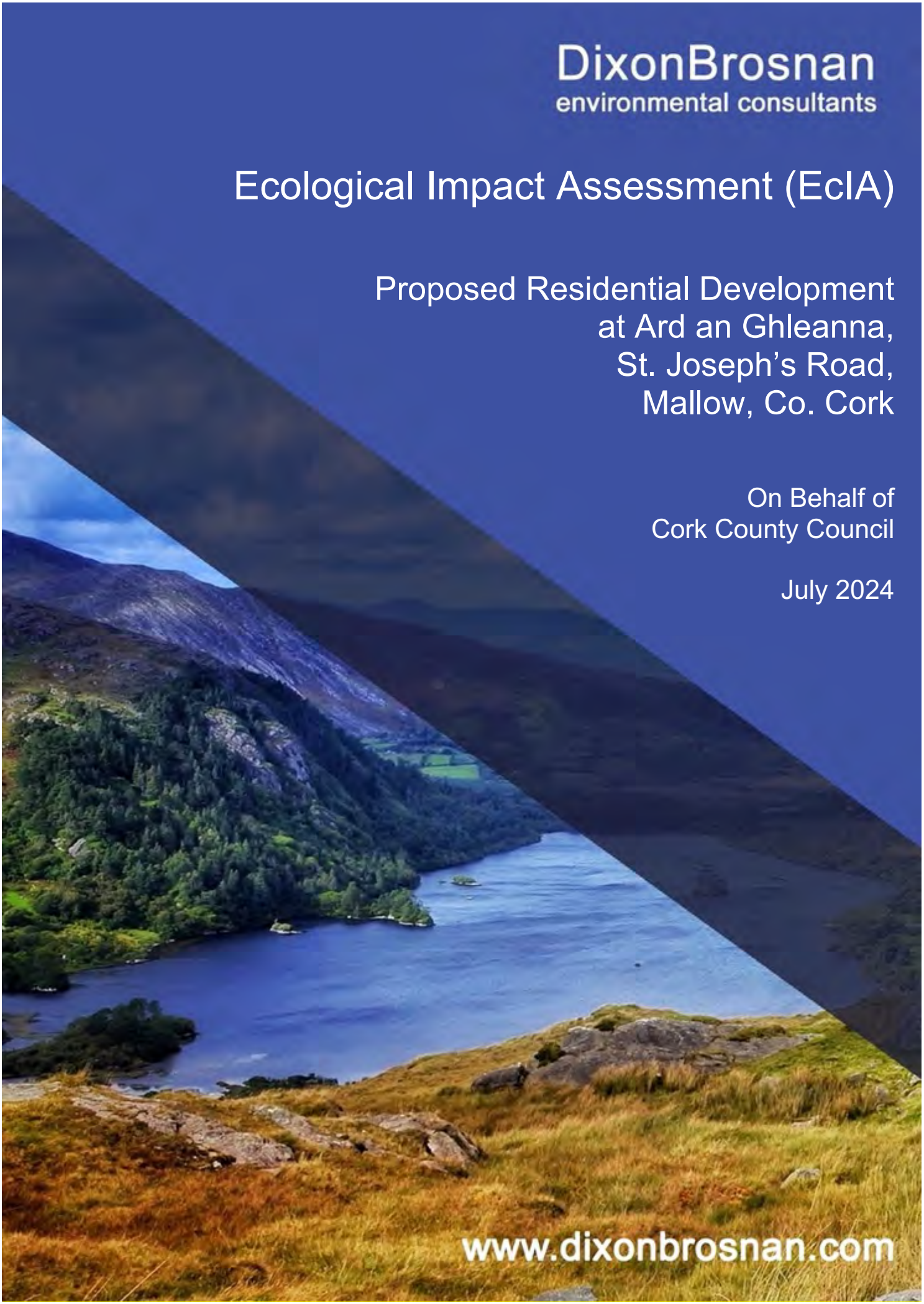
Ecological Impact Assessment (EcIA)

Proposed Residential Development at Ard an Ghleanna, St. Joseph's Road, Mallow, Co. Cork

On Behalf of
Cork County Council

July 2024



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Date	**Revision**	**Prepared By**
19/12/23	First Draft	Sorcha Sheehy BSc PhD
03/07/24	Second Draft	Carl Dixon BSc MSc
11/07/24	Issue to client	

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1. Introduction

DixonBrosnan Environmental Consultants were commissioned to assess the potential ecological impacts of the proposed residential development at Ard an Ghleanna, St. Joseph's Road, Mallow, Co. Cork.

This report addresses the issues raised in this correspondence and describes and evaluates the habitats with their representative flora and fauna and addresses the potential impacts of the development on the ecology of the site and the surrounding area.

2. Methodology

2.1 Introduction

This appraisal is based on surveys of the proposed works area and a review of desktop data. Although not part of an Environmental Impact Assessment Report (EIAR) this report follows the structure and protocols detailed in Advice notes for preparing Environmental Impact Statements (EPA Draft, 2015) and Guidelines on the Information to *be Contained in Environmental Impact Assessment Reports'* (EPA 2022).

2.2 Relevant Guidance

This report follows the Environmental Protection Agency's Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022). It also takes account of the Draft Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government, August 2018), Guidelines on Ecological Impact Assessment in the UK and Ireland, 2nd edition (Chartered Institute of Ecology and Environmental Management CIEEM 2016) and Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Version 1.1 (CIEEM, 2018).

Reference was also made to the following documents where relevant:

- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) (European Union (EU), 2017);
- Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC (EC Environment Directorate-General, 2018);
- Guidance on integrating climate changes and biodiversity into environmental impact assessment (EU Commission 2013);
- Assessment of plans & projects in relation to N2K sites – Methodological Guidance (EC 2021);
- Biodiversity Net Gain Good practice principles for development (CIEEM 2019)
- Biodiversity Net Gain. A practical guide. (CIEEM 2016);

- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters Inland Fisheries Ireland (2016);
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC 2021);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority (NRA) 2009);
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011);
- A Guide to Habitats in Ireland (Fossitt, 2000);
- Guidelines for the treatment of Badgers prior to the construction of National Road Schemes. National Roads Authority, Dublin (National Roads Authority (NRA) 2005a);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority (NRA) 2005b).
- Guidelines for the treatment of bats during the construction of national road schemes (National Roads Authority (NRA) 2005c);
- Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes. (National Roads Authority (NRA) 2006).
- Guidelines for the treatment of Otters prior to the construction of National Road Schemes (National Roads Authority (NRA) 2008);
- Bird Census Techniques (Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. 2000)
- Bird Monitoring Methods - a Manual of Techniques for Key UK Species. (Gilbert, G., Gibbons, D.W. & Evans, J. (1998))
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed)' (Collins, 2016)
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn)' (Collins, 2023)
- Bat Mitigation Guidelines for Ireland Volume 2. (F. Marnell, C. Kelleher and E. Mullen NPWS (2022))
- Otter Survey in relation to the Mallow Flood Relief Scheme (DixonBrosnan 2011)
- Electrofishing survey for lamprey in two minor watercourses as part of the Munster Blackwater River (Mallow South and West) Drainage Scheme (DixonBrosnan, 2011b)
- Freshwater Pearl Mussel Survey Blackwater [Munster] River – Mallow (Ecofact, 2018)
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011)

- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2009);
- Foulkes, N., Fuller, J., Little, D., McCourt, S. and Murphy, P. (2013). Hedgerow Appraisal System - Best Practise Guidance on Hedgerow Survey, Data Collation and Appraisal. Woodlands of Ireland, Dublin. Unpublished Report
- *Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU)* European Union, 2017.

2.3 Desktop Study

The appraisal of impacts follows the protocols outlined in guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2009) and CIEEM (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition*.

A desktop study was carried out to collate the available information on the local ecological environment. The purpose of the desktop study was to identify features of ecological value occurring within the proposed development site and those occurring near to it which have the potential to be affected by the proposed development. A desktop review also allows the key ecological issues to be identified early in the assessment process and facilitates the planning of surveys. Sources of information utilised for this report include the following:

- National Parks and Wildlife Service (NPWS) - www.npws.ie
- Environmental Protection Agency (EPA) – www.epa.ie
- National Biodiversity Data Centre (NBDC) – www.biodiversityireland.ie
- Bat Conservation Ireland - www.batconservationireland.org
- Birdwatch Ireland - www.birdwatchireland.ie
- National Biodiversity Action Plan 2017-2021 (NPWS 2017)
- Invasive species Ireland invasivespeciesireland.com
- Cork County Development Plan 2022
- Cork Biodiversity Action Plan 2009-2014.

2.4 Relevant Legislation

Flora and fauna in Ireland are protected at a national level by the Wildlife Acts, 1976 to 2000 and the European Communities (Birds and Natural Habitats) Regulations 2011. They are also protected at a European level by the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC.

Under this legislation, sites of nature conservation importance are then designated in order to legally protect faunal and floral species and important/vulnerable habitats.

The categories of designation are as follows:

- Special Areas of Conservation (SAC) are designated under the European Communities (Birds and Natural Habitats) Regulations 2011 to comply with the EU Habitats Directive (92/43/EEC);
- Special Protection Areas (SPAs) and designated under the EU Birds Directive (79/409/EEC) amended in 2009 as the Directive 2009/147/EC;
- Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Under the Wildlife Amendment Act (2000) , NHAs are legally protected from damage from the date they are formally proposed for designation and
- Proposed Natural Heritage Areas (pNHA) are listed under the Wildlife (Amendment) Act, 2000. They have limited legal protection under Local Authority Development Plans.

2.5 Survey Overview

A site surveys were carried out on the 19th of September 2022, 15th of March 2023 and 10th of February 2024. The following surveys were carried out as part of this assessment.

- Habitats were mapped according to the classification scheme outlined in the Heritage Council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and following the guidelines contained in *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). Hedgerows were assessed using the Heritage Council's hedgerow appraisal system (Foulkes et al. (2013)). Habitats were cross referenced with Habitats Directive Annex I habitats. Habitat surveys were carried out on the 19th of September 2022, 15th of March 2023 and 10th of February 2024. During these surveys, the site was also surveyed for invasive species and rare floral species (Wyse et al., 2016; Stace 2019).

- Non-volant mammal surveys were carried out during habitat surveys followed guidelines from the Harris et al. (1989), National Roads Authority (NRA) (2005a) and NRA (2008). All habitats within 150m of the proposed development site were examined for signs of mammals, with particular focus on Badger *Meles meles* and Otter *Lutra lutra*. Signs of mammals, including spraints, footprints, or feeding remains, were recorded where present.

- Dusk bat activity/emergence surveys were carried out in the proposed development site during suitable weather conditions (sunset temperatures above 10°C, no rain and no strong wind) on the 19th of September 2022. The surveys followed the guidelines set out in 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)' (Collins, 2016). Surveyors walked along woodland and treelines which might support bats, and habitats which might be affected by the proposed development. The surveys were carried out 15 minutes before sunset. Dusk activity surveys used Elekon Batloggers, Batbox Duet, EchoMeter Touch 2 PRO bat detectors. The primary purpose of bat surveys was to assess usage of trees and habitats, located within or in close proximity to the proposed development site boundary and to identify foraging and/or commuting routes within the proposed development site boundary (i.e., woodland, treelines, hedgerow etc.).

- A preliminary roost assessment was also carried at ground level on trees earmarked for removal within the proposed development site. The aim of this survey was to identify 'potential roosting features (PRFs)' and any evidence indicating the presence of bats i.e., staining, dropping etc. These assessments followed the guidelines set out in 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd and 4th ed)' (Collins, 2016/2023).

- It is noted that surveys were conducted outside the breeding season for birds. All lands within the proposed development site were walked so that all habitats within 50m of all potential nesting features were surveyed. The ornithological surveyor slowly walked through the site, stopping at regular intervals to scan with binoculars and to listen for bird calls or song. Birds were identified by sight and song. All species seen or heard in the survey area and immediate environs were recorded including those in flight. Visits were made during favourable weather conditions.

This report has been prepared by Carl Dixon MSc. (Ecological Monitoring) and Sorcha Sheehy PhD (Ecology/Ornithology).

Carl Dixon MSc (Ecology) is a senior ecologist who has over 25 years' experience in ecological and water quality assessments. Carl Dixon holds an Honours Degree (BSc) in Ecology and a Masters (MSc) in Ecological Monitoring from UCC. He is a senior ecologist with over 25 years' experience in ecological assessment. Prior to setting up DixonBrosnan Environmental Consultants in 2000, Carl set up and ran Core Environmental Services which included Rural Environmental Protection Scheme (REPS) planning for landowners and ecological assessments. Carl has particular experience in freshwater ecology including electrofishing fish stock assessments and water quality assessments. He also has considerable experience in habitat mapping and mammal ecology including survey work and reporting in relation to Badgers and bats. Other competencies include surveys for invasive species and bird surveys. Carl has extensive experience with regards to EIAR and NIS mitigation and impact assessment. He has particular experience in large-scale industrial developments with extensive experience in complex assessments as part of multi-disciplinary teams. Such projects include gas pipelines, incinerators, electrical cable routes, oil refineries and quarries.

Dr. Sorcha Sheehy PhD (ecology/ornithology) is an experienced ecological consultant specialising in bird behaviour. Sorcha received a BSc in Applied Ecology from UCC and subsequently went on to receive a PhD in behavioural ornithology at UCC. During her PhD research, Sorcha studied bird-aircraft collision with a particular focus on bird behaviour. Sorcha has worked for over 15 years in a professional ecology role and specialises in the coordination of ecology projects and assessments. She has coordinated and contributed to Habitats Directive Assessments (AA screenings and NIS) and Environmental Impact Assessment Reports (EIAR) for a range of small and large-scale projects with particular expertise in assessing impacts on birds. Notable projects include Arklow Bank Wind Park, Shannon Technology and Energy Park and Waste to Energy Facility Ringaskiddy.

3. Receiving Environment

3.1 Existing site

The proposed development site is located on a greenfield site accessed through the existing mature housing estate at Aldworth Heights, as illustrated in **Figure 1**. The County Council's land holding includes a further 0.78 ha of lands to the west, which forms part of the cliff escarpment see **Figure 2**. The access road to Aldworth Heights is from St. Joseph's Road, (L-1220-0). Located on the northeastern edge of Mallow town, the site is bounded to the west by the N72 national route. Lands to the immediate north and west are dominated by agricultural lands, mainly tillage. Lands to the south include large areas of existing residential development.

The South Caherduggan Stream (aka Spa Glen Stream), a 1st order tributary of the River Blackwater is located approximately 50m west of the proposed development site boundary. This is separated from the stream by an escarpment of woodland and scrub on a steep incline sloping towards the stream.

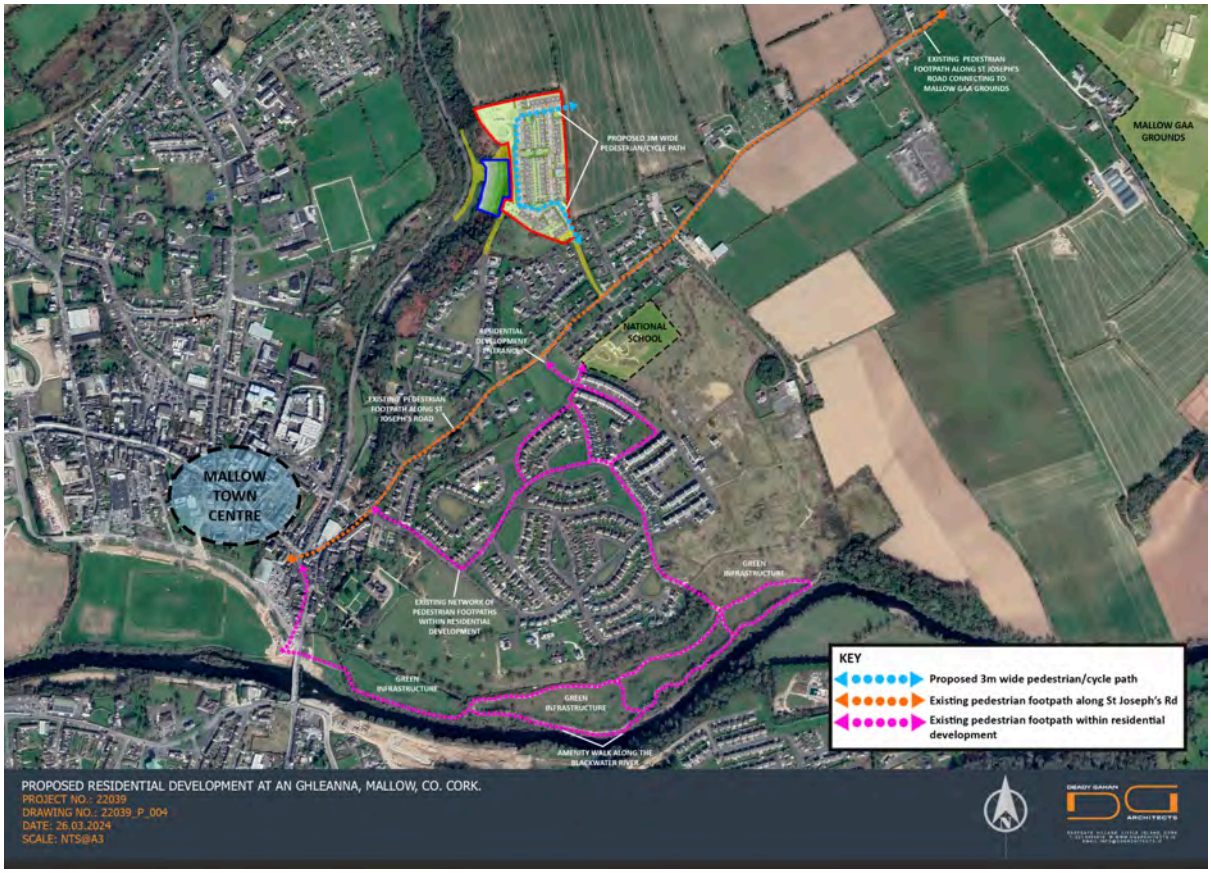

Figure 1. Proposed Development Site Location | Source DG Architects

Figure 2. Proposed Site Layout | Source DG Architects

3.2 Proposed Development

The proposed development would consist of a total of 138no. dwellings comprising 4no. 4 bed semi-detached houses, 14no. 3 bed semi-detached houses, 20no. 3 bed townhouses, 36no. 2 bed townhouses, 32no. 2 bed apartments and 32no. 1 bed apartments. A new vehicular access to the site is proposed which would connect to the end of the Aldworth Heights Road that is currently a cul-de-sac. The Aldworth Heights road connects to St. Josephs Road (L-1220). The proposed development will also include new internal estate roads, drainage, water supply, landscaping, boundary treatments, public lighting, electrical and telecommunications infrastructure and all other site development works entailed in a residential development.

An overview of the proposed development is shown in **Figure 2**.

3.3 Surface Water Drainage

The proposed storm sewer collection system consists of a 100mm diameter pipe collection network around each house in accordance with TGD part H discharging to 225mm diameter uPVC sewer or larger in the public areas of the development. The surface water network layout is shown in drawing no. 22054-XX-XX-XX-XX-DR-WDG-CE-002 and the typical details for the surface water infrastructure are shown on drawing no. 22054-XX-XX-XX-XX-DR-WDG-CE-500.

The surface water sewers have been designed using the Causeway Flow design software and the Wallingford procedure for the design and analysis of urban drainage. The surface water system for the development is a single network including extensive SuDS measures falling generally from south to north and exiting the site in the northwest. It is intended to discharge the attenuated stormwater into the Spa Stream that flows in a southward direction, beside the N72, adjacent to the site.

SuDS measures are proposed for the development in both public and private areas in accordance with the guidance from the County Development Plan 2022 Advice Note 1 on Surface Water management and the CIRIA SuDS Manual C753. The Measures proposed will decrease the impact of the development on the receiving environment and also provide amenity and biodiversity in many cases. Regular maintenance of the SuDS measures will be required to ensure that they are effective throughout their design life. The following paragraphs describe the SuDS features proposed: detention basins, permeable paving, under-drained roadside swales, bio-retention tree pits, bio-retention, raingardens and water butts.

3.4 Wastewater Drainage

The layout of the proposed wastewater drainage network for the development is shown on WDG drawing no. 22054-XX-XX-XX-XX-DR-WDG-CE-002 and the typical details for the wastewater infrastructure are shown on drawing no. 22054-XX-XX-XX-XX-DR-WDG-CE-501.

One conventional piped, gravity sewer network is proposed. The network will generally fall from the south and east to the northwest where it will connect to existing Irish Water infrastructure in the N72 to the west of the site. All sewers within the curtilage of individual houses are to be installed in accordance with TGD Part H (2010) and will consist of 100 mm diameter uPVC Sewers from individual houses laid to falls of min 1:60 to connect to a 150mm and 225mm uPVC sewer to be laid under the estate roads. Inspection chambers will be

constructed within 1m of the boundary of each private property in accordance with Irish Water Standard Details.

All wastewater sewers in the public realm have been designed in compliance with Irish Water's Code of Practice for Wastewater Infrastructure – A Design and Construction Guide for Developers (Revision 2) July 2020. All construction details within the public realm will be in accordance with Irish Water, Wastewater Infrastructure Standard Details (Revision 4), July 2020.

A pre-connection enquiry was submitted to Irish Water to assess the feasibility of providing a connection to the site and Irish Water subsequently issued a confirmation of feasibility for the development. Irish Water responded to say that; "*in order to accommodate the proposed connection, upgrade works are required to increase the capacity of Mallow WWTP. Irish Water currently has a project underway which will provide the necessary upgrade and capacity. This upgrade project is scheduled to be completed by Q3 2023 (this may be subject to change) and the proposed connection could be completed as soon as possibly practicable after this date."*

4. Designated Conservation Areas

Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 sites or European sites. Natural Heritage Areas and proposed Natural Heritage Areas (NHAs/pNHAs) are national designations under the Wildlife Act 1976, as amended. A NHA/pNHA is designated for its wildlife value and receives statutory protection. A list of pNHAs was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated. Consultation with the NPWS is still required if any development is likely to impact on a pNHA.

The proposed development area does not form part of any Natural Heritage Area (NHA), Special Protection Area (SPA), Special Area of Conservation, Nature Reserve, or National Park.

4.1 European (Natura 2000) Sites

Special Areas of Conservation (SACs) and candidate SACs (cSACs) are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites.

In accordance with the European Commission Methodological Guidance (EC 2018), a list of Natura 2000 sites that can be potentially affected by the proposed project has been compiled. All SAC, cSAC and SPAs sites which could potentially be impacted by the proposed Special Areas of Conservation (SACs) and candidate SACs (cSACs) are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive

2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites.

The proposed development does not overlap with any European site. European sites within the likely zone of impact of the proposed development site are listed in **Table 1** and illustrated in **Figure 3** and **Figure 4**. A potential source-pathway-receptor link has been identified between the source (the proposed development) and the receptors (Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA) via a potential pathway (discharge of surface water run-off during construction/operation, wastewater discharges during operation, loss/disturbance of ex situ foraging habitats, spread of invasive species) (See **Table 1** for details). Further information on these European sites is provided below.

Table 1. Natura 2000 sites within the zone of influence of the proposed development site

Natura 2000 site	Site Code	Qualifying Interests/Special Conservation Interests	Distance at closest point and potential source-pathway-receptor link
Special Area of Conservation (SAC)			
Blackwater River (Cork/Waterford) SAC	002170	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (*Juncetalia 15irsute15*) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Margaritifera margaritifera* (freshwater pearl mussel) [1029] *Austropotamobius pallipes* (white-clawed crayfish) [1092] *Petromyzon marinus* (sea lamprey) [1095] Lampetra planeri (brook lamprey) [1096] *Lampetra fluviatilis* (river lamprey) [1099] *Alosa fallax fallax* (twaite shad) [1103] *Salmo salar* (salmon) [1106] *Lutra lutra* (otter) [1355] *Trichomanes speciosum* (Killarney fern) [1421]	930m south. The South Caherduggan Stream, a tributary of the River Blackwater, is located c.50m from proposed development site. During construction and operation, contaminated surface water runoff could potentially impact on water quality within South Caherduggan Stream and River Blackwater. During operation, wastewater from the proposed development will discharge to the Blackwater River Via Mallow WWTP. Habitats within the proposed development site could potentially provide ex situ habitats for QI species. Given the location of the proposed development relative to the European site boundary and the identified downstream hydrological connectivity as well as the potential for *ex situ* SCI species to occur within proposed development, a viable source pathway connector link has been identified.
Special Protection Area (SPA)			
Kilcolman Bog SPA	004095	Whooper Swan (*Cygnus cygnus) [*A038] Teal (*Anas crecca) [A052]* Shoveler (*Anas clypeata) [A056]*	11.3km north. Habitats within the proposed development site could potentially provide *ex situ* habitats for SCI species. Given the location of the proposed development relative to the European site boundary as well as the potential for *ex situ* SCI species to occur within proposed development, a viable source pathway connector link has been identified.

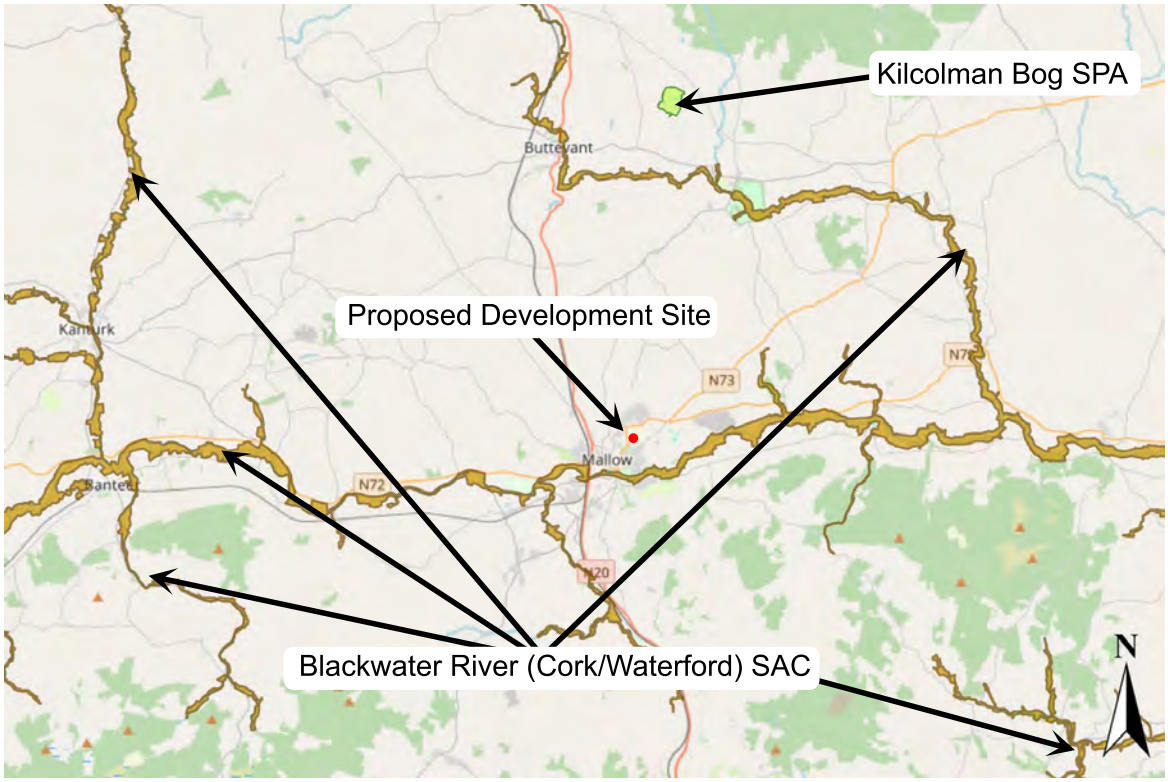

Figure 3. Natura 2000 Sites within zone of influence proposed development site | Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | Not to scale

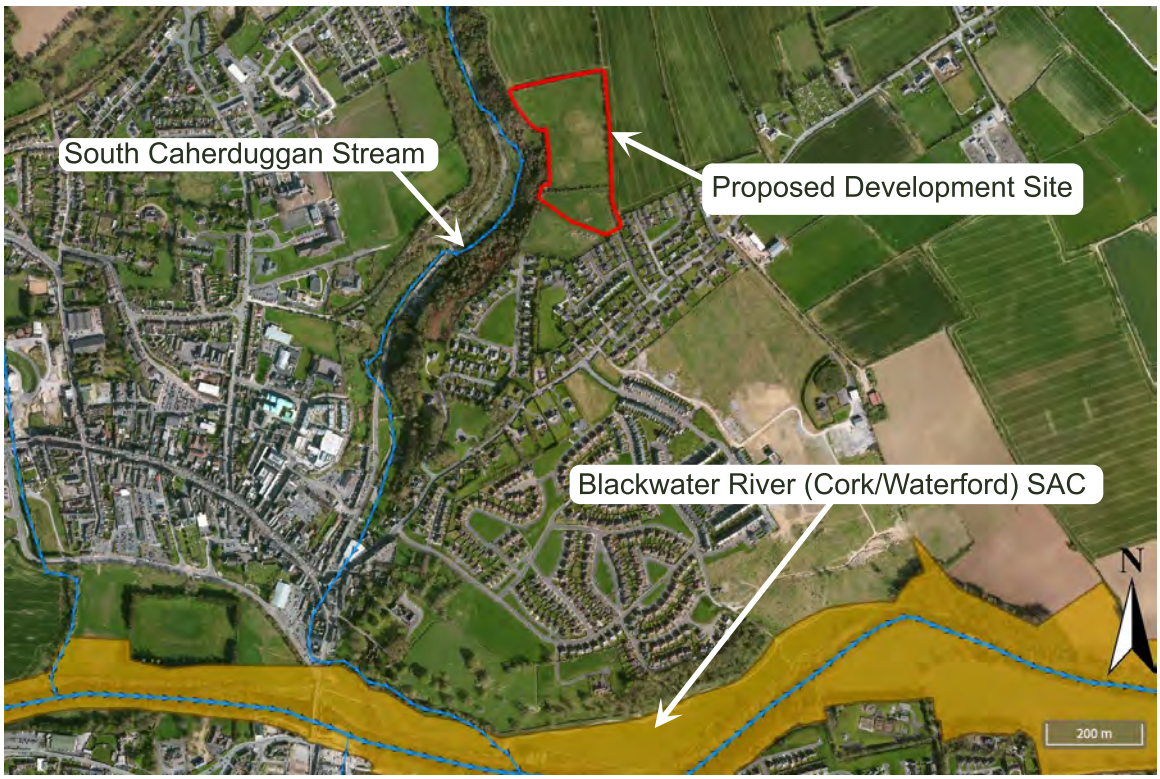

Figure 4. Location of proposed development site and Caherduggan South Stream relative Blackwater River (Cork/Waterford) SAC Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | Not to scale

The Blackwater River (Cork/Waterford) SAC is a large site which drains a major part of County Cork and five mountain ranges. The site supports a high diversity of Annex I habitats and

Annex II species of the E.U. Habitats Directive, including Atlantic salmon and Otter. The site designated as the Blackwater River SAC consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond and as far downstream as the tidal stretches into Youghal Harbour as well as the many tributaries along the way, the larger of which include the Licky, Bride, Flesk, Chimneyfield, Finisk, Araglin, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, Owentaraglin and Awnaskirtaun. The extent of the Blackwater and its tributaries in this site flows through the counties of Kerry, Cork, Limerick, Tipperary and Waterford. The designated site covers a total area of 15,048 ha. The location of the proposed development in relation to the Blackwater River (Cork/Waterford) SAC is shown in **Figure 3** and **Figure 4**.

Kilcolman Bog SPA is situated on the southern foothills of the Ballyhoura Mountains in Co. Cork. It occupies a glacially eroded hollow in Carboniferous limestone. The site comprises a quaking fen fed by calcareous groundwater, with areas of reed swamp, freshwater marsh and wet grassland. This site is of special conservation for the following species: Whooper Swan, Teal and Shoveler. The site is of ornithological interest because it supports nationally important numbers of these species. Of particular note is the regular presence of Whooper Swan and Golden Plover, two species that are listed on Annex I of the E.U. Birds Directive. The location of the proposed development in relation to the Kilcolman Bog SPA is shown in **Figure 3.**

4.2 Nationally Protected Sites

Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) are national designations under the Wildlife Act 1976, as amended. A Natural Heritage Area (NHA) is designated for its wildlife value and receives statutory protection. These areas are considered nationally important for the habitats present or which holds species of plants and animals whose habitats needs protection. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation.

Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated. These sites are also of significance for wildlife and habitats. Prior to statutory designation, pNHAs are still subject to limited protection, in the form of:

- Agri-environmental farm planning schemes support the objective of maintaining and enhancing the conservation status of pNHAs;
- There is a requirement for the Forest Service to gain NPWS approval before they will pay afforestation grants on pNHA lands; and,
- A recognition of the ecological value of pNHAs by Planning and Licencing Authorities.

The NHAs and pNHAs located in the vicinity of the proposed development site are listed in **Table 2** and are shown in **Figure 5**.

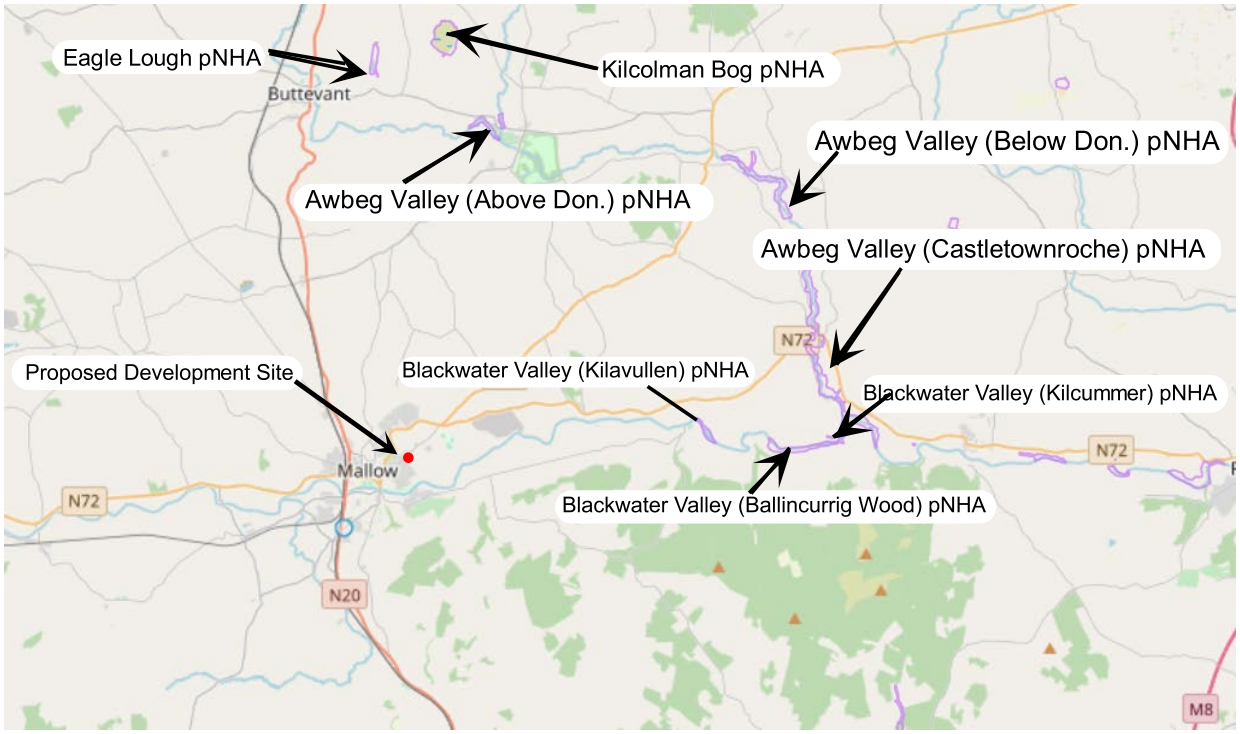

Figure 5. Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHAs) in the vicinity of the proposed development site | Source EPA envision mapping | Not to scale

Table 2. Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHAs) in the vicinity of the proposed development site

NHAs & NHAs/pNHAs	Site Code	Overlaps with European site		Distance at closest point and potential source-pathway-receptor link
Blackwater Valley Kilavullen pNHA	001080	Blackwater River (Cork/Waterford) SAC	This site is situated just downstream (east) of Killavullen Village within an area of limestone. Large prominent outcrops of limestone and caves can be seen along this section. Other habitats included within this site are broad leaved dry woodland and scrub.	8.2km E. Potential hydrological connection via the Caherduggan South Stream. However, no impact on terrestrial qualifying habitats and therefore no viable pathway.
Awbeg Valley (Above Doneraile) pNHA	000075	Blackwater River (Cork/Waterford) SAC	The site is of interest because the limestone substrate gives rise to plant communities that are unusual in the south-west. Along this section of the river, below Doneraile, dry broad- leaved woodlands dominate the valley sides, although there are a few patches of conifers. Within the Awbeg Valley as a whole, two local plants associated with the woods are Toothwort (*Lathraea sqaumaria*) and Ivy Broomrape (*Orobanche hederae*). At the edges of the valley thin soils over limestone support an interesting community, including herbs such as Marjorum (*Origanum vulgare*) and common Calamint (*Calamentha sylvatica subsp. ascendens*), along with several grasses (*Koeleria cristata, Trisetum flavescens* and *Aira caryophylea*). The recent NHA survey recorded abundant frogspawn within a marshy field.	9.0km N. Upstream of proposed development site. No viable pathway identified.
Blackwater Valley (Ballincurrig Wood) pNHA	001793	Blackwater River (Cork/Waterford) SAC	The Ballincurrig Wood site is recommended for inclusion in the Blackwater Valley NHA because the area supports the growth of a population of the very rare Starred Woodsedge.	10.1km E Potential hydrological connection via the Caherduggan South Stream. A viable source pathway connector link has been identified.
Eagle Lough pNHA	001049	No	Eagle Lough is a fluctuating lake with many of the features of a turiough. It lies in limestone country east of Butevant and is surrounded by farmland with one small wood.	11.2km N. No viable pathway

NHAs & NHAs/pNHAs	Site Code	Overlaps with European site		Distance at closest point and potential source-pathway-receptor link
Kilcolman Bog pNHA	000092	Kilcolman Bog SPA	Kilcolman Bog is situated on the southern foothills of the Ballyhoura Mountains in Co. Cork. It occupies a glacially eroded hollow in Carboniferous limestone. The site comprises a quaking fen fed by calcareous groundwater, with areas of reed swamp, freshwater marsh and wet grassland.	11.3km N. No viable pathway
Blackwater Valley (Kilcummer) pNHA	001794	Blackwater River (Cork/Waterford) SAC	Within the site there is wet woodland of Alder (*Alnus glutinosa)* and Willow (*Salix species*) This woodland is one of a series of woodlands along the banks of the Blackwater river. The valley sides support the growth of much woodland, but also of ecological interest are the marshes, the river itself and the associated limestone outcrops e.g. inland cliffs and craggs. The river-side trees are Alders (*Alnus glutinosa*) and Willow (*Salix species*) including the Almond Willow (*Salix triandra*). The shallower river water and adjacent marshland are vegetated with Common Bulrush (*Scirpus lacustris subsp. lacustris*), Bur-reeds (*Sparganium species*) and Pondweeds (*Potamogeton species*). The flowering rush (*Butomus umbellatus*) grows locally in the water and Creeping Yellow- Cress (*Ronippa sylvestris*) on the river banks	11.2km E. Potential hydrological connection via the Caherduggan South Stream. However, no impact on terrestrial qualifying habitats and therefore no viable pathway.
Awbeg Valley (Castletownroche) pNHA	001561	Blackwater River (Cork/Waterford) SAC	The site is of interest because the limestone substrate gives rise to plant communities that are unusual in the south-west.	11.8km E. Upstream of proposed development site. No viable pathway identified.
Awbeg Valley (Below Doneraile) pNHA	000074		The site is of interest because the limestone substrate gives rise to plant communities that are unusual in the south-west. Along this section of the river, below Doneraile, dry broad- leaved woodlands dominate the valley sides, although there	12.1km NE. Upstream of proposed development site. No viable pathway identified.

NHAs & NHAs/pNHAs	Site Code	Overlaps with European site		Distance at closest point and potential source-pathway-receptor link
			are a few patches of conifers. Within the Awbeg Valley as a whole, two local plants associated with the woods are Toothwort (*Lathraea sqaumaria*) and Ivy Broomrape (*Orobanche hederae).* At the edges of the valley thin soils over limestone support an interesting community, including herbs such as Marjorum (*Origanum vulgare*) and common Calamint (*Calamentha sylvatica subsp. ascenden*s), along with several grasses (*Koeleria cristata, Trisetum flavescens* and *Aira caryophylea*). The recent NHA survey recorded abundant frogspawn within a marshy field.	
Ballyhoura Mountains pNHA	002036		The Ballyhoura Mountains are important for conservation, particularly in relation to the extensive areas of relatively undisturbed heath and bog vegetation. Stream headwaters and rock outcrops add to the diversity of the site. The heathland and surrounding afforested slopes are important for Hen Harrier and Peregrine.	13.6km N No viable pathway

The proposed development is potentially hydrologically connected to a number of pNHAs as described in **Table 2** i.e. Blackwater Valley Kilavullen pNHA, Blackwater Valley (Ballincurrig Wood) pNHA and Blackwater Valley (Kilcummer) pNHA. However, as these sites are designated for their terrestrial habitats there is no potential for impacts as a result of the proposed development.

4.3 Salmonid Waters – River Blackwater

The River Blackwater main channel (of which the Caherduggan South Stream is a 1st order tributary) is a designated salmonid river in accordance with EU Directive 78/659 (SI No 293 of 1988) and as such receives protection under S.I. No. 293/1988: European Communities (Quality of Salmonid Waters) Regulations, 1988.

The River Blackwater supports resident Brown Trout (*Salmo trutta fario*), a population of Sea Trout (both *Salmo trutta*) in addition to a significant and biologically valuable population of Atlantic salmon (*Salmo salar*). Atlantic Salmon is listed under Annex II and V of the EU Habitats Directive.

4.4 Important Bird Areas – Nagle Mountains

Important Bird and Biodiversity Areas (IBAs) are sites selected as important for bird conservation because they regularly hold significant populations of one or more globally or regionally threatened, endemic or congregator bird species or highly representative bird assemblages. The European IBA programme aims to identify, monitor and protect key sites for birds all over the continent. It aims to ensure that the conservation value of IBAs in Europe (now numbering more than 5,000 sites or about 40% of all IBAs identified globally to date) is maintained, and where possible enhanced. The programme aims to guide the implementation of national conservation strategies, through the promotion and development of national protected-area programmes. Through their designation they aim to form a network of sites ensuring that migratory species find suitable breeding, stop-over and wintering places along their respective flyways.

The function of the Important Bird Area (IBA) Programme is to identify, protect and manage a network of sites that are important for the long-term viability of naturally occurring bird populations, across the geographical range of those bird species for which a site-based approach is appropriate. The proposed development site is located approximately 11.3km west of this IBA.

While the IBA criteria from 2005 list 9 pairs as present within the Nagle Mountains, in 2015 just 5 pairs were estimated to be breeding in this area (Ruddock *et al.* 2016). Hen Harrier are listed under Annex I of the E.U. Birds Directive. In Ireland, small birds and small mammals appear to be the most frequently taken prey.

The site qualifies for designation under the following IBA Criteria (2000):

- C6 - The site is one of the five most important in the European region in question for a species or subspecies considered threatened in the European Union.

Table 3. Provides a summary of the Nagle Mountains IBA trigger species.

Species	Current IUCN Red List Category	Season	Year(s) of estimate	Population estimate	IBA Criteria Triggered
Hen Harrier (*Circus cyaneus*)	LC	Breeding	2005	9 breeding pairs	C6

There is no suitable nesting habitat for Hen Harrier within the proposed development site. While Hen Harrier could potentially overfly the site during the winter months, when they tend to be more widely distributed, the proposed development site does not provide valuable foraging habitat for this species.

5. Flora

5.1 Habitats

5.1.1 Habitat Survey

A habitat survey was carried out on the 19th of September 2022, 15th of March 2023 and 10th of February 2024. Habitat mapping was carried out in line with the methodology outlined in the Heritage Council Publication, *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). The terrestrial and aquatic habitats within the proposed development site were classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex I Habitats where required.

A current overview of habitats recorded within the site is shown in **Figure 6** and the habitats recorded on site are described in **Table 4**. Site photographs are also included below**.** The ecological value of habitats has been defined using the classification scheme outlined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) which is included in **Appendix 1**. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. Habitats that are considered to be good examples of Annex I and Priority habitats are classed as being of International or National Importance. Semi-natural habitats with high biodiversity in a county context and that are vulnerable, are considered to be of County Importance. Habitats that are semi-natural, or locally important for wildlife, are considered to be of Local Importance (higher value) and sites containing small areas of semi-natural habitat or maintain connectivity between habitats are considered to be of Local Importance (lower value). No Annex I habitats were recorded within the proposed development site.

Table 4. Habitat present and their relative value

Habitat	Description	Ecological value (NRA 2009)
Hedgerow WL1/Scrub WS1	Generally poorly delineated mixture of hedgerow. Some old mature Hawthorn and Elder and Blackthorn. Ivy on older Hawthorn is dense. Understorey species include Cleavers, Nettle, Ivy, Bramble, Hogweed, Yorkshire fog, Lord and ladies, Curled dock, Lesser celandine, Bracken and, Spear thistle. An earth covers an older stone water which is no longer visible as	Local importance (lower value)

	it is covered by vegetation. In general, the trees within the hedgerow mature with large gaps between them.	
Improved agricultural grassland GA1/Dry meadows and grassy verges GS2	Improved agricultural grassland and dry meadow and grassy verge dominate the site. Species recorded in this habitat include Field thistle, Hogweed, Bracken, Creeping buttercup, Broadleaved dock, Cleavers, Cocksfoot, Knapweed, Field sorrel, Common Bent, Dandelion and Crested Dogs Tail. These species were recorded in areas of deeper soil where topsoil is still present Other areas where topsoil has been removed support a high component of common moss species with species such Ribwort plantain, Red fescue, St. John's wort and Self-heal as well as occasional Buddleia Noted. Scrub encroachment i.e. Bramble, Bracken and Blackthorn from the treelines, hedgerow and woodland habitats is evident on the boundaries and further encroach is likely to occur in the absence of active management. Dry meadows and grassy verges GS2 habitat corresponds to the Habitats Directive Annex I habitat: 'lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510). GS1 habitat has links with Annex I: Calcareous grasslands with either high numbers or diversity of orchids correspond to the priority habitat, 'semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometea) (*important orchid sites) (6210)'. However, the grassland mosaic within the proposed development area is not an example of this Annex I habitat type.	Local importance (lower value)
Spoil and bare ground ED2/Improved agricultural grassland GA1	An area on the southern field has been cleared of topsoil. Subsoil is gradually being recolonised by a mix of common species. . Species recorded include Creeping buttercup, Daisy, Field thistle, Dandelion and common grass species.	Local importance (lower value)
Spoil and bare ground ED2/Scrub WS1	Where topsoil has been stockpiled, recolonisation with scrub species has occurred. Species recorded include dense Bramble with some Hawthorn and Gorse. Winter Heliotrope was recorded on the periphery of this area.	Local importance (lower value)
Mixed broadleaved woodland WD1/Scrub WS1 **(Outside proposed development site boundary)**	This habitat mosaic forms a loose mix of woodland/scrub and is located on a steep bank between the grassland the Caherduggan South Stream/N72 route. Some areas within this habitat are dominated by Bracken and Bramble. Trees are patchily distributed and include large numbers of Sycamore, Hawthorn, semi-mature Ash, Elm and juvenile Blackthorn. Understorey species recorded include Ivy, Lords and ladies, Nettle, Wood rush. Honeysuckle. Ivy growth on trees is relatively dense. Soft shield fern and Hogweed were was noted in more shaded areas of habitat. Areas of scrub on the periphery support Bracken, Gorse and Bracken. The western boundary of this habitat is delineated by green palisade fencing and an area of scrub which separates the study area from the Caherduggan South Stream.	Local importance (higher value)

	It is noted that a review of historical maps found that this habitat was not present in the first edition maps (1829-1842) or on the 25" maps (1897-1913). However it noted that woodland was present to the northwest of the site along the Caherduggan Stream on the first edition maps (1829-1842). In general however the trees are relatively young with no significant mature or veteran trees noted in the woodland.	
Treeline WL2 **(Outside proposed development site boundary)**	A treeline runs along the eastern boundary of the site. The stumps of a small number of very old ash trees remain in situ with some juvenile growth evident. Other species included Willow, Wild rose, Elder, Blackthorn, Hazel and Holly. Understory species recorded include Lord and ladies, Field parsley, Hogweed, Cleavers, Ivy and Nettle. Scrub encroachment is evident due to lack of active management. It is noted that a review of historical maps found that this field boundary was mapped on the 1st edition mapping (1829-1842). This is a high value habitat at a local level with a broad mixture of species.	Local importance (higher value)

Figure 6. Habitats recorded within proposed development site

Plate 1. Hedgerow adjacent to palisade fencing along northern boundary

Plate 2. Hedgerow habitat along northern boundary

Plate 3. Internal hedgerow/scrub habitat

Plate 4. Scrub encroachment along western boundary

Plate 5. Woodland/scrub within land ownership area

Plate 5. Area of bracken/gorse within woodland/scrub habitat

Plate 6. Areas of scrub within woodland/scrub habitat

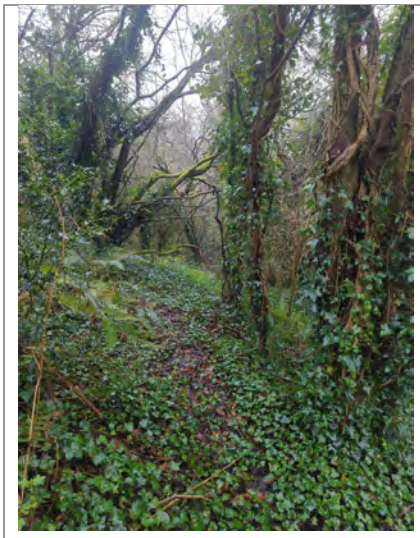

Plate 7. Woodland area with dense ivy

Plate 8. Large field with treeline boundary on margin

Plate 9. Fields with scrub encroachment on margins

Plate 10. More diverse grassland on deeper soils

Plate 11. Moss species dominant on shallower soils

Plate 12. Treeline habitat

Plate 13. Mature tree within treeline

Plate 14. Treeline habitat with scrub on margins

Plate 15. Area of site cleared/bare soil

Plate 16. Scrub recolonisation on mounded topsoil

Plate 17. Caherduggan South Stream located to west of study site boundary

5.1.2 Hedgerow Appraisal

An evaluation of the hedgerows and treelines within the site was also carried out using the Heritage Council's *Hedgerow Appraisal System Best Practice Guidance on Hedgerow Surveying, Data Collation and Appraisal* (Foulkes *et al*. 2013). Results of the hedgerow assessment are included in **Table 5.**

Table 5. Hedgerow appraisal.

Location	Historical Significance	Species Diversity	Ground Flora	Structure	Habitat Connectivity	Landscape Significance	Other	Total
Eastern Boundary Treeline (outside proposed developments tie boundary)	4	2	2	2	1	2	0	13
Western Boundary	1	0	2	0	1	1	0	5
Internal hedgerow	1	0	2	0	1	1	0	5
KEY: 0-Low Significance, 1-Slightly Significant, 2-Moderately Significant, 3-Significant, 4-Highly Significant								

The eastern treeline runs along the boundary of the proposed development site and is outside the proposed development site boundary. However the scrub habitat which located along the treeline partly falls within the proposed development site. This treeline has a good dense structure and is included on the 1st edition historical mapping. Within the tree layer, Hawthorn, Hazel, Ash, Willow, Crab apple, Wild Rose, Sycamore and Holly were recorded. Understorey specie include Ivy, Cleavers, Lords and Ladies, Wintergreen, Nettle, Soft Shield Fern, Hogweed, Field Thistle, Herb Robert, Cow parsley. This treeline is located on a 4 foot earth bank.

The northern and internal hedgerows do not form coherent linear structures. Tree species included Willow and Blackthorn. However, the hedgerow is dominated by low growing/scrub species including Bramble, Bracken, Cow parsley, Ivy, Nettle, Cleavers, Bindweed and common grass species. This feature is relatively recent in origin and has No historical significance connecting the woodland.

5.2 Rare Flora

The site of the proposed development lies within Ordnance Survey (OS) National Grid 10km square W59 (hectad). The National Biodiversity Data Centre (NBDC) online database provides data on the distribution of mammals, birds, and invertebrates within the 10 km grid squares.

A review of the NBDC database for flowering plants recorded within W59 was carried out on the 15/12/23. No flowering plants recorded within the hectad are designated as threatened, endangered or extinct and none are protected by the Flora Protection Order 2022 (S.I. 235 of 2022). The National Parks and Wildlife Service (NPWS) rare plant database shows no records of protected bryophyte species within grid square W59. It is noted however that there is the potential for less common species to occur within the woodland to the north of the proposed development.

5.3 Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality. The NBDC lists a number of both aquatic and terrestrial high impact invasive species which have been recorded within grid square W59 (**Table 6**).

Table 6. High impact invasive species recorded in W59

Group	Species
bird	Ruddy Duck (*Oxyura jamaicensis*)
flowering plant	Canadian Waterweed (*Elodea canadensis*)
flowering plant	Cherry Laurel (*Prunus laurocerasus*)
flowering plant	Indian Balsam (*Impatiens glandulifera*)
flowering plant	Japanese Knotweed (*Fallopia japonica*)
terrestrial mammal	American Mink (*Mustela vison*)
terrestrial mammal	Brown Rat (*Rattus norvegicus*)
terrestrial mammal	Fallow Deer (*Dama dama*)
terrestrial mammal	Sika Deer (*Cervus nippon*)

Source NBDC 10/05/24

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 make it an offence to plant, disperse, allow dispersal or cause the spread of certain species e.g. Japanese knotweed and Rhododendron, keep the plant in possession for purpose of sale, breeding, reproduction, propagation, distribution, introduction or release, keep anything from which the plant can be reproduced or propagated from the species, without a granted licence and keep any vector material for the purposes of breeding, distribution, introduction or release. Regulation 49 deals with the 'Prohibition on introduction and dispersal' while Regulation 50 deals with the 'Prohibition on dealing with and keeping certain species'. Regulation 50 has yet to be brought into Irish law. Regulation 74 is a transitional provision in relation to Regulation 49 and 50.

The control of invasive species in Ireland comes under the Wildlife (Amendment) Act 2000, where it states that

'Any person who— [...] plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora, ['refers only to exotic species thereof']][...] otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence.'

The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibits the introduction and dispersal of species listed in the Third Schedule, which includes Japanese Knotweed and Himalayan Balsam *Impatiens glandulifera*, as follows: "any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [….] shall be guilty of an offence."

No third schedule species were recorded within the proposed development site. The medium impact listed species (as classified by the NBDC) Buddleia (*Buddleja davidii*) and the low impact species Winter Heliotrope (*Arctostaphylos Luciana*) were recorded within the proposed development site. These species are not included in the Third Schedule of the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011). Therefore, their presence at the site does not have the potential to lead to an offence under the Birds and Natural Habitats Regulations 2011 (S.I. 477 of 2011).

6. Fauna

6.1 Otter

A review of existing NBDC records within a 10km radius of the study site (Grid Square W59) showed that Otter or signs of Otter have been recorded on 20 occasions, most recently in September 2015 (Source NBDC 15/03/23).

Otter is a qualifying interest for the Blackwater River (Cork/Waterford)) SAC which is one of the most important sites in Ireland for this species. The most recent national Otter Survey recorded Otter in 98.8% of the site assessed within the Blackwater catchment (Reid et al. 2013).

Otters are also known to frequent sections of the River Blackwater within Mallow town (Carl Dixon Personal observation). While there are no records of Otter on the Caherduggan South Stream, given its connection to the River Blackwater, Otter are likely to use this watercourse.

There are no wetland habitats within the proposed development site and therefore no foraging opportunities for Otter within the site. The Caherduggan South Stream (aka Spa Glen Stream), a 1st order tributary of the River Blackwater is located approximately 50m west of the proposed development site boundary. This is separated from the stream by an escarpment of woodland and scrub on a steep incline sloping towards the stream. As noted above, Otters commonly occur along the River Blackwater and are listed as a QI for the Blackwater River (Cork/Waterford) SAC. While Otter could potentially forage along the Caherduggan South Stream, no signs of Otter were recorded within 150m of the proposed development site.

6.2 Bats

6.2.1 Bat Background Data

In Ireland, nine species of bat are currently known to be resident. These are classified into two Families: the *Rhinolophidae* (Horseshoe bats) and the *Vespertilionidae* (Common bats). The

Lesser Horseshoe Bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: Common *Pipistrellus pipistrellus*, Soprano *Pipistrellus pygmaeus* and Nathusius' *Pipistrellus nathusii*, four *Myotids*: Natterer's *Myotis nattereri*, Daubenton's *Myotis daubentonii*, Whiskered *Myotis mystacinus*, Brandt's *Myotis brandtii*, the Brown Long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

Whiskered and Natterer's bats are listed as '*Threatened in Ireland*', while the other species are listed as 'Internationally Important' in the Irish Red Data Book 2: Vertebrates (Whilde, 1993). The population status of both Whiskered and Natterer's bats was considered '*indeterminate*' because of the small numbers known of each, a few hundred and approximately a thousand respectively. Ireland is considered to be an international stronghold for Leisler's bat, whose global status is described as being at '*low risk, near threatened*' (LR; nt) by the IUCN (Hutson *et al*., 2001).

Near threatened status is applied to those taxa that are close to being listed as vulnerable (facing a high risk of extinction in the wild in the medium-term future on the basis of a range of criteria defined by the IUCN). The Irish population of the Lesser Horseshoe Bat is estimated at 14,000 individuals and is considered of International Importance because it has declined dramatically and become extinct in many other parts of Europe. Data collected shows that the species increased significantly between from the early 1990's to present.

A review of existing bat records within W59 shows that five Irish bat species recorded within this hectad (**Table 7**).

Table 7. Presence of Irish bat species within grid squares W59.

Common name	Scientific name	Present/Absent
Lesser Noctule	*Nyctalus leisleri*	Present
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Present
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Present
Daubenton's Bat	*Myotis daubentonii*	Present
Natterer's Bat	*Myotis nattereri*	Absent
Brown Long-eared Bat	*Plecotus auritus*	Present
Whiskered Bat	*Myotis mystacinus*	Absent
Lesser Horseshoe	*Rhinolophus hipposideros*	Absent
Nathusius's Pipistrelle	*Pipistrellus nathusii*	Absent

NBDC 12/12/23

It is noted that other species which have not been included within this database are also likely to occur. Lesser Horseshoe Bat is the only species of bat listed on Annex II of the Habitats Directive (Directive 92/43/EEC). The closest recorded records for Lesser horseshoe bat is approximately 18km west of the proposed development site (NBDC records). While the remaining Irish bat species; Nathusius' pipistrelle, Natterer's Bat and Brandt's bats have not

been recorded in the local area to date, Natterer's Bat could potentially occur. Nathusius' pipistrelle and Brandt's bat, are rarer Irish species, which are less likely to occur.

A study by Lundy *et al*. (2011) examined the relative importance of landscape and habitat associations across Ireland. Maximum Entropy Models (MEM) were constructed for each bat species using records from the National Bat Database from 2000-2009. This method allows species' records that have not been collected in a systematic survey to be analysed. The results help explain patterns of species' occurrence and predict where species might occur. Landcover (CORINE), topography, climate, soil pH, riparian habitat and human bias factors were incorporated into the models. The analyses provide a picture of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species. This also provides a 'habitat suitability' index. The index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats.

The habitat indices for all Irish bats for the landscape at Mallow is shown in **Table 8**.

Table 8. Model Predicted Habitat suitability indices for All Irish bat species

Bat species	Common Name	Habitat indices
All Bats		34.89
Pipistrellus pygmaeus	Soprano pipistrelle	49
Plecotus auritus	Brown long-eared bat	51
Pipistrellus pipistrellus	Common pipistrelle	50
Rhinolophus hipposideros	Lesser horseshoe	0
Nyctalus leisleri	Leisler's bat	48
Myotis mystacinus	Whiskered bat	39
Myotis daubentonii	Daubenton's bat	35
Pipistrellus nathusii	Nathusius' pipistrelle	4
Myotis nattereri	Natterer's bat	38

Source: NBDC 12/12/23

6.2.2 Bat Activity Survey

There are no mature trees located within the proposed development site boundary. The preliminary roost assessment found that trees at the site are largely of negligible to low potential for roosting bats. as they lack the significant roost features such holes, cracks, crevices, dethatched bark and detached Ivy, which could provide roosting opportunities. No signs of bats were recorded within the trees such as rub marks, staining or droppings.

It is noted that there are a number of semi-mature trees on the eastern treeline. However, this is located outside the proposed development site boundary and will not be directly impacted by the proposed development. Although foraging activity was observed in the vicinity of woodland and treelines, no activity indicative of emergence or direct emergence of bats was

recorded. However, bats can use trees as temporary roosts and therefore the presence of occasional bats cannot be altogether excluded.

There are a number of linear features and areas of semi-natural habitat within or adjacent to the proposed development site including woodland, treelines and hedgerow. Bat activity surveys focused in particular on the area of treeline along the eastern boundary and the boundary between the woodland area to the west which were considered the habitats with the highest potential for roosting and foraging bats. Although this woodland habitat is somewhat isolated in the context of the wider landscape, it is of local value as a block of semi-natural habitat which is dark and undisturbed.

Four bat species were recorded during site surveys i.e., Common and Soprano Pipistrelle Leisler's and Brown Long-eared. Common and Soprano pipistrelle activity were recorded along the treeline running along the eastern boundary of the site and data were indicative of 1-2 individuals of each species foraging along this linear habitat. Common pipistrelle (1 individual) was recorded foraging along the boundary of the woodland area to the east. One Brown Long-eared bat was also recorded briefly foraging on the boundary of the woodland area along the western boundary of the proposed development site. No foraging was recorded on the internal hedgerow/scrub habitats. Occasional, sporadic foraging was recorded along the northern hedgerow.

Leisler's Bat were recorded during the survey close to the existing entrance along the southern boundary and at the treeline along the eastern boundary.

In general, the area with the highest level of activity was along the treeline along the eastern boundary and the woodland along the western boundary which provide local foraging resources for four bat species, namely Brown Long-eared, Common and Soprano Pipistrelle and Leisler's Bat. It is noted that the woodland area to the east of the proposed development site could be used by additional species, however this area it outside the proposed development site boundary. Overall, the habitats within the proposed development site are of local importance, lower value, for foraging and commuting bat species.

6.4 Other Mammals

Sixteen other species of terrestrial mammal have been recorded within grid square W59 of the proposed development site, eight of which are protected under the Irish Wildlife Act (as amended); namely Badger Meles meles, Pygmy Shrew Sorex minutus, Red Squirrel Sciurus vulgaris, Hedgehog Erinaceus europaeus, Fallow Deer Dama dama and Irish Hare Lepus *timidus subsp. Hibernicus*, Sika Deer *Cervus nippon* and Hedgehog *Erinaceus europaeus*.

6.4.1 Badger

Badger and their setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. This species has been recorded 74 times in W59, with the most recent record in March 2017. Badgers are known to occur within the wider landscape (NBDC), however no signs of Badger, were recorded within the proposed development site.

6.4.2 Pygmy Shrew

Pygmy Shrew is common throughout mainland Ireland and prefers habitats such as hedgerows and grasslands; they have also been found utilizing stone walls. There are three records of Pygmy Shrew in W59, the most recent from July 2018. Due to the mix of habitats and recolonising areas present within the proposed site, providing cover for small mammal species, Pygmy Shrew could potentially be present.

6.4.3 Red Squirrel

Red Squirrel is listed on Appendix III of the Berne Convention can be found throughout Ireland. There are nine records of Red Squirrel in the 10km grid square W59, the most recent from April 2018. Red Squirrel have been recorded within to the northwest of Mallow Town on both scattered trees and parkland and on peanut feeders as recently as 2013 (NBDC). The woodland habitats west of the site could potentially provide habitat for Red Squirrel. However, there is no valuable habitat for this species within the proposed development site boundary.

6.4.4 Pine Marten

Pine Marten is protected in Ireland by both national and international legislation. Under the Irish Wildlife Acts it is an offence, except under licence, to capture or kill a Pine Marten, or to destroy or disturb its resting places. The European Union's Habitats & Species Directive further obliges Ireland to maintain the favourable conservation status of the Pine Marten throughout its range. There are three records of Pine Marten in W59 (NBDC), the most recent from August 2013. Pine Marten is found mainly in deciduous and coniferous woodland, but has also adapted to scrubland. Woodland habitats adjacent to the proposed development site could potentially provide habitat for Pine Marten. However, there are no valuable habitats for this species within the proposed development site boundary.

6.4.5 Hedgehog

Hedgehog is protected under the Wildlife Act and is also listed on Appendix III of the Berne Convention. Hedgehogs can be found throughout Ireland, with male Hedgehogs having an annual range of around 56 hectares. This species has been recorded eight times on W59, the most recent record in May 2021. Due to the mix of habitats and recolonising areas present within the proposed site, providing cover for small mammal species, Hedgehog could potentially be present.

6.4.6 Irish Hare

Irish Hare is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book.

The Irish hare is adaptable and lives in a wide variety of habitats. It typically reaches its highest densities on farmland, particularly where there is a mix of grassland and arable fields along with hedgerows and other cover. According to the NBDC, hares have been recorded in W59 on three occasions, the most recent record in September 2017. Semi-natural grassland habitats onsite could potentially provide habitat for Irish Hare, although this area is unlikely to provide critical foraging habitat for this species.

6.4.7 Fallow Deer

Fallow deer are Ireland's second largest deer species and are the most widespread of the deer, found in nearly every county of the island. In Ireland the fallow deer mainly resides in mature deciduous or mixed woodlands which are close to open grassland. The pattern of habitat use can vary throughout the year depending on the season or the particular area in which the deer are located providing different foraging opportunities.

Fallow deer are classified as grazers or non-selective bulk feeders, although they will browse on trees and shrubs. The species has become almost nocturnal in their grazing habits in areas of high disturbance. The woodland habitats west of the site could potentially provide habitat for deer. However, there is no valuable habitat for this species within the proposed development site boundary.

6.4.8 Sika Deer

This species prefer forest with dense understorey, thickets, natural woodlands and commercial plantations, but will also forage in open grassy areas with dense cover nearby. Sika Deer are highly opportunistic feeders, foraging on grasses to a range of shrubs and tree species. They have very large daily ranges, moving up to 2.5km per day and are classified as intermediate grazer-browsers due to their highly opportunistic feeding patterns. The woodland habitats west of the site could potentially provide habitat for deer. However, there is no valuable habitat for this species within the proposed development site boundary.

6.5 Reptiles and Amphibians

According to records held by the NBDC, Common Frog (*Rana temporaria*) is the only amphibian species recorded within grid square W59 (Source: NBDC 15/03/23). Common Frog is listed in Annex V of the EU Habitats Directive and is protected under the Wildlife Acts. There are no wetland habitats or waterbodies within the proposed development site which could support these species. No signs of amphibians were recorded and given the habitats present onsite, they are unlikely to occur.

Common Lizard (*Zootoca vivipara*) is Ireland's only native terrestrial reptile and is so protected under the Wildlife Act. Ideal habitats for the species are south-facing, damp tussocky grassland, scrub covered hillsides, dunes or banks, and woodland tracks, and it also resides in peat bogs, dry grasslands and heathlands. There are no records of reptiles in hectad W59 and there are no valuable habitats for this species within the proposed development site.

6.6 Birds

The NBDC lists the following Annex I bird species for hectad W56, Kingfisher (*Alcedo atthis*), Golden Plover (*Pluvialis apricaria),* Hen Harrier (*Circus cyaneus*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*) and Peregrine Falcon (*Falco peregrinus*). Grassland habitats can provide foraging areas or high tide roosts for wading birds such as Golden Plover. However, given the large areas of similar grassland habitat in the vicinity, the grasslands at the proposed development site would not provide critical habitat for wading birds. Overall, the proposed development site does not contain valuable habitats for Annex I bird species.

Bird surveys for general bird usage were carried out in conjunction with habitat surveys within the entire development footprint on the 19th September 2022 and 15th March 2023.

Bird species listed in Annex I of the Birds Directive are considered a conservation priority. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation (Gilbert *et al.* 2021). Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. Bird species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority. Species recorded within the proposed development footprint which were recorded during habitat surveys are shown in **Table 9**.

Table 9. Bird Species recorded during site surveys

Species		Birds Directive Annex	BOCCI*	
		I	Red List	Amber List
Blackbird	*Turdus merula*			
Blue Tit	*Cyanistes caeruleus*			
Chaffinch	*Fringilla coelebs*			
Dunnock	*Prunella modularis*			
Song Thrush	*Tardus philomelos*			
Robin	*Erithacus rubecula*			
Rook	*Corvus frugilegus*			
Woodpigeon	*Columba palumbus*			
Wren	*Troglodytes troglodytes*			
Goldfinch	*Carduelis carduelis*			
Jackdaw	*Corvus monedula*			
Starling	*Sturnus vulgaris*			
Great tit	*Parus major*			

* Gilbert G, Stanbury A and Lewis L (2021), “Birds of Conservation Concern in Ireland 2020 –2026”. Irish Birds 43: 1-22

No Annex I species or birds of conservation concern in Ireland (BOCCI) species were recorded at the site. Some common bird species were recorded during the site visit, but no uncommon or specialised bird species were recorded or would be expected to occur as the habitats on site are common. The mixture of grassland, treeline, woodland and scrub habitats onsite provide a range of nesting and foraging opportunities for common bird species such as Blackbird *Turdus merula*, Blue Tit *Cyanistes caeruleus*, Dunnock *Prunella modularis* and Song Thrush *Turdus philomelos* Early successional species within transitional habitats provide foraging opportunities for species such as Chaffinch *Fringilla coelebs* and Goldfinch *Carduelis*

carduelis. Native, fruit bearing trees such as Hawthorn, Holly and Blackthorn provide local foraging opportunities throughout the winter and summer seasons.

The Caherduggan South Stream could potentially supports some more specialist species including Kingfisher *Alcedo atthis*, Grey Heron *Ardea cinerea*, Mallard *Anas platyrhynchos* and Grey Wagtail *Motacilla cinerea* and is considered an important local resource for birds. However, there are no aquatic habitats onsite which could support specialised bird species. Overall, the proposed development site supports some bird species which are relatively common and widespread within the county.

6.7 Other species

A search of the NBDC database was carried out to determine if any protected, rare or notable species of invertebrates within 2km of the proposed development site. The proposed development site is located in W59U.

One threatened invertebrate species Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidaries)*has been recorded within W59U. Semi-natural grasslands at the site have some local value for invertebrate species. Whilst no site is without invertebrate interest, it is considered unlikely that the proposed development site would support protected invertebrate species given the limited species diversity at the site.

There are no watercourses within or on the boundary of the proposed development site and therefore the site does not support fish or other aquatic species. However the Caherduggan South Stream is of sufficient size to support Brown Trout and European Eel. Potential indirect impacts on aquatic species are discussed in **Section 10** below.

7. Water Quality

7.1 River Basin Management Plan for Ireland 2022-2027 (3rd Cycle)

The Water Framework Directive (WFD) sets out the environmental objectives which are required to be met through the process of river basin planning and implementation of those plans. Specific objectives are set out for surface water, groundwater and protected areas. The challenges that must be overcome in order to achieve those objectives are very significant. Therefore, a key purpose of the River Basin Management Plan (RBMP) is to set out priorities and ensure that implementation is guided by these priorities.

The EPA has published an updated draft Catchment Assessment for each of our 46 catchments. These assessments provide an overview of the situation in the catchment, draw comparison between Cycle 2 and Cycle 3, and will help support the draft River Basin Management Plan 2022-2027 public consultation process. The third cycle RBMP, which was published in July 2022, aims to build on the progress made during the second cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). The former measure has resulted in significant progress in terms both of compliance levels and of the impact of urban wastewater on water quality. The latter provides a considerable environmental baseline which all Irish farmers must achieve and has resulted in improving trends in the level of nitrates and phosphates in rivers and groundwater. It is acknowledged, however, that sufficient progress

has not been made in developing and implementing supporting measures during the first and second cycles.

Overall, RBMP assesses the quality of water in Ireland and presents detailed scientific characterisation of our water bodies. The characterisation process also takes into account wider water quality considerations, such as the special water-quality requirements of protected areas. The characterisation process identifies those water bodies that are *At Risk* of not meeting the objectives of the WFD, and the process also identifies the significant pressures causing this risk. Based on an assessment of risk and pressures, a programme of measures has been developed to address the identified pressures and work towards achieving the required objectives for water quality and protected areas. Data relating to the watercourses within the study area is provided in **Table 10** and the location of these shown in **Figure 7**.

Table 10. WFD Status 3rd Cycle

Catchment: Blackwater Munster (Code 18) – 2nd Cycle			
This catchment includes the area drained by the River Blackwater and all streams entering tidal water between East Point and Knockaverry, Youghal, Co. Cork, draining a total area of 3,310km². The largest urban centre in the catchment is Mallow. The other main urban centres in this catchment are Fermoy, Mitchelstown, Youghal, Kanturk and Millstreet. The total population of the catchment is approximately 109,030 with a population density of 33 people per km². Several small coastal rivers drain the area to the southeast of Cork Harbour and the area at the eastern extreme of the catchment is drained by the Womanagh River which flows into the sea on the western side of Youghal Bay. The proposed development site lies in the Blackwater [Munster]_SC_090 sub catchment. This sub catchment comprises a portion of the Blackwater main channel (Blackwater (Munster)_100 to Blackwater (Munster)_160). The issues on the main channel range from the decline of a High status objective water body (Blackwater (Munster)_110) to Good, which was driven by hydro morphology pressures, to a combination of point (Section 4 and IPC) and urban diffuse sources on Blackwater (Munster)_130. On Blackwater (Munster)_160 fish is the only metric failing to reach Good status and the IFI will advise what the significant pressure is. Tributaries to the Blackwater (Munster)_110, Ballyclogh Stream_010 and Ballyclogh Stream_020 have consistently Poor and Moderate ecological status, respectively. On Ballyclogh Stream_010 the significant pressure is hydromorphology.			
Waterbodies relevant to the proposed project			
Waterbody	**WFD Risk**	**WFD Status 2016-2021**	**Significant pressures**
Blackwater (Munster)_140	Not at risk	Na	Na
Blackwater (Munster)_160	At risk	Moderate	Na

Source: EPA envision mapping and www.catchments.ie

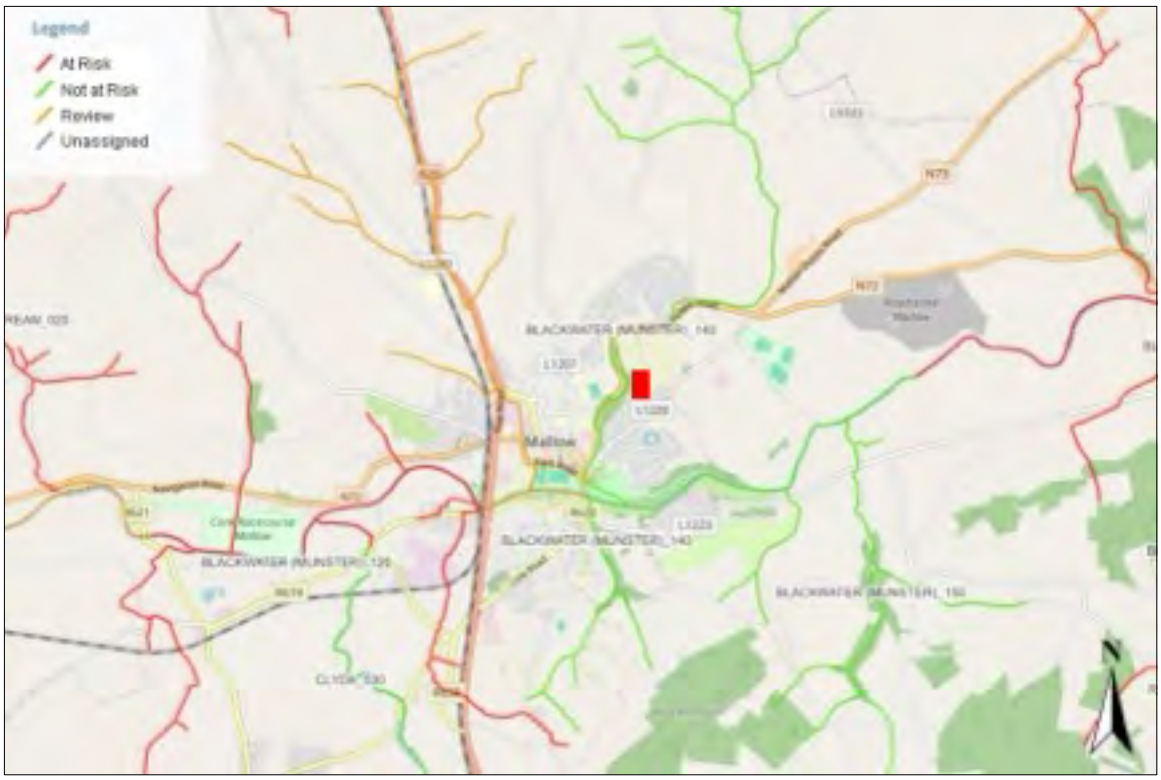

Figure 7. WFD 3rd cycle waterbodies in the vicinity of the proposed development | Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | not to scale

7.3 Urban Wastewater Treatment Directive

The Waste Water Discharge (Authorisation) Regulations 2007 (S.I. 684 of 2007) gives effect to the requirements of the Urban Waste Water Treatment Directive (Directive 91/271/EEC) and the Water Framework Directive (2000/60/EC) in Ireland. The Urban Waste Water Treatment Directive (UWWTD) lays down the requirements for the collection, treatment and discharge of urban waste-water and specifies the quality standards which must be met — based on agglomeration size — before treated waste-water is released into the environment.

The priority objective for this river basin planning cycle is to secure compliance with the Urban Waste Water Treatment Directive and to contribute to the improvement and protection of waters in keeping with the water-quality objectives established by this Plan. Achieving this objective entails addressing waste-water discharges and overflows where protected areas (i.e. designated bathing waters and shellfish waters) or high-status waters are at risk from urban waste-water pressures.

As part of the proposed development wastewater discharging from the proposed development will be conveyed to the Mallow Wastewater Treatment Plant (WWTP) (D0052-01) for treatment prior to discharging into the River Blackwater.

8. Evaluation of Potential Impacts

During construction and operation, potential impacts could arise from increased noise and disturbance and habitat loss which could result in the disturbance/displacement of birds and mammals. Increased traffic and noise associated with the site works could potentially increase

levels of disturbance which could result in the disturbance/displacement of birds and mammals. Increased dust levels during construction could have localised impacts on vegetation and habitats.

Discharges of silt, were they to occur through inadequate control of surface water run-off, could impact on fisheries habitat and aquatic ecology in local waterbodies. Minor spills of hydrocarbons during construction could impact on groundwater or surface water quality with resultant impacts on aquatic ecology. Wastewater discharges during operation may also impact on local water quality.

Potential impacts on designated European sites (SAC/cSAC/SPA) are specifically addressed in an Appropriate Assessment Screening Report and Natura Impact Statement (NIS) Report which have been submitted as part of this application.

8.1 Do Nothing' Impact

Most of the habitats to be affected have been significantly modified from their natural state by human activity. In pockets of semi-natural habitats within the site boundary, the general pattern of succession from grassland to scrub to woodland, particularly from boundary habitats, would be expected to continue. In the absence of development, it is expected that the lands within the planning boundary would largely remain under the same management regimes and continue to support a range of common fauna. No significant changes to the habitats within the boundary are likely to occur, in the "do nothing" scenario.

8.2 Impact Appraisal

When describing changes/activities and impacts on ecosystem structure and function, important elements to consider include positive/negative, extent magnitude, duration, frequency and timing, and reversibility (IEEM, 2018).

Section 3.7 of the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'*, (EPA 2022) provides standard definitions which have been used to classify the effects in respect of ecology. This classification scheme is outlined below in **Table 11**.

Table 11. EPA Impact Classification

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment.
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment.
Significance	Imperceptible	An effect capable of measurement but without significant consequences.
	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging trends.
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

Impact Characteristic	Term	Description
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound	An effect which obliterates sensitive characteristics.
Duration and Frequency	Momentary Effects	Effects lasting from seconds to minutes.
	Brief Effects	Effects lasting less than a day.
	Temporary Effects	Effects lasting less than a year.
	Short-term	Effects lasting one to seven years.
	Medium-term	Effects lasting seven to fifteen years.
	Long-term	Effects lasting fifteen to sixty years.
	Permanent	Effects lasting over sixty years.
	Reversible Effects	Effects that can be undone.
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost.
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents.
	'Worst Case'	The effects arising from a development in the case where mitigation measures substantially fail.

9. Potential Impacts

9.1 Designated sites

DixonBrosnan prepared a screening for Appropriate Assessment (AA) and Natura Impact Statement (NIS) report (which accompanies this planning application). This report investigated the potential for the proposed development to have significant effects on European sites (SAC/cSAC/SPA) either alone or in combination with other plans or projects. The screening report identified the potential for significant effects on Blackwater River (Cork/Waterford) SAC arising from the proposed development in the absence of mitigation via impacts on water quality during construction and operation and loss of *ex-situ* habitats for qualifying species.

The proposed development is potentially hydrologically connected to a number of pNHAs i.e. Blackwater Valley Kilavullen pNHA, Blackwater Valley (Ballincurrig Wood) pNHA and Blackwater Valley (Kilcummer) pNHA. However, as these sites are designated for their terrestrial habitats there is no potential for impacts as a result of the proposed development.

9.2 Habitats

Direct impacts on habitats as a result of construction works are described in **Table 12**. It should be noted that the value of a habitat is site specific and will be partially related to the amount of that habitat in the surrounding landscape. The classification scheme below for the value of habitats and the impacts on them, is detailed in the NRA publication *Guidelines for assessment of ecological impacts of National Road Schemes* (See **Appendix 1**). No rare or protected floral species were recorded within the proposed development site and no impact of rare of protected flora has been identified.

Impacts on terrestrial habitats are generally restricted to direct removal of habitats. Indirect impacts may occur via damage and disturbance arising from vehicular activities and storage of overburden and materials. Levels of dust during construction are predicted to be low and effectively managed by mitigation. The impact on vegetation in adjoining habitats from wind-blown dust is predicted to be imperceptible.

No Annex I terrestrial habitats or other high value terrestrial habitats will be directly or indirectly impacted. It is noted that impacts on qualifying species and habitats for the Blackwater River SAC are specifically addressed by the AA screening and NIS which have been submitted with this application.

Table 12. Predicted impacts as a result of the proposed development

Habitat	Ecological value (NRA 2009)	Potential impacts
Hedgerow WL1/Scrub WS1	Local importance (lower value)	Internal hedgerow and scrub habitat will be removed. The northern hedgerow will be retained. Negative, slight, long-term
Improved agricultural grassland GA1/Dry meadows and grassy verges GS2	Local importance (lower value)	This habitat will be largely removed from the proposed development site. Negative, slight, long-term
Spoil and bare ground ED2/Improved agricultural grassland GA1	Local importance (lower value)	This habitat will be largely removed from the proposed development site. Negative, imperceptible, long-term
Spoil and bare ground ED2/Scrub WS1	Local importance (lower value)	This habitat will be largely removed from the proposed development site. Negative, imperceptible, long-term
Mixed broadleaved woodland WD1/Scrub WS1	Local importance (higher value)	Located outside the works area. There will be no direct impact on this habitat. Habitat protection measures will ensure there is no damage to trees within this area.
Treeline WL2	Local importance (higher value)	Located outside the works area. There will be no direct impact on this habitat. Habitat protection measures will ensure there is no damage to trees within this area.

9.3 Invasive Species

No third schedule invasive species or species which are at risk of having damaging effects were recorded within the proposed development site.

Two other invasive species i.e. Buddleia and Winter Heliotrope were recorded at the proposed development site. Buddleia is classified as an Amber Threat species by Invasive Species Ireland and a medium impact species by the NDBC. Winter Heliotrope is classified as a low-risk invasive species by the NBDC. Both species are included in the NRA Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads (NRA, 2010) as they have been shown to have an adverse impact on landscape quality, native biodiversity or infrastructure; and are likely to be encountered during road schemes.

In the absence of mitigation, construction works i.e., machinery and personnel, could potentially disturb these invasive species and spread these species to other habitats within and outside the proposed development site.

9.4 Bats

There are no buildings located within the proposed development site boundary. No trees with the potential to support bat roosts were recorded within the site boundary.

Habitat fragmentation due to the loss of the foraging and commuting habitat has the potential to continue to impact local bat populations during the operational phase of the proposed development. Treelines, hedgerow, woodland and other linear habitat features can provide high value habitat for bats linking roost sites outside the site to foraging areas and facilitating the dispersal of bats into the wider landscape. Treelines, woodland etc are also an important landscape features for commuting bats, as bats prefer to travel in the shelter of such features to reduce predation. Loss of such habitats affects the ability of bats to travel safely from roosting sites to foraging areas. A gap of as little as 10m may force some species to seek an alternative commuting route and even change roosting sites.

With the exception of a small internal hedgerow, boundary treelines, woodland and hedgerows will be retained around the site. There will be no direct loss of potential foraging habitat for bats. The internal hedgerow is low growing and does not form a coherent linear structure. No bats were recorded foraging within the internal habitats. While Common and Soprano Pipistrelle forage in a range of habitats and are commonly recorded, Brown Long-eared Bat displays a preference for deciduous woodland and therefore, foraging habitats in the vicinity of the site are more limited. The landscape plan for the proposed development includes linear native planting along the boundary with the woodland to the west of the site, which create additional foraging/commuting habitat for bats as well as providing a buffer from the new housing.

While there will be no direct loss of foraging habitat for bats increased lighting could potentially impact light sensitive species such as Brown-long Eared Bat. Lighting deters some bat species such as Myotis species and Brown Long-eared Bat, from foraging (Azam et al. 2018). Studies have shown that illumination levels as low as 0.06 lux can influence the behaviour of bats. Even a full moon night (0.02 lux) can reduce bat activity within more sheltered, darker wildlife corridors and foraging areas (e.g., woodlands). It is noted that Pipistrelle species appear to be more tolerant of light and disturbance (Speakman 1991; Stones et al. 2009; Haffner 1986). Leisler's Bats will also opportunistically feed on such insect gatherings in lit areas (Bat Conservation Ireland 2010). However, it is noted that more recently research suggests that even in light opportunistic foraging species, foraging activity may be impacted by increased lighting (Hooker et al. 2022).

Core construction works will be largely carried out during daylight hours and therefore no significant disturbance impacts from lighting during construction works have been identified.

The operational lighting scheme for the proposed development has considered best practice, as published by the UK Bat Conservation Trust (2018), in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations. As outlined in the lighting report which accompanies this application (Kellihers Electrical 2023) lighting will be confined to the internal roads, footpaths and amenity areas of the site and there will be no light spillage on boundary habitats i.e. treelines and woodland.

Overall, the loss of low value internal habitats within the site will not have a significant impact on local bat populations. The impact on foraging bats will be negative, imperceptible and long term at a local geographic level.

9.5 Otter

The proposed development site does not provide foraging habitat for Otter and no signs of Otter were recorded within 150m of the proposed development site. However, Otter could potentially forage along the Caherduggan South Stream, located 50m west of the site.

Increased human presence and/or noise and vibration associated with construction works, has the potential to temporarily displace commuting or foraging Otter. Otters are known to tolerate human disturbance (Bailey and Rochford, 2006, Irish Wildlife Trust, 2012). The proposed development site is dominated by unmanaged, grassland habitats and existing levels of disturbance at the site are low. Increased activity during construction works could potentially create a temporary disturbance impacts to Otter using the Caherduggan South Stream. However, as construction works will typically be undertaken during normal daylight working hours and given that Otters are generally nocturnal in habit and in many circumstances can tolerate high levels of human presence and disturbance, displacement of Otter from their habitat during construction works is unlikely to impact the local Otter populations. It is noted that the woodland habitat located in proximity to the Caherduggan South Stream, screens the stream from the proposed development site and this habitat will be retained during construction works.

Construction works could potentially indirectly affect fish stocks and aquatic invertebrates within the Caherduggan South Stream, which are important food source for Otter. During operation, surface water runoff could potentially indirectly affect fish stocks and aquatic invertebrates downstream via impacts on water quality. As outlined in **Section 11,** construction mitigation measures and surface water design measures will ensure there is no significant impact on local water quality and there will be no significant effect on prey availability for Otter within the Caherduggan South Stream of the River Blackwater.

While there will be no direct loss of aquatic foraging habitat, there could potentially be indirect disturbance impacts to the stream during construction works. During operation, there will be increased noise and disturbance at the proposed development site. Although there is evidence that nocturnal mammals, such as the Otter, can be disturbed by the introduction of artificial light into established breeding and foraging areas (Rich and Longcore, 2005), as discussed above in relation to construction impacts, Otter are relatively tolerant of human and traffic disturbance. Given the retention of woodland habitat around the Caherduggan South Stream and the low value of the habitats within the proposed development site boundary for Otter,

disturbance associated with the construction and operation of the proposed development will not have significant disturbance/displacement impacts on Otter.

The impact on Otter from construction works is predicted to be negative, slight and short-term at a local geographic level due to construction works. The impact on Otter during the operational phase is predicted to be negative, not significant and long-term at a local geographic level.

9.6 Other Mammals

No other protected mammal species were recorded within the proposed development site. While there were no confirmed field signs of Hedgehog, Irish Stoat or Pygmy Shrew, these species are largely nocturnal, and field signs are less frequently observed than for other mammals. Given the habitats onsite these species could potentially occur within the proposed development site. Other species such as Badger, Red Squirrel and Pine Marten could potentially use woodland habitat along the northern boundary of the site and increased recreational usage could lead to higher levels of disturbance. The fencing of this area will avoid significant ongoing disturbance impacts to this valuable habitat.

The habitats to be directly affected are common and there is no evidence to indicate that the proposed development areas are of particular value for these species in the context of the surrounding countryside. Mitigation measures will prevent direct impacts on valuable habitats i.e. treeline and woodland. Overall the impact on other mammal species is predicted to be negative, slight and long-term at a local level.

9.7 Reptiles and amphibians

No habitats suitable for amphibians were recorded within the proposed development site. There will be no impacts on amphibians during construction works.

Given the absence of valuable habitats for Common Lizard at the proposed development site, no impacts are predicted to occur.

9.8 Birds

The most significant impacts on birds will be direct impacts during the construction phase through habitat loss, fragmentation and modification. As noted above, scrub, hedgerow and grassland habitats will be removed during construction works. In the absence of mitigation, direct impacts include disturbance and injury to eggs, young and nests. However, the mature treeline and woodland on the boundary of the site will be retained.

During the construction phase, increased noise and disturbance is likely to disturb and/or displace breeding birds from the site. The birds recorded at the proposed development site are common birds which are typical of the habitats recorded locally on this urban/rural fringe. Given the mobile nature of birds, the common nature of habitats within the site and the availability of alternative foraging habitat in the immediate vicinity, the impact from disturbance will be slight during the construction phase at a local level. Habitat fragmentation due to the loss of the foraging and commuting habitat has the potential to continue to impact local populations of common bird species during the operational phase of the proposed development.

During construction works, mitigation measures will ensure there is no direct impact to nesting birds. The woodland along the western boundary and the treeline along the eastern boundary will be retained and supplementary native planting along this treeline will further enhance its habitat value. The loss of grassland habitat is unlikely to have a significant impact on birds species. However, removal of internal scrub habitat and hedgerow will lead to a loss of low value nesting habitat. The landscape plan will provide additional native tree planting which will provide alternative foraging habitat for common bird species. Natural grassland (natural recolonisation) areas included in the landscape plan may provide foraging habitat for seed eating species such as Goldfinch and House Sparrows. The impact on breeding birds will be negative, slight and long-term at a local level.

9.9 Other species

During construction, there is potential for siltation and pollution of the Caherduggan South Stream in the absence of mitigation, from runoff during construction works e.g., concrete spillage, hydrocarbon spillage. During operation local water quality could be impacted from increased rates of runoff from hard surface and hydrocarbon contamination from parking areas. This could result in impacts on water quality and aquatic ecology downstream of the proposed development site.

As noted above, the Caherduggan South Stream is a 1st order tributary of the River Blackwater and is hydrologically connected to the Blackwater River (Cork/Waterford) SAC. The qualifying species for this European site include a number of aquatic species such as Freshwater Pearl Mussel *Margaritifera margaritifera*, White-clawed crayfish *Austropotamobius pallipes*, lamprey species and Atlantic Salmon *Salmo salar*. Freshwater Pearl Mussel are particularly sensitive to siltation impacts and contaminated surface water runoff could adversely affect this species, as well as other aquatic qualifying species downstream of the works area. Mitigation measures have been specified to ensure that there will be no impact on aquatic receptors during construction works. Furthermore, operational surface water/stormwater design measures will ensure there is no significant impact on water quality during operation.

Given the types of habitats which dominate the site, i.e., agricultural grassland, no significant impact on terrestrial invertebrates is predicted to occur from habitat removal during construction works. Woodland and (largely) native treeline habitat provides the most important habitat for invertebrate species within the site boundary and this will be retained and enhanced as part of the landscape plan. Impacts on terrestrial invertebrates will be neutral, imperceptible and short-term at a local level. Native planting of hedgerow and naturalised meadow areas will provide additional habitat for terrestrial invertebrates species.

10. Potential impact on water quality

10.1 Impacts on water quality during the construction phase

Potential impacts on aquatic habitats which can arise from this type of development include increased silt levels in surface water run-off, silt from dewatering of excavations, concrete spillage and hydrocarbon spillage. In the absence of appropriate design and mitigation, high levels of silt in surface water run-off from construction works, could theoretically impact on fish species. If of sufficient severity, adult fish could theoretically be affected by increased silt levels as gills may become damaged by exposure to elevated suspended solids levels. Excessive

siltation can cause eggs and fry to be smothered. In particular impacts on spawning lamprey and salmonids can be significant. If of sufficient severity, aquatic invertebrates may be smothered by excessive deposits of silt from suspended solids. In areas of stony substrate, silt deposits may result in a change in the macro-invertebrate species composition, favouring less diverse assemblages and impacting on sensitive species. Aquatic plant communities may also be affected by increased siltation. Submerged plants may be stunted and photosynthesis may be reduced.

Inadvertent spillages of hydrocarbons during construction could introduce toxic chemicals into the aquatic environment via surface water run-off or groundwater contamination and have a direct toxicological impact on habitats and fauna.

The Caherduggan South Stream, a 1st order tributary of the River Blackwater is located c.50m west of the proposed development site. The site slopes west towards this stream and in the absence of mitigation, contaminated surface water runoff could potentially flow into the Caherduggan South Stream and impact on sensitive aquatic receptors downstream. During construction there may be an increased probability of silt discharging from the proposed development site as well as potential spillage of hydrocarbons and cementous materials. As part of the proposed construction process, several mitigation measures have been specified to ensure that water quality within the Caherduggan South Stream and other watercourses downstream are not impacted during construction works (**Section 11**). It is noted that no instream works are proposed. Directional drilling will be used to allow proposed wastewater network to pass under the stream and there will be no direct impacts on aquatic habitats. Following mitigation, there will be no significant impact on surface water from the from the proposed development during the construction phase.

10.2 Impacts on water quality during the operational phase

10.2.1 Wastewater discharges

The proposed residential development could potentially result in an increase in nutrients discharging to the River Blackwater via the Mallow Wastewater Treatment Plant (WWTP). Increased nutrients can potentially impact on aquatic habitats by changing baseline ecological condition.

The Mallow WWTP was designed to cater for a Population Equivalent of 18,000PE and BOD loading of 1,080 Kg/day. The WWTP obtained a discharge licence (Reg: D0052-01) from the Environmental Protection Agency in 2012 and has assigned emission limit values (ELV's) for a range of parameters to ensure a high degree of protection to the River Blackwater into which it discharges. The treatment process includes the following: -

- Preliminary Treatment (Automatic Screening & Grit Removal)
- Secondary Treatment (Conventional Activated Sludge)
- Nutrient Removal (Ferric dosing for P removal)
- Odor Treatment Unit
- Standby Generator and Scada System

- Sludge Treatment - Sludge Acceptance Tank, Sludge Behind/Holding Tank, Picket Fence Thickener and Sludge Belt Presses.

The discharge licence assigns a number of ELV's for biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), ammonia, orthophosphate (Ortho P), pH, Total P, Total N and Ammonia NH_3. The ELVs are set based on the full design capacity (P.E. 18,000) and are aimed at providing a high degree of protection to the receiving water body. ELV's are set for Ammonia (as N) at 3mg/l, Total Phosphorus (as P) at 2mg/l and orthophosphate (as P) at 1.5mg/l.

As detailed in the most recently published Annual Environmental Report i.e.. AER 2021 (EPA 2021), Planning Permission has been granted for the Mallow WWTP upgrade which includes for upgrading the existing treatment plant design capacity from 10,500 Population Equivalent to 22,000 Population Equivalent. The original WWTP had two treatment streams with an overall Design P.E. of 18,000. However only one treatment stream is operational which has a Design P.E of 10,500 therefore the current organic capacity (PE) is 10,500. The plant has a current agglomeration PE of 14,367 and is therefore in exceedance of its design capacity by 3,867 PE.

Table 13 provides a summary of the 2020 operating conditions for the WWTP obtained from the most recent Environmental Protection Agency Annual Environment Report (EPA 2021). This table shows the overall compliance of the final effluent with the Emission Limit Values (ELVs).

Table 13. Wastewater Treatment & Discharge Mallow WWTP Main Effluent Discharge

Effluent Monitoring Summary	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	Total P (mg/l)	Ortho P(mg/l)	Total N (mg/l)*	Ammonia (as N) (mg/l)	pH
WWDL ELV (Schedule A)	25.00	125.00	25.00	2.00	1.50	n/a	3.00	9
ELV with Condition 2 Interpretation included	50.00	250.00	62.50	2.40	1.80	n/a	3.60	9
No. of Sample results	13	13	13	13	13	13	13	13
Number of sample results above WWDL ELV	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Number of sample results above ELV with condition 2 interpretation	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Annual Mean (parameters where a mean ELV applies are shaded)	4.53	20.75	9.49	0.18	0.06	12.66	1.53	7.75
Overall Compliance (Pass/Fail)	Pass	Pass	Pass	Pass	Pass		Pass	Pass

The WWTP is compliant with the ELV's set in the Wastewater Discharge Licence. A summary of monitoring from ambient monitoring points associated with the wastewater discharge is provided in **Table 14** below.

Table 14. Ambient Water Quality Monitoring Results

Ambient Monitoring	Irish Grid Reference	EPA Feature Coding Tool code	Bathing water	Drinking water	FWPM	Shellfish	Current WFD Status
Upstream Monitoring point	E157482, N98165	RS18B021690	No	No	Yes	No	Unassigned
Downstream Monitoring point	E158083, N98036	RS18B021720	No	No	Yes	No	Unassigned

The 2020 AER notes the following in relation to the significance of results:

- The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.
- The ambient monitoring results meet the required EQS. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.
- Based on ambient monitoring results a deterioration in Orthophosphate concentration downstream of the effluent discharge is noted.
- A deterioration in water quality has been identified, however it is not known if it or is not caused by the WWTP.
- Other causes of deterioration in water quality in the area are: Diffuse Urban Point Sources & S4 Industries
- The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.

Mallow Wastewater Treatment Plant (WWTP), in its' present configuration and setup, is overloaded and cannot cater for the existing population equivalent. Mallow WWTP has a design capacity of 18,000 population equivalent (PE). However, some of the existing treatment units are no longer operational and require refurbishment and/or replacement. Mallow Agglomeration is currently in breach of Articles 3, 4(1), 5(1) and 12 of the Urban Wastewater Treatment Directive (UWWTD) (91/271/EEC) and as such is the subject of an infringement notice from the European Court of Justice (ECJ).

In line with Irish Water's Investment Plan for 2017-2021 a planning application was submitted to Cork County Council in 2018 for the Mallow WWTP upgrade and upgrade to the sewerage network. Planning was subsequently granted by Cork County Council (Planning Ref. 19/05078).

A pre-connection enquiry was submitted to Irish Water to assess the feasibility of providing a connection to the site and Irish Water subsequently issued a confirmation of feasibility for the development. Irish Water responded to say that; "*in order to accommodate the proposed connection, upgrade works are required to increase the capacity of Mallow WWTP. Irish Water currently has a project underway which will provide the necessary upgrade and capacity. This upgrade project is scheduled to be completed by Q3 2023 (this may be subject to change)*

and the proposed connection could be completed as soon as possibly practicable after this date."

The proposed development will not be connected to Mallow WWTP until the upgrade has been completed. Following this upgrade there will be sufficient capacity within the Mallow WWTP and there will be no impact from operational wastewater discharges to local aquatic ecology or the River Blackwater (Cork/Waterford) SAC.

10.2.2 Surface water discharges during operation

Chemical contaminants in operational surface water runoff such as hydrocarbons could potentially impact on water quality and thus could impact on water quality within the Caherduggan South Stream and qualifying species/habitats for the Blackwater River. (Cork/Waterford) SAC. The increase in hard surfaces at the site i.e., car parks, road surfaces pathways could increase the rate of runoff from the proposed development site, which could impact on the hydrological regimes of the Caherduggan South Stream.

The Cork County Development Plan 2022-2028 includes digital flood mapping where projected Flood zones A & B can be turned on as layers to assess a site's potential vulnerability to flooding. As with the OPW maps, projected flood extents near the site are limited to the banks of the Spa Stream and along the N72. These vulnerable locations and watercourses are at significantly lower elevations than the development site, however, and it is clear from all maps available that the site lies outside any areas that have a probability of flooding in any event, whether fluvial, coastal or groundwater, up to and including a 1 in 1000-year storm. This places the site in flood zone C where residential development is appropriate without requiring a justification test.

As per Sustainable Drainage Systems (SuDS) principles, management of surface water run-off during operation of the proposed residential development has been built into the plans (See **Section 3.3**). The surface water system for the development is a single network including extensive SuDS measures falling generally from south to north and exiting the site in the northwest. It is intended to discharge the attenuated stormwater into the Spa Stream that flows in a southward direction, beside the N72, adjacent to the site. SuDS measures are proposed for the development in both public and private areas in accordance with the guidance from the County Development Plan 2022 Advice Note 1 on Surface Water management and the CIRIA SuDS Manual C753. The Measures proposed will decrease the impact of the development on the receiving environment and also provide amenity and biodiversity in many cases. Regular maintenance of the SuDS measures will be required to ensure that they are effective throughout their design life. The following paragraphs describe the SuDS features proposed: detention basins, permeable paving, under-drained roadside swales, bio-retention tree pits, bio-retention raingardens and water butts.

Given the operational surface water design measures will ensure there are no significant impact on local water quality and therefore there will be no impact on the the conservation objectives of the Blackwater River (Cork/Waterford) SAC from operational surface water discharges.

11. Mitigation Measures

The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage. These mitigation measures are designed to achieve a lowering or reducing of the risk of impact to acceptable levels. The following mitigation measures will be implemented.

The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage. It is clear that the mitigation measures are designed to achieve a lowering or reducing of the risk of impact to acceptable levels. The risk that the mitigation measures will not function effectively in preventing significant ecological impacts is low. The likely success of the proposed mitigation measures is high. A construction and environmental management plan (CEMP) has been submitted with this application. Measures relevant to ecology are summarised below. The following mitigation measures will be implemented.

11.1 Earthworks

Once surface water management measures are in place and topsoil has been stripped, earthworks operations can commence. This will consist of moving fill from the higher ground at the east to the lower ground to the west. Material will be excavated by 360° excavators and transported to the deposition area by articulated dumpers. The fill will then be placed by dozers and compacted using vibratory rollers. A testing regime will be implemented to ensure the acceptability of the fill and that the degree of compaction is sufficient. Fill will be brought to the required level across the site to allow construction of roads and foundations. An overall earthworks balance has been targeted i.e., no imported fill will be required for the bulk earthworks and no soil will be removed from the site.

11.2 Protection of Water Quality

The subject site is on high ground that falls generally from south to North but also from the eastern boundary towards the western boundary. There is a steep, wooded embankment from the western boundary down towards the small stream that runs southwards alongside the N72 roadway.

Surface water will naturally tend to flow away from the higher boundaries with the existing Aldworth Heights, Castle Heights and Castle Grove estates in the south, towards the western boundary. Roughly half of the western boundary (southern half) is shared with lands in the same ownership as the subject site whereas the northern half bounds lands in different ownership. The most sensitive part of the site in terms of surface water will be the western boundary due to the natural flow path towards that boundary and onwards to the stream.

Run-off into excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. All run-off will be prevented from directly entering any water courses as no construction will be undertaken directly adjacent to open water.

No significant dewatering will be required during the construction phase which would result in the localised lowering of the water table. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept safe and relatively dry.

The measures outlined in the following sections will be put in place during the construction phase to ensure protection of surface waterbodies. Construction works will be informed by best practice guidance from Inland Fisheries Ireland on the prevention of pollution during development projects. These measures comply with the following relevant CIRIA and Inland fisheries guidance documents:

- Control of Water Pollution from construction Sites, Guidance for consultants and contractors (C532)
- Environmental Good Practice on Site (3rd edition) (C692)
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)

11.3 Pollution Control

11.3.1 Suspended Solids

Prior to the commencement of topsoil stripping and earthworks operations, the following site-specific surface water management measures will be put in place:

Where possible, significant earthworks operations should be limited to the summer months.

Silt fencing will be installed around the perimeter of the site. The location of the silt fencing will be determined in the construction stage CEMP and will be subject to a detailed assessment of the area or phase to be developed. The purpose of the silt fencing is to prevent silt laden water leaving the site and entering neighbouring land with the potential to impact nearby watercourses. A typical silt fencing arrangement is shown below in **Figure 8**. It will consist of a double layer of geotextile membrane fixed to wooden stakes approximately 600mm high. The membrane will be anchored into the ground to form a continuous barrier to silt laden water from the works site. Silt fences will be monitored via a silt inspection log (to be maintained by the Environmental Manager/ECoW) and periodically maintained during the construction period. Typical maintenance will consist of repairs to damaged sections of membrane and removal of a build-up of silt on the upslope side of the fence. Daily silt fence inspections are recommended as part of their operation ensuring that any necessary repairs can be expedited.

Figure 8 - Typical Silt Fencing Arrangement

Drainage ditches will be installed to intercept surface water where there is a risk of significant water flow into excavations or onto adjoining lands. There will also be a requirement to periodically pump water from excavations. All collected and pumped water will have to be treated prior to discharge. The run-off will be directed through appropriately sized settlement ponds in series to remove suspended solids before being discharged, see **Figure 9**.

Figure 9. Settlement Ponds in Series

Emergency contact numbers for the Local Authority Environmental Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same.

The Environmental Manager or ECoW will be responsible for the implementation of these measures. They will be inspected on at least a daily basis for the duration of the works, and a record of these inspections will be maintained.

Any temporary storage of soil, hardcore, crushed concrete or similar material will be stored 50m from any surface water drains. All temporary storage areas should also have surface runoff controls in place to prevent migration of possible materials. There can be no direct pumping of silty water from the works directly to any watercourse. All water from excavations must be treated by infiltration over lands or via settlement ponds, silt busters etc.

11.3.2 Flooding

The subject site is elevated and sloping to a degree that flooding is not anticipated in any event. The flood extent map drawn up as part of the Southwestern CFRAM Study (floodinfo.ie) shows the stream to the west overflowing its normal channel during fluvial flood events but this is significantly below the level of the site's lowest point. The site is not in any risk category in the CFRAM Study Maps.

11.3.3 Control of Cement Run-off

The washing out of concrete delivery vehicles is a potential source of pollution and shall be carried out in designated wash out areas only, see **Figure 10**.

Wash-out areas on site will be located more than 50m from any natural watercourse and properly designed with an impermeable liner to contain all cement laden water. No wash-out of ready-mix concrete vehicles shall be located within 10 metres of any temporary or permanent drainage features. Signage shall be erected to clearly identify the wash-out areas. Sufficient wash-out areas shall be provided to cater for all vehicles at peak delivery times.

On-site batching of concrete is not envisaged, but ready to use mortar silos are often used for housing developments. These systems involve the delivery and storage of dry cement and aggregates in silos, water is added at the point of delivery to make mortar or plaster. The following controls shall be put in place for the on-site batching of concrete, mortar and render:

- The plant shall be maintained in good condition,
- Delivery of cement shall be means of a sealed system to prevent escape of cement,
- The plant shall be situated on a paved area at least 20m from any temporary or permanent drainage features,
- Emergency procedures shall be in place to deal with accidental spillages of cement or mortar.

Figure 10. Concrete Truck Washout Area with Impermeable Liner

11.3.4 Accidental Leaks or Spills

No bulk chemicals will be stored within the active construction areas. Temporary oil and fuel storage tanks may be kept in the material storage area in suitable containers and will be stored on appropriately bunded spill pallets as required. Any fuel and oil stored on site shall be stored on bunded spill pallets (approved under BS EN 1992-3:2006). All bunds will be impermeable and capable of retaining a volume of equal to or greater than 1.1 times (>110%) capacity of the containers stored on them. In the event of a spillage, excess oil or fuel will be collected in the bund.

Refuelling of vehicles and the addition of hydraulic oils or lubricants to vehicles will be undertaken off site where possible. Where this is not possible, filling and maintenance will take place in a designated material storage compound, which is located at least 10 metres from any temporary or permanent drainage features. Spill protection equipment such as absorbent mats, socks and sand will be available in clearly marked bins/silos and in construction vehicles to be used in the event of an accidental release during refuelling. Training will be given to site workers in how to manage a spill event.

The following mitigation measures will be taken at the construction site to prevent any spillages to ground of fuels during machinery activities and prevent any resulting soil and/or groundwater quality impacts:

1. Refuelling will be undertaken off site where possible,
2. Where mobile fuel bowsers are used the following measures will be taken:
3. Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use.
4. Any pump or valve will be fitted with a lock and will be secured when not in use.

5. All bowsers to carry a spill kit and operatives must have spill response training; and
6. Portable generators or similar fuel containing equipment will be placed on suitable drip trays.
7. Weekly checks of spill kits will be carried out to ensure they are sufficiently stocked.

11.3.5 Monitoring

Daily checks will be carried out and recorded in a Surface Water Management Log to ensure surface water drains are not blocked by silt, or other items, and that all storage is located the required distance from surface water receptors. A daily log of inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur

11.4 Lighting

11.4.1 Lighting During Construction

Lighting will be provided as necessary at construction compounds. Consideration of best practice and guidance in relation to lighting and wildlife impact such as Bats & Lighting Guidance Notes for Planners, Engineers, Architects and Developers (Bat conservation Ireland, December 2010); All lighting will be directional with appropriate cowling installed to minimise light spillage from the site. The height of lamp posts will be restricted (e.g. <8m where possible) to reduce the amount of light spillage to where it is not needed. The lights will be positioned facing away from the woodland and stream to the west, where possible, to minimize impact on bats that may use this area as a commuting route as well as other species who may use this habitat. Where possible all light fittings will be LED, have asymmetrical projection i.e. directional, and with colour temperature of 2700K (warm spectrum preferred by bats). The radiation will be above 500nm to avoid the blue or UV light, most disturbing to bats.

Construction work will generally be confined to daylight hours and lighting will generally not be required for the construction phase. There will however be occasions where the provision of portable lighting will be required such as evening work during later winter/early spring, works on roadways and power floating floors. Where possible and without jeopardising site safety, lights will be pointed down at a 45-degree angle and away from sensitive receptors. The site compound will have external lights for safety and security. This lighting will also be controlled by occupancy/motion sensors so that it will remain at a low output unless activated. This will mitigate light overspill as well as avoiding energy wastage. Construction stage lighting will be designed to minimise the broadcast of light to surrounding areas including sensitive receptors.

11.4.2 Lighting During Operation

The primary lighting mitigation which will be implemented for this project relates to bats, as these are considered the most sensitive species in relation to night-time lighting. It is noted however that the mitigation proposed will also lessen in the impact in relation other nocturnal species such as Badger and Otter. The lighting scheme has considered best practice, as published by the UK Bat Conservation Trust (2018), in respect of mitigation strategies, to minimise the impact of outdoor lighting upon bat populations.

LED type lanterns, of the Warm White type, have been specified, with a Colour Temperature of 3000 kelvin, as is considered least disruptive to the emergence of bats from roosts at dusk, and subsequent movement from habitats to foraging locations.

LED luminaires have been specified due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;

Column heights have been carefully considered to minimise light spill.

Lanterns are of the fully cut off type with no light output above the horizontal plane;

Screening by existing trees and newly planted trees will prevent light spillage onto boundary habitats; and

11.5 Ecology

To facilitate the earthworks operation, site clearance will have to be carried out to remove vegetation. Removal of woody vegetation shall only take place outside the bird breeding season (1st March to 31st August). No removal of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase. Existing trees and hedgerows shall be retained where possible. Temporary surface water management measures will be put in place prior to stripping of topsoil and will remain in place until the completion of the development, or until the completion of each phase.

Topsoil will be stripped from the area to be developed and from areas where site won fill may be excavated to bring the development to the correct level. All excavated topsoil will be stored in dedicated stockpiles with environmental controls in place. Prior to topsoil clearance, an Invasive Species Management Plan and survey is recommended to ensure areas of invasive plant species (if any) are identified and managed prior to or during site clearance works. There is a responsibility on the Environmental Manager or Ecological Clerk of Works (ECoW) to regularly inspect and supervise maintenance of the environmental controls throughout the process.

Proposed planning includes 265 no. new semi-mature and advanced trees. 255 trees are native (96%), with 10 acclimatised Lime trees for climate change adaptability and pollinator benefits identified in the All-Ireland Pollinator Plan. The result is a far greater diversity than what is currently offered on site. Combined with several thousand pollinator shrubs, the green infrastructure gain is a neutral in the short term and a net positive in the long term.

Tree along the boundary of the site (both inside and outside the proposed development site boundary) will be protected for the duration of the construction activities on site and in accordance with BS 5837.

Prior to the commencement of any work, or any materials being brought on site, existing trees to be retained are to be protected with temporary fencing. This shall be maintained in good and effective condition until the work is completed. Stabiliser struts will be used to secure fence for duration of construction and all fencing will be fully remove when construction is complete.

The protective fencing is to coincide, as far as is practical, with the root protection area (rpa), unless otherwise agreed. all weather notices shall be securely fixed to the fence words such

as 'construction exclusion zone - no access. Further detail on tree protection measures are included in the Landscape development package (Forestbird Deign) submitted with this planning application.

11.6 Invasive Species

Construction works within the proposed works areas could potentially disturb stands of invasive plants and/or soils contaminated with invasive plant material, should such species be identified during site surveys. In addition to lands within the proposed works areas, there is an identified risk of invasive plant species being spread onto neighbouring lands and onto public roads and other locations. Construction works could therefore result in the spread of invasive plant species both in-situ and ex-situ. The following measures are proposed to prevent the inadvertent spread of invasive plant species:

1. The Contractor will prepare an Invasive Alien Species (IAS) Management Plan for the works. The Plan must be clearly communicated to all site staff and must be adhered to if it is to be implemented successfully,
2. Prior to the development and landscaping works an updated survey by an appropriately experienced ecologist will be carried out to establish the full extents of the invasive plant species within the proposed development site boundary,
3. In accordance with the TII guidance this survey will produce accurate 1:5000 scale mapping for the precise location of invasive species. The pre-construction surveys will be undertaken by suitable ecologists with competence in identifying the species concerned having regard to any seasonal constraint,
4. Areas of invasive species will be fenced off and signage installed where no works will take place within this area until such time as they can be eradicated/managed,
5. The invasive species will be appropriately managed (aiming for eradication) prior to any vegetation clearance works occurring where these species were identified.

For the best available methods of control and eradication refer to the NRA Guidelines (2010) and Fennell et al. (2018). It is recommended that a suitably experienced contractor is employed to undertake the invasive species eradication programme at the site. Several approaches are available for the control of invasive plant species consisting of chemical control, physical control, or a combination of both. For example, manual control may only work for small, new infestations such as young Buddleia shrubs, but a combination of manual and chemical control may be required to ensure the complete eradication of more established shrubs. The specialist contractor will advise/finalise the best approach based on their knowledge of the species in question.

11.7 Biodiversity Enhancements

It is proposed that five bat boxes will be installed at the proposed development site i.e., Bat box pro or similar (https://www.wildcare.co.uk/vincent-pro-bat-box-10651.html). These bat boxes will be located within retained treelines and woodland along the boundary of the site. These will be positioned at least 10m from any light fittings.

It is proposed that six bird nesting boxes (various types including open fronted, entrance hole and kestrel nest boxes e.g., https://www.nhbs.com/kestrel-nest-box) will be installed at the proposed development site. These will be located within woodland habitat along the site boundary. These will be positioned at least 10m from any light fittings.

Five insect nesting boxes suitable for Hymenoptera spp. (bees and wasps) will be put in place adjacent to areas of meadow grassland area as a biodiversity enhancement measure.

Log piles will be installed to allow sites for small mammals such as Hedgehog and Pygmy Shrew. These will be situated along retained habitat and/or areas of newly planted shrub and groundcover.

11.8 Noise Vibration & Dust Control

Construction of the development has the potential to create significantly increased noise and dust levels locally unless adequate controls are put in place. Earthworks operations will involve the use of heavy construction plant. Stockpiles of material and haul roads could become dusty in dry weather. Road and housing construction are also potential sources of noise and dust.

11.8.1 Noise Control

Specific noise abatement measures shall comply with the recommendations of BS5228-1 2009. These measures will include:

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise,
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations,
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract,
- Compressors and generators will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers,
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use,
- Any plant, such as generators or pumps, required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen,
- Location of plant shall consider the likely noise propagation to nearby sensitive receptors.

The earthworks will generate typical construction activity related noise and vibration sources from use of a variety of plant and machinery such as rock breakers (where required),

excavators, lifting equipment, dumper trucks, compressors and generators. The noise levels shall comply with the mitigation measures and any planning conditions.

A designated noise liaison will be appointed to site during construction works. Any complaints will be logged and followed up in a prompt fashion. In addition, prior to particularly noisy construction activity, e.g., excavation close to a property, etc., the site contact will inform the nearest noise sensitive locations of the time and expected duration of the works.

All works on site shall comply with BS 5228 2009+ A1 2014 (Parts 1 & 2) which gives detailed guidance on the control of noise and vibration from construction activities. In general, the contractor shall implement the following mitigation measures during the proposed infrastructure works:

- Avoid unnecessary revving of engines and switch off equipment when not required,
- Keep internal haul roads well maintained and avoid steep gradients,
- Minimise drop height of materials,
- Start-up plant sequentially rather than all together.

12. Cumulative Impacts

A review of the Cork County Council and An Bord Pleanála online planning records was carried out. The following development have been granted planning in the vicinity of the proposed development within the past 24 months (from 01/06/24).

- 23/5197 Extension to planning ref. 16/6949 for the construction of the unbuilt portion of the original parent permission comprising 108 residential units (Planning ref. 04/2912) Approx. 1km northeast from site entrance/ Granted 08/08/2023, ceases 22/09/2024.
- 24/4243 Permission for an LRD comprising 186 residential units, 1 creche and all associated ancillary works. A NIS was submitted with the application. Approx 700m north from site entrance New Application Further Information required.
- 24/4519 Permission for 99 residential units, one creche and all associated ancillary works. NIS was submitted with the application Approx. 340m southeast from site entrance New application, decision due 20/05/2024.

The proposed development site is on the edge of Mallow town. Lands to the north and west of the site are dominated by agricultural lands. Lands to the south as east are largely urban and residential. The Caherduggan South Stream, a 1st order tributary of the River Blackwater, runs c.50m west of the proposed development site. In the absence of significant impacts on water quality (following mitigation), no adverse cumulative effects on the the Caherduggan South Stream of downstream aquatic receptors have been identified.

If the construction of projects listed above were to run concurrently with the proposed development, there is potential for localised cumulative disturbance effects. It is noted that for the proposed development noise mitigation measures have been specified in the CEMP. All works will be carried out being mindful of potential noise impacts from construction activities.

Plant and machinery operating on the site will be the main source of noise during the works most notably during any earthworks, rock breaking etc. The works will be carried out in accordance with the requirements of *BS5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites.* Following mitigation, no significant impact from cumulative noise and disturbance impacts are predicted to occur.

Mitigation measures outlined in **Section 11** will ensure there is no impact on local water quality from surface water runoff during the construction phase of the proposed development. A range of design measures (and mitigation measures) have been included in the project to ensure there will be no impact on local water quality during operation of the proposed development. Following the implementation of these mitigation measures, the proposed development no significant cumulative impacts on downstream aquatic receptors are predicted to occur.

13. Conclusions

Overall, the development will impact primarily on habitats of lower local importance. The proposed development layout, landscape plan and mitigation measure have been designed to avoid valuable habitats for wildlife within the proposed development site. While the main habitat to be impacted is low value agricultural grassland, the loss of scrub and hedgerow habitat will have a slight, negative impact as they are likely to be used as foraging grounds for common bird and mammal species. Valuable foraging areas for bats, within and outside the proposed development site, will be protected to retain commuting/foraging habitat for local wildlife and prevent habitat fragmentation. The lighting layout and lighting plan will prevent any significant light spillage onto habitats on the boundary of the site i.e. woodland and treeline. The landscape plan, which uses native species and natural recolonisation, will provide additional habitats for local wildlife as these areas mature.

A range of mitigation and design measures have been specified to ensure this stream is protected during construction and operation of the proposed development. No significant impact on aquatic habitats is predicted.

No difficulties in the effective implementation of the prescribed mitigation measures have been identified. No impact from the spread of invasive species will occur.

Design measures and mitigation measures to protect water quality will ensure that no adverse impact on aquatic ecology or on designated sites (SACs, SPAs or pNHAs) and/or their conservation objectives will occur,

During construction, there will be increased noise and disturbance which could potentially impact on birds and mammals. However, the impact will short term and will not be significant. Given the availability of alternative habitat in the vicinity, the impact on nesting birds is likely to be slight and short-term. With the exception of localised impacts and short-term impacts during construction, no significant impacts on fauna will occur.

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Appendices

Appendix 1. NRA 2009 Guidelines

Table 1: Examples of valuation at different geographical scales

Ecological valuation: Examples
International Importance: • 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (pSPA). • Site that fulfills the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). • Features essential to maintaining the coherence of the Natura 2000 Network.[4] • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level)5 of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & The Biosphere Programme). • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • Biogenetic Reserve under the Council of Europe. • European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).[6]
National Importance: • Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. • Resident or regularly occurring populations (assessed to be important at the national level)7 of the following: o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. • Site containing 'viable areas'[8] of the habitat types listed in Annex I of the Habitats Directive.
County Importance: • **Area of Special Amenity.[9]** • **Area subject to a Tree Preservation Order.** • **Area of High Amenity, or equivalent, designated under the County Development Plan.** • **Resident or regularly occurring populations (assessed to be important at the County level)[10] of the following:** o **Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;** o **Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;** o **Species protected under the Wildlife Acts; and/or** o **Species listed on the relevant Red Data list.** • **Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.**

- **County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, 11 if this has been prepared.**
- **Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.**
- **Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.**

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)12 of the following:
    - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
    - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
    - Species protected under the Wildlife Acts; and/or
    - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

4 See Articles 3 and 10 of the Habitats Directive.
5 It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.
6 Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).
7 It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.
8 A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).
9 It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.
10 It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.
11 BAP: Biodiversity Action Plan
12 It is suggested that, in general, 1%of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle

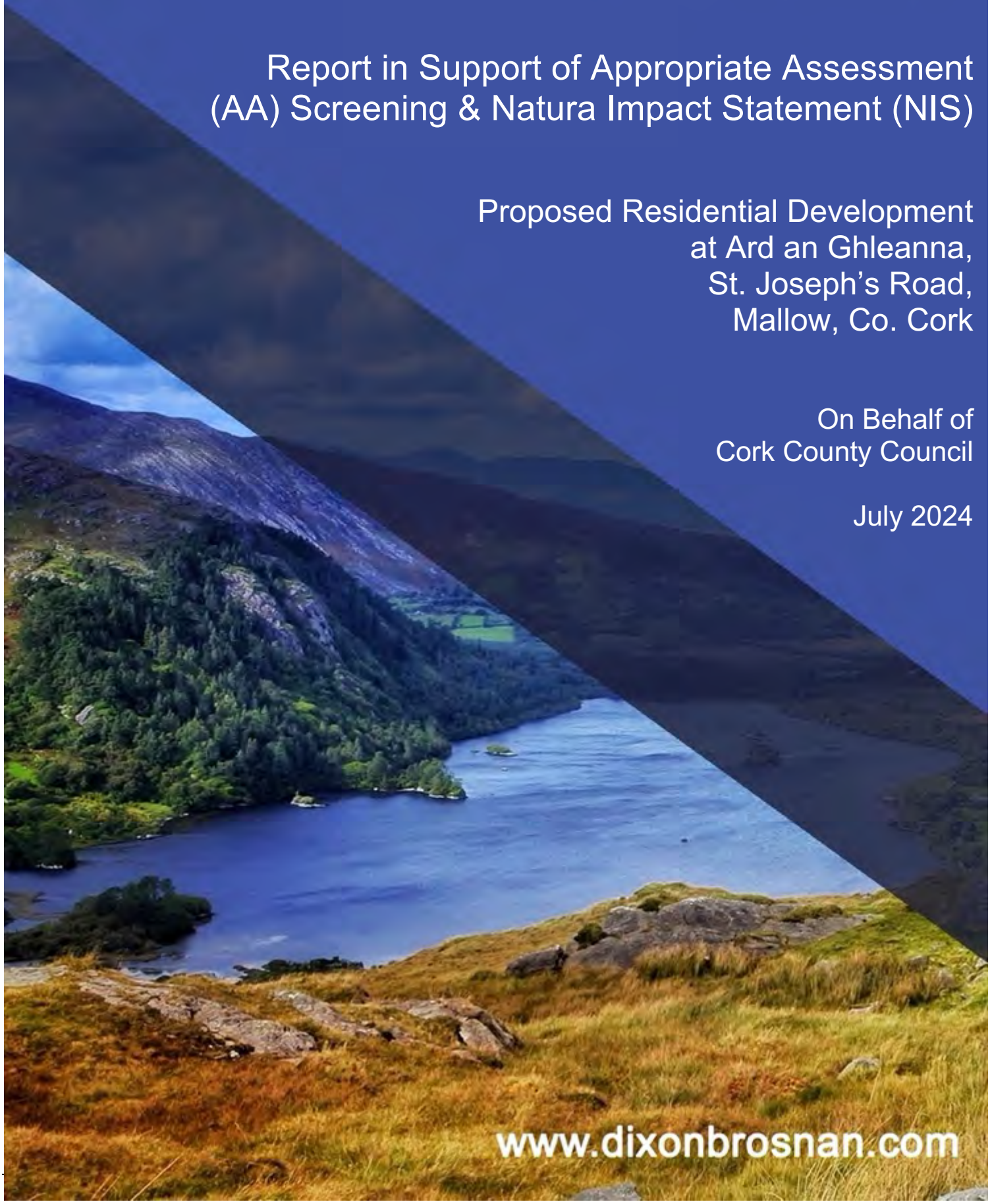
DixonBrosnan
environmental consultants

Report in Support of Appropriate Assessment (AA) Screening & Natura Impact Statement (NIS)

Proposed Residential Development
at Ard an Ghleanna,
St. Joseph's Road,
Mallow, Co. Cork

On Behalf of
Cork County Council

July 2024



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Project	Report in Support of Appropriate Assessment (AA) Screening & Natura Impact Statement (NIS) for at Ard an Ghleanna, St. Joseph's Road, Mallow, Co. Cork	
Client	Cork County Council	
Project Ref.	23135	
Report No.	23135.02	
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Date	**Revision**	**Prepared By**
19/12/23	First Draft	Sorcha Sheehy PhD
04/07/24	Second Draft	Carl Dixon MSc
11/07/24	Issue to client	

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Table of Contents

1. Introduction

1.1 Background

The information in this report has been compiled by DixonBrosnan Environmental Consultants, on behalf of the applicant. It provides information on and assesses the potential for the proposed residential development at Ard an Ghleanna, St. Joseph's Road, Mallow, to impact on any Natura 2000 sites within its zone of influence. The information in this report forms part of and should be read in conjunction with the planning application documentation for the proposed development.

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) put an obligation on EU Member States to establish the Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SACs, including candidate SACs) and Special Protection Areas (SPAs). SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests of the sites and from these the conservation objectives of the site are derived. The Birds and Habitats Directives set out various procedures and obligations in relation to nature conservation management in Member States in general, and of the Natura 2000 sites and their habitats and species in particular. A key protection mechanism is the requirement to consider the possible nature conservation implications of any plan or project on the Natura 2000 site network before any decision is made to allow that plan or project to proceed. Not only is every new plan or project captured by this requirement but each plan or project, when being considered for approval at any stage, must take into consideration the possible effects it may have in combination with other plans and projects when going through the process known as Appropriate Assessment (AA).

The obligation to undertake Appropriate Assessment (AA) derives from Article 6(3) and 6(4) of the Habitats Directive, and both involve a number of steps and tests that need to be applied in sequential order. Article 6(3) is concerned with the strict protection of sites, while Article 6(4) is the procedure for allowing derogation from this strict protection in certain restricted circumstances. As set out in Section 177U of the Planning and Development Act 2000 as amended, a screening for appropriate assessment of an application for consent for the proposed development must be carried out by the competent authority to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effect on any European site. Each step in the assessment process precedes and provides a basis for other steps. The results at each step must be documented and recorded carefully so there is full traceability and transparency of the decisions made.

The purpose of this report is to inform the AA process as required under the Habitats Directive (92/43/EEC) in instances where a plan or project may give rise to significant impacts on a Natura 2000 site. This report aims to inform the Appropriate Assessment process in determining whether the development, both alone and in combination with other plans or projects, are likely to have a significant impact on the Natura 2000 sites in the study area, in

the context of their conservation objectives and specifically on the habitats and species for which the sites have been designated.

This report has been prepared with regard to the following guidance documents, where relevant.

- *Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC* (European Commission (EC), 2018);
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodical Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (European Commission (EC), 2001);
- *Guidance Document on Article 6(4) of the Habitats Directive 92/43/EEC* (European Commission, (EC) 2007);
- *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities* (Department of Environment, Heritage and Local Government, 2010 revision);
- *Appropriate Assessment under Article 6 of the Habitats Directive; Guidance for Planning Authorities. Circular NPW 1/10 and PSSP 2/10* (Department of Environment, Heritage and Local Government, 2010);
- *Guidelines for Good Practice Appropriate Assessment of Plans under Article 6(3) Habitats Directive* (International Workshop on Assessment of Plans under the Habitats Directive, 2011
- Practice Note PN01 Appropriate Assessment Screening for Development Management Office of the Planning Regulator (2021) and
- *Communication from the Commission on the precautionary principle. European Commission* (2000).

1.2 Authors of the Report

This report was prepared by Carl Dixon MSc (Ecological Monitoring) and Dr. Sorcha Sheehy PhD (Ecology/ornithology).

Carl Dixon MSc (Ecology) is a senior ecologist who has over 25 years' experience in ecological and water quality assessments. Carl Dixon holds an Honours Degree (BSc) in Ecology and a Masters (MSc) in Ecological Monitoring from UCC. He is a senior ecologist with over 25 years' experience in ecological assessment. Prior to setting up DixonBrosnan Environmental Consultants in 2000, Carl set up and ran Core Environmental Services which included Rural Environmental Protection Scheme (REPS) planning for landowners and ecological assessments. Carl has particular experience in freshwater ecology including electrofishing fish stock assessments and water quality assessments. He also has considerable experience in habitat mapping and mammal ecology including survey work and reporting in relation to badgers and bats. Other competencies include surveys for invasive species and bird surveys. Carl has extensive experience with regards to EIAR and NIS mitigation and impact assessment. He has particular experience in large-scale industrial developments with

extensive experience in complex assessments as part of multi-disciplinary teams. Such projects include gas pipelines, incinerators, electrical cable routes, oil refineries and quarries.

Dr. Sorcha Sheehy PhD (ecology/ornithology) is an experienced ecological consultant specialising in bird behaviour. Sorcha received a BSc in Applied Ecology from UCC and subsequently went on to receive a PhD in behavioural ornithology at UCC. During her PhD research, Sorcha studied bird-aircraft collision with a particular focus on bird behaviour. Sorcha has worked for over 15 years in a professional ecology role and specialises in the coordination of ecology projects and assessments. She has coordinated and contributed to Habitats Directive Assessments (AA screenings and NIS) and Environmental Impact Assessment Reports (EIAR) for a range of small and large-scale projects with particular expertise in assessing impacts on birds. Notable projects include Arklow Bank Wind Park, Shannon Technology and Energy Park and Waste to Energy Facility Ringaskiddy.

2. Regulatory Context and Appropriate Assessment Procedure

2.1 Regulatory Context

The Habitats Directive (Council Directive 92/43/EEC on the *Conservation of Natural Habitats and of Wild Fauna and Flora*) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe. The requirements of these directives are transposed into Irish law through the European Communities (Birds and Natural Habitats Regulations 2012-2022).

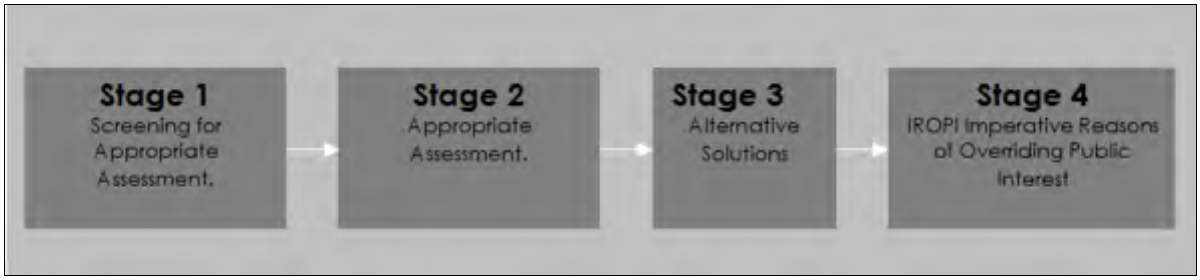
Under the Directive a network of sites of nature conservation importance have been identified by each Member State as containing specified habitats or species requiring to be maintained or returned to favourable conservation status. In Ireland the network consists of SACs and SPAs, and also candidate sites, which form the Natura 2000 network.

Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the *Conservation of Natural Habitats and of Wild Fauna and Flora* (as amended) (hereafter 'the Habitats Directive') requires that, any plan or project not directly connected with or necessary to the management of a designated site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. A competent authority (e.g. the EPA or Local Authority) can only agree to a plan or project after having determined that it will not adversely affect the integrity of the site concerned.

The possibility of a significant effect on a designated or "European" site has generated the need for an appropriate assessment to be carried out by the competent authority for the purposes of Article 6(3). A Stage Two Appropriate Assessment is required if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site. The first (Screening) Stage for appropriate assessment operates merely to determine whether a (Stage Two) Appropriate Assessment must be undertaken on the implications of the plan or project for the conservation objectives of relevant European sites.

2.2 Appropriate Assessment Procedure

The assessment requirements of Article 6(3) establish a stage-by-stage approach. This assessment follows the stages outlined in the 2001 European Commission publications "Assessment of plans and projects significantly affecting Natura 2000 sites: methodological guidance on the provisions of Articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC" (2001) and Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (Draft) Office for Official Publications of the European Communities, Luxembourg (EC, 2015);



The stages are as follows:

Stage One: Screening — the process which identifies any appreciable impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant;

Stage Two: Appropriate assessment — the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts;

Stage Three: Assessment of alternative solutions: The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site. It is confirmed that no reliance is placed by the developer on Stage Three in the context of this application for development consent;

Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain — an assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed (it is important to note that this guidance does not deal with the assessment of imperative reasons of overriding public interest). Again, for the avoidance of doubt, it is confirmed that no reliance is placed by the developer on Stage Four in the context of this application for development consent.

It is the responsibility of the competent authority to make a decision on whether or not the proposed development should be approved, taking into consideration any potential impact upon any Natura 2000 site within its zone of influence.

3. Receiving Environment

3.1 Existing site

The proposed development site is located on a greenfield site accessed through the existing mature housing estate at Aldworth Heights, as illustrated in **Figure 1**. The County Council's land holding includes a further 0.78 ha of lands to the west, which forms part of the cliff escarpment see **Figure 2**. The access road to Aldworth Heights is from St. Joseph's Road, (L-1220-0). Located on the northeastern edge of Mallow town, the site is bounded to the west by the N72 national route. Lands to the immediate north and west are dominated by agricultural lands, mainly tillage. Lands to the south include large areas of existing residential development.

The South Caherduggan Stream (aka Spa Glen Stream), a 1st order tributary of the River Blackwater is located approximately 50m west of the proposed development site boundary. This is separated from the stream by an escarpment of woodland and scrub on a steep incline sloping towards the stream.

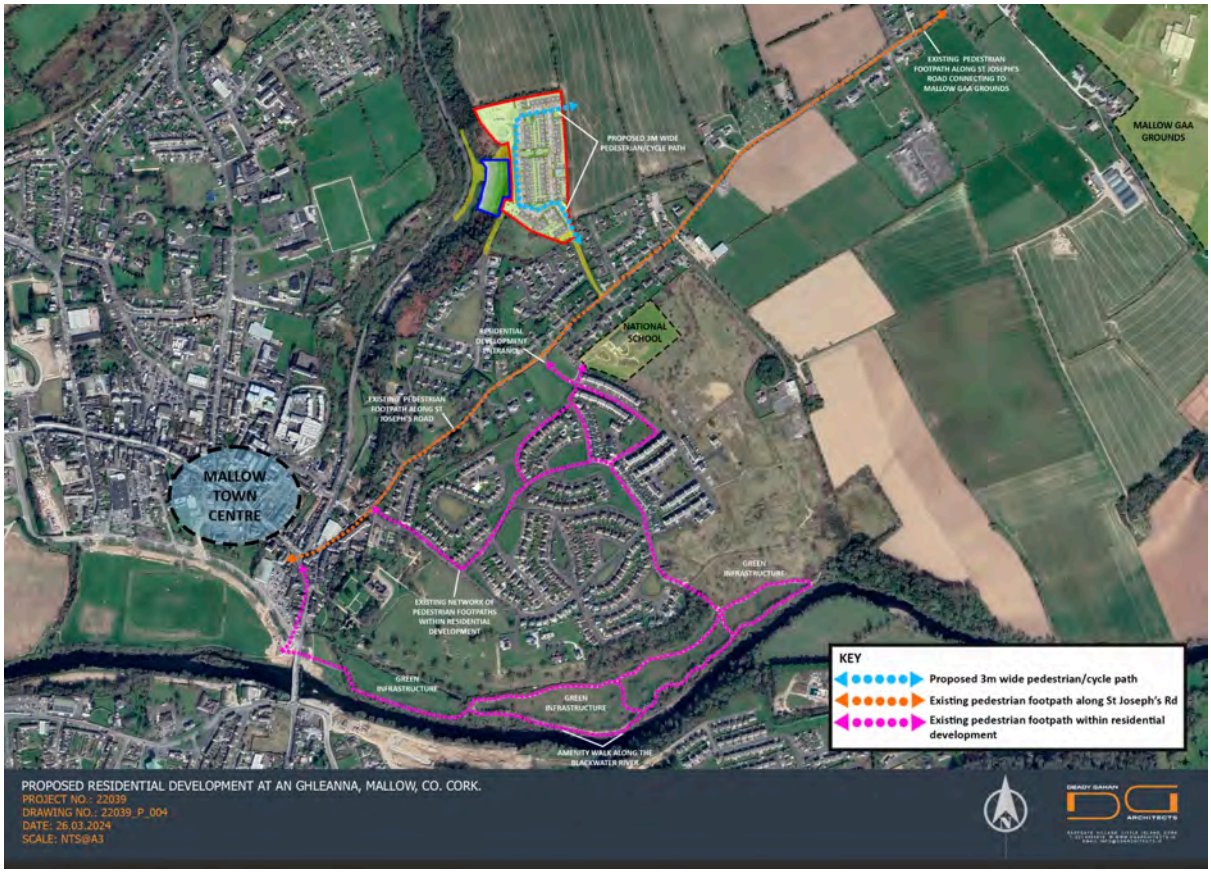


Figure 1. Proposed Development Site Location | Source DG Architects

Figure 2. Proposed Site Layout | Source DG Architects

3.2 Proposed Development

The proposed development would consist of a total of 138no. dwellings comprising 4no. 4 bed semi-detached houses, 14no. 3 bed semi-detached houses, 20no. 3 bed townhouses, 36no. 2 bed townhouses, 32no. 2 bed apartments and 32no. 1 bed apartments. A new vehicular access to the site is proposed which would connect to the end of the Aldworth Heights Road that is currently a cul-de-sac. The Aldworth Heights road connects to St. Josephs Road (L-1220). The proposed development will also include new internal estate roads, drainage, water supply, landscaping, boundary treatments, public lighting, electrical and telecommunications infrastructure and all other site development works entailed in a residential development.

An overview of the proposed development is shown in **Figure 2**. Site drawings are included in **Appendix 2.**

3.3 Surface Water Drainage

The proposed storm sewer collection system consists of a 100mm diameter pipe collection network around each house in accordance with TGD part H discharging to 225mm diameter uPVC sewer or larger in the public areas of the development. The surface water network layout is shown in drawing no. 22054-XX-XX-XX-XX-DR-WDG-CE-002 and the typical details for the surface water infrastructure are shown on drawing no. 22054-XX-XX-XX-XX-DR-WDG-CE-500.

The surface water sewers have been designed using the Causeway Flow design software and the Wallingford procedure for the design and analysis of urban drainage. The surface water system for the development is a single network including extensive SuDS measures falling generally from south to north and exiting the site in the northwest. It is intended to discharge the attenuated stormwater into the Spa Stream that flows in a southward direction, beside the N72, adjacent to the site.

SuDS measures are proposed for the development in both public and private areas in accordance with the guidance from the County Development Plan 2022 Advice Note 1 on Surface Water management and the CIRIA SuDS Manual C753. The Measures proposed will decrease the impact of the development on the receiving environment and also provide amenity and biodiversity in many cases. Regular maintenance of the SuDS measures will be required to ensure that they are effective throughout their design life. The following paragraphs describe the SuDS features proposed: detention basins, permeable paving, under-drained roadside swales, bio-retention tree pits, bio-retention, raingardens and water butts.

3.4 Wastewater Drainage

The layout of the proposed wastewater drainage network for the development is shown on WDG drawing no. 22054-XX-XX-XX-XX-DR-WDG-CE-002 and the typical details for the wastewater infrastructure are shown on drawing no. 22054-XX-XX-XX-XX-DR-WDG-CE-501.

One conventional piped, gravity sewer network is proposed. The network will generally fall from the south and east to the northwest where it will connect to existing Irish Water infrastructure in the N72 to the west of the site. All sewers within the curtilage of individual houses are to be installed in accordance with TGD Part H (2010) and will consist of 100 mm diameter uPVC Sewers from individual houses laid to falls of min 1:60 to connect to a 150mm

and 225mm uPVC sewer to be laid under the estate roads. Inspection chambers will be constructed within 1m of the boundary of each private property in accordance with Irish Water Standard Details.

All wastewater sewers in the public realm have been designed in compliance with Irish Water's Code of Practice for Wastewater Infrastructure – A Design and Construction Guide for Developers (Revision 2) July 2020. All construction details within the public realm will be in accordance with Irish Water, Wastewater Infrastructure Standard Details (Revision 4), July 2020.

A pre-connection enquiry was submitted to Irish Water to assess the feasibility of providing a connection to the site and Irish Water subsequently issued a confirmation of feasibility for the development. Irish Water responded to say that; "*in order to accommodate the proposed connection, upgrade works are required to increase the capacity of Mallow WWTP. Irish Water currently has a project underway which will provide the necessary upgrade and capacity. This upgrade project is scheduled to be completed by Q3 2023 (this may be subject to change) and the proposed connection could be completed as soon as possibly practicable after this date.*"

4. Stage 1 - Screening for Appropriate Assessment

4.1 Introduction

This section contains the information required for the competent authority to undertake screening for AA for the proposed development.

The aims of this section are to:

- Determine whether the proposed development is directly connected with, or necessary to, the conservation management of any Natura 2000 sites;
- Provide information on, and assess the potential for the proposed development to significantly effect on Natura 2000 Sites (also known as European sites); and
- Determine whether the proposed development, alone or in combination with other projects, is likely to have significant effects on Natura 2000 sites in view of their conservation objectives.

The proposed development is not directly connected with, or necessary to the conservation management of any Natura 2000 sites.

4.2 Zone of influence

The Zone of Influence (ZoI) comprises the area within which the proposed development may potentially affect the conservation objectives (or qualifying interests) of a Natura 2000 site. There is no recommended zone of influence, and guidance from the National Parks and Wildlife Service (NPWS) recommends that the distance should be evaluated on a case-by-case basis with reference to the nature, size and location of the project, the sensitivities of the ecological receptors, and the potential for in-combination effects (cumulative).

In ecological and environmental impact assessment, for an effect to occur there must be a risk enabled by having a source (e.g. construction works at a proposed development site), a 'receptor' (e.g. SAC or other ecologically sensitive feature), and a pathway between the source and the receptor (e.g. a watercourse which connects the proposed development site to the SAC, *ex situ* foraging habitat for SCI birds). A 'receptor' is defined as the Special Conservation Interest (SCI) of SPAs or Qualifying Interest (QI) of SACs for which conservation objectives have been set for the European sites being screened.

Consideration is therefore given to the source-pathway-receptor linkage and associated risks between the proposed development and Natura 2000 sites. For a significant effect to occur there needs to be an identified risk whereby a source (e.g. contaminant or pollutant arising from construction activities) affects a particular receptor (i.e. Natura 2000 site) through a particular pathway (e.g. a watercourse which connects the proposed development with the Natura 2000 site).

The identification of risk does not automatically mean that an effect will occur, nor that it will be significant. The identification of these risks means that there is a possibility of environmental or ecological damage occurring. The level and significance of the effect depends upon the nature of the consequence, likelihood of the risk and characteristics of the receptor.

The precautionary principle is applied for the purposes of screening to ensure that consideration and pre-emptive action is undertaken where there is a lack of scientific evidence. It is noted that mitigation measures are not taken into account in the AA screening assessment process.

4.3 Natura 2000 Sites

4.3.1 Natura 2000 Sites within Zone of Influence

Special Areas of Conservation (SACs) and candidate SACs (cSACs) are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites.

In accordance with the European Commission Methodological Guidance (EC 2018), a list of Natura 2000 sites that can be potentially affected by the proposed project has been compiled. All SAC, cSAC and SPAs sites which could potentially be impacted by the proposed Special Areas of Conservation (SACs) and candidate SACs (cSACs) are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites. The proposed development does not overlap with any European site. European sites within the likely zone of impact of the proposed development site are listed in **Table 1** and illustrated in **Figure 3** and **Figure 4**.

The Caherduggan South Stream (aka Spa Glen Stream) is located c.50m west of the proposed development site and the site slopes west towards the stream. This stream is a 1st order tributary of the River Blackwater with its confluence located 1.6km downstream of the proposed development site. Therefore, the proposed development site is hydrologically connected to the Blackwater River (Cork/Waterford) SAC (See **Figure 4**). During construction surface water runoff could potentially flow into the Caherduggan South Stream. During operation surface water from the site will discharge to the Caherduggan South Stream via a proposed outfall pipe. During construction and operation, contaminated surface water runoff could potentially impact on water quality within Caherduggan South Stream and River Blackwater. Construction works could also spread invasive species outside the proposed development site and impact on the SAC downstream. During operation, wastewater from the site will discharge to the River Blackwater via the Mallow wastewater treatment plant (WWTP). Habitats within the proposed development site could potentially provide *ex situ* habitats for QI species i.e., Otter. Habitats within the proposed development site could also potentially provide *ex situ* habitats for SCI species of the Kilcolman Bog SPA i.e., Whooper Swan.

Therefore, a potential source-pathway-receptor link has been identified between the source (the proposed development) and the receptors (Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA) via a potential pathway (discharge of surface water run-off during construction/operation, wastewater discharges during operation, loss/disturbance of ex situ foraging habitats, spread of invasive species) (See **Table 1** for details). Further information on these European sites is provided below.

Table 1. Natura 2000 sites within the zone of influence of the proposed development site

Natura 2000 site	Site Code	Qualifying Interests/Special Conservation Interests	Distance at closest point and potential source-pathway-receptor link
Special Area of Conservation (SAC)			
Blackwater River (Cork/Waterford) SAC	002170	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Mediterranean salt meadows (*Juncetalia 14irsute14*) [1410] Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] *Margaritifera margaritifera* (freshwater pearl mussel) [1029] *Austropotamobius pallipes* (white-clawed crayfish) [1092] *Petromyzon marinus* (sea lamprey) [1095] Lampetra planeri (brook lamprey) [1096] *Lampetra fluviatilis* (river lamprey) [1099] *Alosa fallax fallax* (twaite shad) [1103] *Salmo salar* (salmon) [1106] *Lutra lutra* (otter) [1355] *Trichomanes speciosum* (Killarney fern) [1421]	930m south. The South Caherduggan Stream, a tributary of the River Blackwater, is located c.50m from proposed development site. During construction and operation, contaminated surface water runoff could potentially impact on water quality within South Caherduggan Stream and River Blackwater. During operation, wastewater from the proposed development will discharge to the Blackwater River Via Mallow WWTP. Habitats within the proposed development site could potentially provide ex situ habitats for QI species. Given the location of the proposed development relative to the European site boundary and the identified downstream hydrological connectivity as well as the potential for *ex situ* SCI species to occur within proposed development, a viable source pathway connector link has been identified.
Special Protection Area (SPA)			
Kilcolman Bog SPA	004095	Whooper Swan (*Cygnus cygnus) [*A038] Teal (*Anas crecca) [A052]* Shoveler (*Anas clypeata) [A056]*	11.3km north. Habitats within the proposed development site could potentially provide *ex situ* habitats for SCI species. Given the location of the proposed development relative to the European site boundary as well as the potential for *ex situ* SCI species to occur within proposed development, a viable source pathway connector link has been identified.

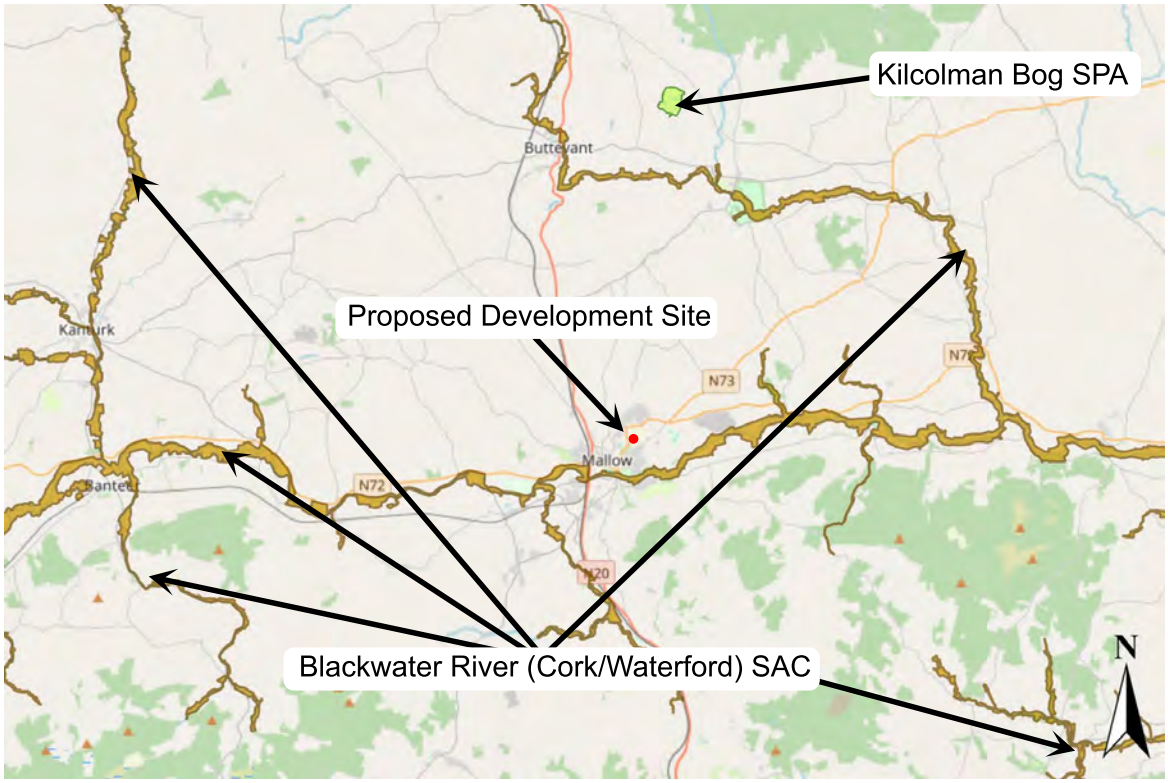


Figure 3. Natura 2000 Sites within zone of influence proposed development site | Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | Not to scale

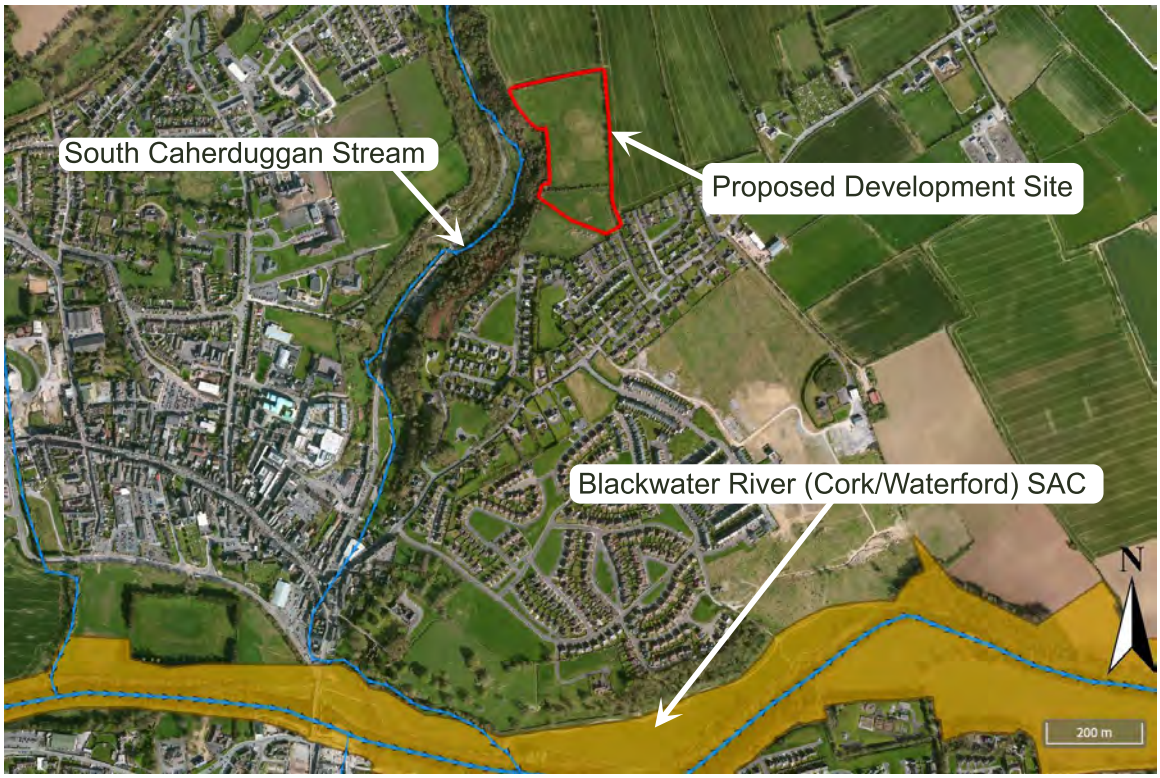


Figure 4. Location of proposed development site and Caherduggan South Stream relative Blackwater River (Cork/Waterford) SAC Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | Not to scale

4.3.2 Blackwater River (Cork/Waterford) SAC

This very large site drains a major part of County Cork and five mountain ranges. The site supports a high diversity of Annex I habitats and Annex II species of the E.U. Habitats Directive, including Atlantic salmon and Otter. The site designated as the Blackwater River cSAC consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond and as far downstream as the tidal stretches into Youghal Harbour as well as the many tributaries along the way, the larger of which include the Licky, Bride, Flesk, Chimneyfield, Finisk, Araglin, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, Owentaraglin and Awnaskirtaun. The extent of the Blackwater and its tributaries in this site flows through the counties of Kerry, Cork, Limerick, Tipperary and Waterford. The designated site covers a total area of 15,048 ha.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, dredging of the upper reaches of the Awbeg, over-grazing within the woodland areas, and invasion by non-native species, for example Rhododendron and Cherry Laurel.

Overall, the River Blackwater is of considerable conservation significance for the occurrence of good examples of habitats and populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively. Furthermore, it is of high conservation value for the populations of bird species that use it. Two Special Protection Areas, designated under the E.U. Birds Directive, are also located within the site - Blackwater Callows and Blackwater Estuary. Additionally, the importance of the site is enhanced by the presence of a suite of uncommon plant species.

A full site synopsis for the River Blackwater (Cork/Waterford) SAC is included as **Appendix 1** of this report.

4.3.3 Kilcolman Bog SPA

Kilcolman Bog is situated on the southern foothills of the Ballyhoura Mountains in Co. Cork. It occupies a glacially eroded hollow in Carboniferous limestone. The site comprises a quaking fen fed by calcareous groundwater, with areas of reed swamp, freshwater marsh and wet grassland. This site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation for the following species: Whooper Swan, Teal and Shoveler. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Kilcolman Bog is a privately-owned Nature Reserve and Wildfowl Sanctuary that has been managed for conservation since the 1970s. The site is of ornithological interest because it supports nationally important numbers of three species. Of particular note is the regular presence of Whooper Swan and Golden Plover, two species that are listed on Annex I of the E.U. Birds Directive. The site is notable as being one of the few sites in the country where almost daily observations have been made over a long period.

A full site synopsis for the Kilcolman Bog SPA is included as **Appendix 1** of this report.

4.4 Natura 2000 sites – Features of interests and conservation objectives.

The EU Habitats Directive contains a list of habitats (Annex I) and species (Annex II) for which SACs must be established by Member States. Similarly, the EU Birds Directive contains lists of important bird species (Annex I) and other migratory bird species for which SPAs must be established. Those that are known to occur at a site are referred to as 'qualifying interests' and are listed in the Natura 2000 forms which are lodged with the EU Commission by each Member State. A 'qualifying interest' is one of the factors (such as the species or habitat that is present) for which the site merits designation. The National Parks and Wildlife Service (NPWS) are responsible for the designation of SACs and SPAs in Ireland.

The conservation objectives for the Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA are detailed in the following publication:

NPWS (2012) Conservation Objectives: Blackwater River (Cork/Waterford) SAC 002170, Version 1. NPWS, Department of Arts, Heritage & the Gaeltacht.

NPWS (2022) Conservation objectives for Kilcolman Bog SPA [004095]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network. European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status sites designated as Special Areas of Conservation and Special Protection Areas. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Favourable conservation status of a habitat is achieved when its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis. The species and/or habitats listed as qualifying interests for Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA and specific conservation objectives are included in **Tables 2 - 4**.

Table 2. Qualifying Species for the Blackwater River (Cork/Waterford) SAC

Species code	Species		*Conservation objective*
1029	Freshwater Pearl Mussel	*Margaritifera margaritifera*	Restore
1092	White-clawed crayfish	*Austropotamobius pallipes*	Maintain
1095	Sea Lamprey	*Petromyzon marinus*	Restore
1096	Brook Lamprey	*Lampetra planeri*	Maintain
1099	River Lamprey	*Lampetra fluviatilis*	Maintain
1103	Twaite shad	*Alosa fallax*	Restore
1106	Atlantic Salmon	*Salmo salar*	Maintain
1355	Otter	*Lutra lutra*	Restore
1421	Killarney Fern	*Trichomanes speciosum*	Maintain

Restore = Restore favourable conservation condition, Maintain = Maintain favourable conservation condition

Table 3. Qualifying Habitats for the Blackwater River (Cork/Waterford) SAC

Habitat Code	Habitat	Conservation objective
1130	Estuaries	Maintain
1220	*Perennial vegetation of stony banks*	Maintain
1140	*Mudflats and sandflats not covered by seawater at low tide*	Maintain
1310	Salicornia and other annuals colonizing mud and sand	Maintain
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Restore
1410	Mediterranean salt meadows (*Juncetalia maritimi*)	Maintain
3260	Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	Maintain
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (A*lno-Padion, Alnion incanae, Salicion albae*)	Restore
91J0	*Taxus baccata woods of the British Isles	Under Review
91A0	Old sessile oak woods with Ilex and Blechnum in British Isles	Restore

Restore = Restore favourable conservation condition, Maintain = Maintain favourable conservation condition

Table 4. Special Conservation Interests Kilcolman Bog SPA

Species code	Species		*Conservation objective*
A038	Whooper Swan	*Cygnus cygnus*	Maintain/Restore
A052	Teal	*Anas crecca*	Maintain/Restore
A056	Shoveler	*Anas clypeata*	Maintain/Restore

Restore = Restore favourable conservation condition, Maintain = Maintain favourable conservation condition

4.5 Baseline Data

The ecological baseline for the proposed development site was based on a desktop review and direct surveys of the relevant works area and areas proximate to same. This focused on habitats and species that are listed as Qualifying Interests (QI) (in the case of SACs) and Special Conservation Interests (SCI) (in the case of SPAs) in the designations for the European sites. Surveys for habitats, mammals, birds and invasive species were undertaken within the study area.

4.5.1 Habitats

Habitat surveys were carried out on the 19th of September 2022 and 15th of March 2023.. Habitat mapping was carried out in line with the methodology outlined in the Heritage Council Publication, *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011). The terrestrial and aquatic habitats within the proposed development site were classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex I Habitats where required.

A current overview of habitats recorded within the site is shown in **Figure 5** and the habitats recorded on site are described in **Table 5**. Site photographs are also included below**.**

Table 5. Habitats recorded during site survey

Habitat	Description
Hedgerow WL1/Scrub WS1	Generally poorly delineated mixture of hedgerow. Some old mature Hawthorn and Elder and Blackthorn. Ivy on older Hawthorn is dense. Understorey species include Cleavers, Nettle, Ivy, Bramble, Hogweed, Yorkshire fog, Lord and ladies, Curled dock, Lesser celandine, Bracken and, Spear thistle. An earth covers an older stone water which is no longer visible as it is covered by vegetation. In general, the trees within the hedgerow mature with large gaps between them.
Improved agricultural grassland GA1/Dry meadows and grassy verges GS2	Improved agricultural grassland and dry meadow and grassy verge dominate the site. Species recorded in this habitat include Field thistle, Hogweed, Bracken, Creeping buttercup, Broadleaved dock, Cleavers, Cocksfoot, Knapweed, Field sorrel, Common Bent, Dandelion and Crested Dogs Tail. These species were recorded in areas of deeper soil where topsoil is still present Other areas where topsoil has been removed support a high component of common moss species with species such Ribwort plantain, Red fescue, St. John's wort and Self-heal as well as occasional Buddleia Noted. Scrub encroachment i.e. Bramble, Bracken and Blackthorn from the treelines, hedgerow and woodland habitats is evident on the boundaries and further encroach is likely to occur in the absence of active management. Dry meadows and grassy verges GS2 habitat corresponds to the Habitats Directive Annex I habitat: 'lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510). GS1 habitat has links with Annex I: Calcareous grasslands with either high numbers or diversity of orchids correspond to the priority habitat, 'semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometea) (*important orchid sites) (6210)'. However, the grassland mosaic within the proposed development area is not an example of this Annex I habitat type.
Spoil and bare ground ED2/Improved agricultural grassland GA1	An area on the southern field has been cleared of topsoil. Subsoil is gradually being recolonised by a mix of common species. . Species recorded include Creeping buttercup, Daisy, Field thistle, Dandelion and common grass species.
Spoil and bare ground ED2/Scrub WS1	Where topsoil has been stockpiled, recolonisation with scrub species has occurred. Species recorded include dense Bramble with some Hawthorn and Gorse. Winter Heliotrope was recorded on the periphery of this area.
Mixed broadleaved woodland WD1/Scrub WS1 **(Outside proposed development site boundary)**	This habitat mosaic forms a loose mix of woodland/scrub and is located on a steep bank between the grassland the Caherduggan South Stream/N72 route. Some areas within this habitat are dominated by Bracken and Bramble. Trees are patchily distributed and include large numbers of Sycamore, Hawthorn, semi-mature Ash, Elm and juvenile Blackthorn. Understorey species recorded include Ivy, Lords and ladies, Nettle, Wood rush. Honeysuckle. Ivy growth on trees is relatively dense. Soft shield fern and Hogweed were was noted in more shaded areas of habitat. Areas of scrub on the periphery support Bracken, Gorse and Bracken. The western boundary of this habitat is delineated by green palisade fencing and an area of scrub which separates the study area from the Caherduggan South Stream. It is noted that a review of historical maps found that this habitat was not present in the first edition maps (1829-1842) or on the 25" maps (1897-1913). However it noted that woodland was present to the northwest of the site along the Caherduggan Stream on the first edition maps (1829-1842). In general however the trees are relatively young with no significant mature or veteran trees noted in the woodland.

Treeline WL2 **(Outside proposed development site boundary)**	A treeline runs along the eastern boundary of the site. The stumps of a small number of very old ash trees remain in situ with some juvenile growth evident. Other species included Willow, Wild rose, Elder, Blackthorn, Hazel and Holly. Understory species recorded include Lord and ladies, Field parsley, Hogweed, Cleavers, Ivy and Nettle. Scrub encroachment is evident due to lack of active management. It is noted that a review of historical maps found that this field boundary was mapped on the 1st edition mapping (1829-1842). This is a high value habitat at a local level with a broad mixture of species.

Figure 5. Habitats recorded within proposed development site

Plate 1. Hedgerow adjacent to palisade fencing along northern boundary

Plate 2. Hedgerow habitat along northern boundary

Plate 3. Internal hedgerow/scrub habitat

Plate 4. Scrub encroachment along western boundary

Plate 5. Woodland/scrub within land ownership area

Plate 5. Area of bracken/gorse within woodland/scrub habitat

Plate 6. Areas of scrub within woodland/scrub habitat

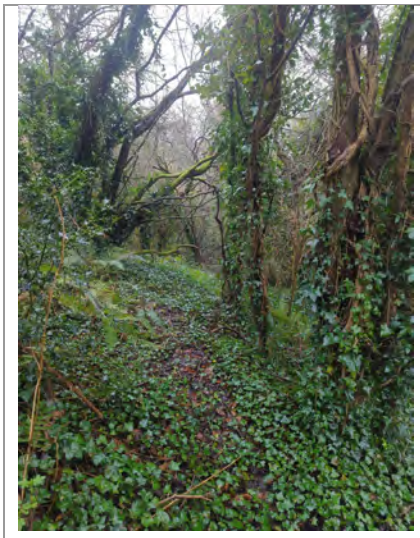


Plate 7. Woodland area with dense ivy

Plate 8. Large field with treeline boundary on margin

Plate 9. Fields with scrub encroachment on margins

Plate 10. More diverse grassland on deeper soils

Plate 11. Moss species dominant on shallower soils

Plate 12. Treeline habitat

Plate 13. Mature tree within treeline

Plate 14. Treeline habitat with scrub on margins

Plate 15. Area of site cleared/bare soil

Plate 16. Scrub recolonisation on mounded topsoil

Plate 17. Caherduggan South Stream located to west of study site boundary

4.5.2 Otter

The site of the proposed development lies within Ordnance Survey (OS) National Grid 10km square W59 (hectad). The National Biodiversity Data Centre (NBDC) online database provides data on the distribution of mammals, birds, and invertebrates within the 10 km grid squares.

A review of existing NBDC records within a 10km radius of the study site (Grid Square W59) showed that Otter or signs of Otter have been recorded on 20 occasions, most recently in September 2015 (Source NBDC 15/03/23).

Otter is a qualifying interest for the Blackwater River (Cork/Waterford)) SAC which is one of the most important sites in Ireland for this species. The most recent national Otter Survey recorded Otter in 98.8% of the site assessed within the Blackwater catchment (Reid et al. 2013).

Otters are also known to frequent sections of the River Blackwater within Mallow town (Carl Dixon Personal observation). While there are no records of Otter on the Caherduggan South Stream, given its connection to the River Blackwater, Otter are likely to use this watercourse.

There are no wetland habitats within the proposed development site and therefore no foraging opportunities for Otter within the site. The Caherduggan South Stream (aka Spa Glen Stream), a 1st order tributary of the River Blackwater is located approximately 50m west of the proposed development site boundary. This is separated from the stream by an escarpment of woodland and scrub on a steep incline sloping towards the stream. As noted above, Otters commonly occur along the River Blackwater and are listed as a QI for the Blackwater River (Cork/Waterford) SAC. While Otter could potentially forage along the Caherduggan South Stream, no signs of Otter were recorded within 150m of the proposed development site.

4.5.3 Birds

The NBDC lists the following Annex I bird species for hectad W56, Kingfisher (*Alcedo atthis*), Golden Plover (*Pluvialis apricaria),* Hen Harrier (*Circus cyaneus*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*) and Peregrine Falcon (*Falco peregrinus*). Grassland habitats can provide foraging areas or high tide roosts for wading birds such as Golden Plover. However, given the large areas of similar grassland habitat in the vicinity, the grasslands at the proposed development site would not provide critical habitat for wading birds. Overall, the proposed development site does not contain valuable habitats for Annex I bird species.

Bird surveys for general bird usage were carried out in conjunction with habitat surveys within the entire development footprint on the 19th September 2022 and 15th March 2023.

Bird species listed in Annex I of the Birds Directive are considered a conservation priority. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation (Gilbert *et al.* 2021). Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. Bird species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority. Species recorded within the proposed development footprint which were recorded during habitat surveys are shown in **Table 6**.

Table 6. Bird Species recorded during site surveys

Species		Birds Directive Annex	BOCCI*	
		I	Red List	Amber List
Blackbird	*Turdus merula*			
Blue Tit	*Cyanistes caeruleus*			
Chaffinch	*Fringilla coelebs*			

Species		Birds Directive Annex	BOCCI*	
		I	Red List	Amber List
Dunnock	*Prunella modularis*			
Song Thrush	*Tardus philomelos*			
Robin	*Erithacus rubecula*			
Rook	*Corvus frugilegus*			
Woodpigeon	*Columba palumbus*			
Wren	*Troglodytes troglodytes*			
Goldfinch	*Carduelis carduelis*			
Jackdaw	*Corvus monedula*			
Starling	*Sturnus vulgaris*			
Great tit	*Parus major*			

* Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 43: 1-22

No Annex I species or birds of conservation concern in Ireland (BOCCI) species were recorded at the site. Some common bird species were recorded during the site visit, but no uncommon or specialised bird species were recorded or would be expected to occur as the habitats on site are common. The mixture of grassland, treeline, woodland and scrub habitats onsite provide a range of nesting and foraging opportunities for common bird species such as Blackbird *Turdus merula*, Blue Tit *Cyanistes caeruleus*, Dunnock *Prunella modularis* and Song Thrush *Turdus philomelos* Early successional species within transitional habitats provide foraging opportunities for species such as Chaffinch *Fringilla coelebs* and Goldfinch *Carduelis carduelis.* Native, fruit bearing trees such as Hawthorn, Holly and Blackthorn provide local foraging opportunities throughout the winter and summer seasons.

The Caherduggan South Stream could potentially supports some more specialist species including Kingfisher *Alcedo atthis*, Grey Heron *Ardea cinerea*, Mallard *Anas platyrhynchos* and Grey Wagtail *Motacilla cinerea* and is considered an important local resource for birds. However, there are no aquatic habitats onsite which could support specialised bird species. Overall, the proposed development site supports some bird species which are relatively common and widespread within the county.

4.5.4 Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth

from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality. The NBDC lists a number of both aquatic and terrestrial high impact invasive species which have been recorded within grid square W59 (**Table 7**).

Table 7. High impact invasive species recorded in W59

Group	Species
bird	Ruddy Duck (*Oxyura jamaicensis*)
flowering plant	Canadian Waterweed (*Elodea canadensis*)
flowering plant	Cherry Laurel (*Prunus laurocerasus*)
flowering plant	Indian Balsam (*Impatiens glandulifera*)
flowering plant	Japanese Knotweed (*Fallopia japonica*)
terrestrial mammal	American Mink (*Mustela vison*)
terrestrial mammal	Brown Rat (*Rattus norvegicus*)
terrestrial mammal	Fallow Deer (*Dama dama*)
terrestrial mammal	Sika Deer (*Cervus nippon*)

Source NBDC 10/05/24

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 make it an offence to plant, disperse, allow dispersal or cause the spread of certain species e.g. Japanese knotweed and Rhododendron, keep the plant in possession for purpose of sale, breeding, reproduction, propagation, distribution, introduction or release, keep anything from which the plant can be reproduced or propagated from the species, without a granted licence and keep any vector material for the purposes of breeding, distribution, introduction or release. Regulation 49 deals with the 'Prohibition on introduction and dispersal' while Regulation 50 deals with the 'Prohibition on dealing with and keeping certain species'. Regulation 50 has yet to be brought into Irish law. Regulation 74 is a transitional provision in relation to Regulation 49 and 50.

The control of invasive species in Ireland comes under the Wildlife (Amendment) Act 2000, where it states that

'Any person who— [...] plants or otherwise causes to grow in a wild state in any place in the State any species of flora, or the flowers, roots, seeds or spores of flora, ['refers only to exotic species thereof']][...] otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence.'

The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibits the introduction and dispersal of species listed in the Third Schedule, which includes Japanese Knotweed and Himalayan Balsam *Impatiens glandulifera*, as follows: "any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow [….] shall be guilty of an offence."

No third schedule species were recorded within the proposed development site. The medium impact listed species (as classified by the NBDC) Buddleia (*Buddleja davidii*) and the low impact species Winter Heliotrope (*Arctostaphylos Luciana*) were recorded within the proposed development site. These species are not included in the Third Schedule of the Birds and Natural Habitats Regulations 2011 (SI 477 of 2011). Therefore, their presence at the site does not have the potential to lead to an offence under the Birds and Natural Habitats Regulations 2011 (S.I. 477 of 2011).

4.6 Water Quality

4.6.1 River Basin Management Plan for Ireland 2022-2027 (3rd Cycle)

The Water Framework Directive (WFD) sets out the environmental objectives which are required to be met through the process of river basin planning and implementation of those plans. Specific objectives are set out for surface water, groundwater and protected areas. The challenges that must be overcome in order to achieve those objectives are very significant. Therefore, a key purpose of the River Basin Management Plan (RBMP) is to set out priorities and ensure that implementation is guided by these priorities.

The EPA has published an updated draft Catchment Assessment for each of our 46 catchments. These assessments provide an overview of the situation in the catchment, draw comparison between Cycle 2 and Cycle 3, and will help support the draft River Basin Management Plan 2022-2027 public consultation process. The third cycle RBMP, which was published in July 2022, aims to build on the progress made during the second cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). The former measure has resulted in significant progress in terms both of compliance levels and of the impact of urban wastewater on water quality. The latter provides a considerable environmental baseline which all Irish farmers must achieve and has resulted in improving trends in the level of nitrates and phosphates in rivers and groundwater. It is acknowledged, however, that sufficient progress has not been made in developing and implementing supporting measures during the first and second cycles.

Overall, RBMP assesses the quality of water in Ireland and presents detailed scientific characterisation of our water bodies. The characterisation process also takes into account wider water quality considerations, such as the special water-quality requirements of protected areas. The characterisation process identifies those water bodies that are *At Risk* of not meeting the objectives of the WFD, and the process also identifies the significant pressures causing this risk. Based on an assessment of risk and pressures, a programme of measures has been developed to address the identified pressures and work towards achieving the required objectives for water quality and protected areas. Data relating to the watercourses within the study area is provided in **Table 8** and the location of these shown in **Figure 6**.

Table 8. WFD Status 3rd Cycle

Catchment: Blackwater Munster (Code 18) – 2nd Cycle			
This catchment includes the area drained by the River Blackwater and all streams entering tidal water between East Point and Knockaverry, Youghal, Co. Cork, draining a total area of 3,310km². The largest urban centre in the catchment is Mallow. The other main urban centres in this catchment are Fermoy, Mitchelstown, Youghal, Kanturk and Millstreet. The total population of the catchment is approximately 109,030 with a population density of 33 people per km². Several small coastal rivers drain the area to the southeast of Cork Harbour and the area at the eastern extreme of the catchment is drained by the Womanagh River which flows into the sea on the western side of Youghal Bay. The proposed development site lies in the Blackwater [Munster]_SC_090 sub catchment. This sub catchment comprises a portion of the Blackwater main channel (Blackwater (Munster)_100 to Blackwater (Munster)_160). The issues on the main channel range from the decline of a High status objective water body (Blackwater (Munster)_110) to Good, which was driven by hydro morphology pressures, to a combination of point (Section 4 and IPC) and urban diffuse sources on Blackwater (Munster)_130. On Blackwater (Munster)_160 fish is the only metric failing to reach Good status and the IFI will advise what the significant pressure is. Tributaries to the Blackwater (Munster)_110, Ballyclogh Stream_010 and Ballyclogh Stream_020 have consistently Poor and Moderate ecological status, respectively. On Ballyclogh Stream_010 the significant pressure is hydromorphology.			
Waterbodies relevant to the proposed project			
Waterbody	**WFD Risk**	**WFD Status 2016-2021**	**Significant pressures**
Blackwater (Munster)_140	Not at risk	Na	Na
Blackwater (Munster)_160	At risk	Moderate	Na

Source: EPA envision mapping and www.catchments.ie

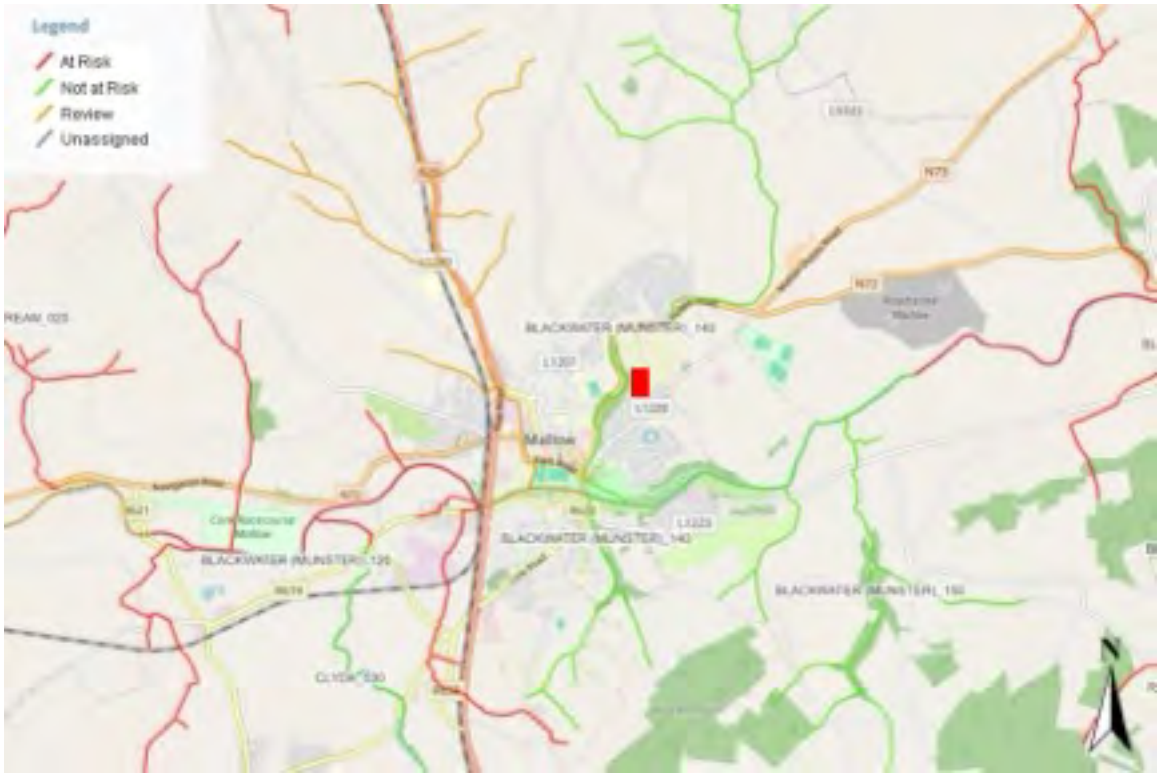


Figure 6. WFD 3rd cycle waterbodies in the vicinity of the proposed development | Source: EPA Envision mapping https://gis.epa.ie/EPAMaps/) | not to scale

4.6.2 Urban Wastewater Treatment Directive

The Waste Water Discharge (Authorisation) Regulations 2007 (S.I. 684 of 2007) gives effect to the requirements of the Urban Waste Water Treatment Directive (Directive 91/271/EEC) and the Water Framework Directive (2000/60/EC) in Ireland. The Urban Waste Water Treatment Directive (UWWTD) lays down the requirements for the collection, treatment and discharge of urban waste-water and specifies the quality standards which must be met — based on agglomeration size — before treated waste-water is released into the environment.

The priority objective for this river basin planning cycle is to secure compliance with the Urban Waste Water Treatment Directive and to contribute to the improvement and protection of waters in keeping with the water-quality objectives established by this Plan. Achieving this objective entails addressing waste-water discharges and overflows where protected areas (i.e. designated bathing waters and shellfish waters) or high-status waters are at risk from urban waste-water pressures.

As part of the proposed development wastewater discharging from the proposed development will be conveyed to the Mallow Wastewater Treatment Plant (WWTP) (D0052-01) for treatment prior to discharging into the River Blackwater.

4.7 Potential Impact of Proposed Development on Blackwater River (Cork/Waterford)

4.7.1 Loss of habitat

Any habitat loss of Natura 2000 sites or deterioration in habitat quality would reduce the extent of habitat available for SCI/QI species. This could potentially decrease the viability of existing

QI habitats and increase the pressure on existing habitat and may result in further deterioration.

The proposed development site does not overlap with any European site. The Blackwater River (Cork/Waterford) SAC is located 930 southwest of the proposed development site. An ecological appraisal of the proposed development site indicates that it supports common habitats which, although of high local value, are not qualifying habitats for European sites. The Caherduggan South Stream (a 1st order tributary of the River Blackwater) is located in c.50m from the proposed development site. However, this stream will not be directly impacted by the proposed works.

There are no wetlands or watercourses within the proposed development site boundary which could provide significant foraging habitat for Otter. No signs of Otter were recorded within 150m of the proposed development site and there will be no direct impact on Otter breeding habitats.

Whooper Swan will normally forage on aquatic vegetation, but they are commonly found grazing on agricultural grasslands and fields where there is spilled grain, as well as potatoes from cultivated land. While this species could potentially forage within the proposed development site, the grassland habitats within the proposed development site are common in the wider landscape and there is nothing to differentiate the proposed development site from other fields nearby. Therefore, the proposed development site does not provide valuable habitat for SCI birds of Kilcolman Bog SPA.

The proposed development will not result in any significant deterioration in habitat quality, loss of habitat or loss of connectivity within Blackwater River (Cork/Waterford) SAC or Kilcolman Bog SPA. Therefore, it has been concluded that the proposed development will not result in any loss or deterioration of habitat within European sites.

4.7.2 Impacts from Noise and Disturbance

Potentially increased noise and disturbance associated with the site works could cause disturbance/displacement of fauna. If of sufficient severity, there could be impacts on reproductive success. The proposed development is located 930m from the Blackwater River (Cork/Waterford) SAC. Although the Caherduggan South Stream has the potential to support Brown Trout and European Eel, this is not a signficinat watercourse for for QI fish/aquatic species for the Blackwater River (Cork/Waterford) SAC i..e Atlantic Salmon. Lamprey species, White-clawed Crayfish and Freshwater Pearl Mussel. While Otters could potentially forage in this stream, no signs of Otter were recorded within 150m of the proposed development site. The lands within the proposed development site are of low to negligible value for Otter. Furthermore, given the largely nocturnal foraging habits of Otter, they could continue to forage along the Caherduggan South Stream during construction and operation.

Given the above, no significant disturbance impacts on Otter or other QI species for the Blackwater River (Cork/Waterford) SAC during construction and operation of the proposed development have been identified.

Whooper Swan will normally forage on aquatic vegetation, but they are commonly found grazing on agricultural grasslands and fields where there is spilled grain, as well as potatoes from cultivated land. While this species could potentially forage within the proposed

development site, the grassland habitats within the proposed development site are common in the wider landscape and there is nothing to differentiate the proposed development site from other fields nearby. Therefore, given the above and the distance from Kilcolman Bog SPA (11.3km), the proposed development site does not provide valuable habitat for SCI birds of Kilcolman Bog SPA and no significant disturbance impacts have been identified.

4.7.3 Impacts on Water Quality (Surface Water)

Silt-laden stormwater run-off during site preparation, site clearance, dewatering of excavations and construction of site access roads as well as spillages of fuel and oil and concrete / cement run-off could potentially impact on water quality within the Caherduggan South Stream and the Blackwater River (Cork/Waterford) SAC downstream of the proposed development site. During operation surface water from the site will discharges to the Caherduggan South Stream. In the absence of mitigation, hydrocarbons from the parking areas could be carried in the stormwater and increased volumes of stormwater as a result of increased areas of impermeable surfaces could also occur during operation.

Contaminated surface water runoff has the potential to impact on water quality within the Caherduggan South Stream and subsequently impact aquatic habitats downstream within the Blackwater River (Cork/Waterford) SAC, i.e. Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260], as well as qualifying species which use these habitats, *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029], *Austropotamobius pallipes* (White-clawed Crayfish) [1092], *Petromyzon marinus* (Sea Lamprey) [1095], *Lampetra planeri* (Brook Lamprey) [1096], *Lampetra fluviatilis* (River Lamprey) [1099], *Alosa fallax fallax* (Twaite Shad) [1103], *Salmo salar* (Salmon) [1106], *Lutra lutra* (Otter) [1355].

Surface water runoff from the proposed development site could potentially impact on the conservation objectives of the Blackwater River (Cork/Waterford) SAC in the absence of mitigation. Therefore, the conservation objectives of Blackwater River (Cork/Waterford) SAC may be impacted by surface water runoff during construction and operation and significant effects from surface water emissions cannot be excluded in the absence of mitigation.

Given the absence of hydrological connection, significant effects on Kilcolman Bog SPA from surface water emissions during construction can be excluded.

4.7.4 Impacts on Water Quality (Wastewater)

The proposed residential development could potentially result in an increase in nutrients discharging to the River Blackwater via the Mallow Wastewater Treatment Plant (WWTP). Increased nutrients can potentially impact on aquatic habitats by changing baseline ecological conditions.

The Mallow WWTP was designed to cater for a Population Equivalent of 18,000PE and BOD loading of 1,080 Kg/day. The WWTP obtained a discharge licence (Reg: D0052-01) from the Environmental Protection Agency in 2012 and has assigned emission limit values (ELV's) for a range of parameters to ensure a high degree of protection to the River Blackwater into which it discharges. The treatment process includes the following: -

- Preliminary Treatment (Automatic Screening & Grit Removal)

- Secondary Treatment (Conventional Activated Sludge)
- Nutrient Removal (Ferric dosing for P removal)
- Odor Treatment Unit
- Standby Generator and Scada System
- Sludge Treatment - Sludge Acceptance Tank, Sludge Behind/Holding Tank, Picket Fence Thickener and Sludge Belt Presses.

The discharge licence assigns a number of ELV's for biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), ammonia, orthophosphate (Ortho P), pH, Total P, Total N and Ammonia NH_3. The ELVs are set based on the full design capacity (P.E. 18,000) and are aimed at providing a high degree of protection to the receiving water body. ELV's are set for Ammonia (as N) at 3mg/l, Total Phosphorus (as P) at 2mg/l and orthophosphate (as P) at 1.5mg/l.

As detailed in the Annual Environmental Report for 2020 (EPA 2021), Planning Permission has been granted for the Mallow WWTP upgrade which includes for upgrading the existing treatment plant design capacity from 10,500 Population Equivalent to 22,000 Population Equivalent. The original WWTP had two treatment streams with an overall Design P.E. of 18,000. However only one treatment stream is operational which has a Design P.E of 10,500 therefore the current organic capacity (PE) is 10,500. The plant has a current agglomeration PE of 14,367 and is therefore in exceedance of its design capacity by 3,867 PE.

Table 9 provides a summary of the 2020 operating conditions for the WWTP obtained from the most recent Environmental Protection Agency Annual Environment Report (EPA 2021). This table shows the overall compliance of the final effluent with the Emission Limit Values (ELVs).

Table 9. Wastewater Treatment & Discharge Mallow WWTP Main Effluent Discharge

Effluent Monitoring Summary	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	Total P (mg/l)	Ortho P(mg/l)	Total N (mg/l)*	Ammonia (as N) (mg/l)	pH
WWDL ELV (Schedule A)	25.00	125.00	25.00	2.00	1.50	n/a	3.00	9
ELV with Condition 2 Interpretation included	50.00	250.00	62.50	2.40	1.80	n/a	3.60	9
No. of Sample results	13	13	13	13	13	13	13	13
Number of sample results above WWDL ELV	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Effluent Monitoring Summary	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	Total P (mg/l)	Ortho P(mg/l)	Total N (mg/l)*	Ammonia (as N) (mg/l)	pH
Number of sample results above ELV with condition 2 interpretation	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Annual Mean (parameters where a mean ELV applies are shaded)	4.53	20.75	9.49	0.18	0.06	12.66	1.53	7.75
Overall Compliance (Pass/Fail)	Pass	Pass	Pass	Pass	Pass		Pass	Pass

The WWTP is compliant with the ELV's set in the Wastewater Discharge Licence. A summary of monitoring from ambient monitoring points associated with the wastewater discharge is provided in **Table 10** below.

Table 10. Ambient Water Quality Monitoring Results

Ambient Monitoring	Irish Grid Reference	EPA Feature Coding Tool code	Bathing water	Drinking water	FWPM	Shellfish	Current WFD Status
Upstream Monitoring point	E157482, N98165	RS18B021690	No	No	Yes	No	Unassigned
Downstream Monitoring point	E158083, N98036	RS18B021720	No	No	Yes	No	Unassigned

The 2020 AER notes the following in relation to the significance of results:

- The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.
- The ambient monitoring results meet the required EQS. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.
- Based on ambient monitoring results a deterioration in Orthophosphate concentration downstream of the effluent discharge is noted.

- A deterioration in water quality has been identified, however it is not known if it or is not caused by the WWTP.
- Other causes of deterioration in water quality in the area are: Diffuse Urban Point Sources & S4 Industries
- The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.

Mallow Wastewater Treatment Plant (WWTP), in its' present configuration and setup, is overloaded and cannot cater for the existing population equivalent. Mallow WWTP has a design capacity of 18,000 population equivalent (PE). However, some of the existing treatment units are no longer operational and require refurbishment and/or replacement. Mallow Agglomeration is currently in breach of Articles 3, 4(1), 5(1) and 12 of the Urban Wastewater Treatment Directive (UWWTD) (91/271/EEC) and as such is the subject of an infringement notice from the European Court of Justice (ECJ).

In line with Irish Water's Investment Plan for 2017-2021 a planning application was submitted to Cork County Council in 2018 for the Mallow WWTP upgrade and upgrade to the sewerage network. Planning was subsequently granted by Cork County Council (Planning Ref. 19/05078).

A pre-connection enquiry was submitted to Irish Water to assess the feasibility of providing a connection to the site and Irish Water subsequently issued a confirmation of feasibility for the development. Irish Water responded to say that; "*in order to accommodate the proposed connection, upgrade works are required to increase the capacity of Mallow WWTP. Irish Water currently has a project underway which will provide the necessary upgrade and capacity. This upgrade project is scheduled to be completed by Q3 2023 (this may be subject to change) and the proposed connection could be completed as soon as possibly practicable after this date."*

The proposed development will not be connected to Mallow WWTP until the upgrade has been completed. Following this upgrade there will be sufficient capacity within the Mallow WWTP and there will be no impact from operational wastewater discharges to local aquatic ecology or the River Blackwater (Cork/Waterford) SAC.

4.7.5 Spread of Invasive Species

Construction works have the potential to spread invasive species outside a works area, particularly in the vicinity of a watercourse. Disturbance of invasive species within the proposed development area could lead to the dispersal of scheduled invasive species either via machinery, materials, clothing or wild animals.

No high-risk invasive species were recorded within the footprint of the proposed development. The medium and low impact species, Buddleia and Winter Heliotrope were recorded. However, these species have limited ability to spread over distances. Given the distance from the Blackwater River (Cork/Waterford) SAC, no pathway for impact from these invasive species has been identified. Therefore, potential significant effects on the on the conservation objectives of Blackwater River (Cork/Waterford) SAC from the spread of invasive species during construction can be excluded.

4.7.6 In-combination Impacts

In-combination impacts refer to a series of individual impacts that may, in combination, produce a significant effect. The underlying intention of this in combination provision is to take account of in-combination impacts from existing or proposed plans and projects and these will often only occur over time.

Article 6(3) of the Habitats Directive requires that:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.

It is therefore required that the potential impacts of the proposed development are considered in-combination with any other relevant plans or projects. An assessment of plans and projects with the potential for in-combination effects in association with the proposed development was undertaken. A search of planning applications in the vicinity of the proposed development was undertaken in December 2023 to examine projects with potential for in-combination effects (Source: Cork County Council, An Bord Pleanála, EPA). Other projects or developments which could potentially cause in-combination impacts are listed in **Table 11**.

Table 11. Other projects or developments which could lead to potential in-combination impacts

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
River Basin Management Plan 2022-2027	The project should comply with the environmental objectives of the Irish RBMP which are to be achieved generally by 2027. • Ensure full compliance with relevant EU legislation • Prevent deterioration • Meeting the objectives for designated protected areas • Protect high status waters Implement targeted actions and pilot schemes in focus sub-catchments aimed at: targeting water bodies close to meeting their objective and addressing more complex issues which will build knowledge for the third cycle.	The implementation and compliance with key environmental policies, issues and objectives of this management plan will result in positive in-combination effects to European sites. The implementation of this plan will have a positive impact for the biodiversity. It will not contribute to in-combination impacts with the proposed development.
Inland Fisheries Ireland Corporate Plan 2021-2025	To ensure that Ireland's fish populations are managed and protected to ensure their conservation status remains favourable. That they provide a basis for a sustainable world class recreational angling product, and those pristine	The implementation and compliance with key environmental issues and objectives of this corporate plan will result in positive on-combination effects to European sites. The implementation of this corporate plan will have a positive

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
	aquatic habitats are also enjoyed for other recreational uses. To develop and improve fish habitats and ensure that the conditions required for fish populations to thrive are sustained and protected. To grow the number of anglers and ensure the needs of IFI's other key stakeholders are being met in a sustainable conservation focused manner. EU (Quality of Salmonid Waters) Regulations 1988. All works during development and operation of the project must aim to conserve fish and other species of fauna and flora habitat; biodiversity of inland fisheries and ecosystems and protect spawning Salmon and trout.	impact for biodiversity of inland fisheries and ecosystems. It will not contribute to in-combination or cumulative impacts with the proposed development.
Irish Water Capital Investment Plan 2020-2024	Proposals to upgrade and secure water services and water treatment services countrywide.	Likely net positive impact due to water conservation and more effective treatment of water. It will not contribute to in-combination impacts with the proposed development.
Water Services Strategic Plan (WSSP, 2015)	Irish Water has prepared a Water Services Strategic Plan (WSSP, 2015), under Section 33 of the Water Service No. 2 Act of 2013 to address the delivery of strategic objectives which will contribute towards improved water quality and biodiversity requirements through reducing: Habitat loss and disturbance from new / upgraded infrastructure; Species disturbance; Changes to water quality or quantity; and Nutrient enrichment /eutrophication.	The WSSP forms the highest tier of asset management plans (Tier 1) which Irish Water prepare and it sets the overarching framework for subsequent detailed implementation plans (Tier 2) and water services projects (Tier 3). The WSSP sets out the challenges we face as a country in relation to the provision of water services and identifies strategic national priorities. It includes Irish Water's short, medium and long-term objectives and identifies strategies to achieve these objectives. As such, the plan provides the context for subsequent detailed implementation plans (Tier 2) which will document the approach to be used for key water service areas such as water resource management, wastewater compliance and sludge management. The WSSP also sets out the strategic objectives against which the Irish Water Capital Investment Programme is developed. The current version of the CAP outlines the proposals for capital expenditure in terms of

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
		upgrades and new builds within the Irish Water owned assets. The overarching strategy was subject to AA and highlighted the need for additional plan/project environmental assessments to be carried out at the tier 2 and tier 3 level. Therefore, significant in-combination effects can be ruled out.
WWTP discharges	Cloyne WWTP, Carrigtohill WWTP, Whitegate-Aghada WWTP, Midleton WWTP	Discharges from municipal WWTPs are required to meet water quality standards. Irish Water Capital Investment Plan 202-2024 proposes to upgrade water treatment services countrywide. Therefore, significant in-combination effects can be ruled out.
Industrial Emissions Licence (IEL)	P0399 John A. Wood (Burnt Lime) Limited; P0316 Mr James O'Brien	Discharges from this facility are governed by strict limits to ensure compliance with quality standards. Therefore, significant in-combination effects can be ruled out.
Other developments in the vicinity	Cork County Council, An Bord Pleanála, EPA planning database was consulted to identify any proposed or permitted developments in proximity to the proposed developments site (01/06/24).	
	• 23/5197 Extension to planning ref. 16/6949 for the construction of the unbuilt portion of the original parent permission comprising 108 residential units (Planning ref. 04/2912) Approx. 1km northeast from site entrance/ Granted 08/08/2023, ceases 22/09/2024. • 24/4243 Permission for an LRD comprising 186 residential units, 1 creche and all associated ancillary works. A NIS was submitted with the application. Approx 700m north from site entrance New Application Further Information required.	In the event that the construction phase of the proposed development was to overlap with this scheme, potential in-combination impacts on water quality could arise. Potential significant adverse effects on water quality during operation of the proposed development have been identified. **In the absence of mitigation, the potential for significant in-combination effects on the Blackwater River (Cork/Waterford) Channel SAC from emissions to water during construction and operation cannot be ruled out.**

Plans and Projects European Network	Key Policies/Issues/Objectives Directly Related to the Conservation of the	
	• 24/4519 Permission for 99 residential units, one creche and all associated ancillary works. NIS was submitted with the application Approx. 340m southeast from site entrance New application, decision due 20/05/2024.	Given the distance from the Blackwater River (Cork/Waterford) SAC boundary and lack of valuable foraging/roosting habitats in the vicinity of the proposed development site, no in combination impacts from noise and disturbance during construction or operation have been identified. No other significant adverse in-combination effects have been identified.

As noted in **Section 4.7.4**, the proposed development will not connect to Mallow WWTP until capacity is available at the plant. Therefore, no significant in-combination impacts due to foul effluent discharges from the proposed development have been identified.

In the absence of mitigation, the potential for significant in-combination effects on the Blackwater River (Cork/Waterford) SAC with certain projects identified in **Table 11** from emissions to water during construction and operation cannot be ruled out.

No specific pressures/threats have been published for Kilcolman Bog SPA. As detailed above, no significant impacts on the Kilcolman Bog SPA have been identified. Given the absence of hydrological connection, significant effects on Kilcolman Bog SPA from in-combination impacts can be excluded.

4.9 Stage One Appropriate Assessment Conclusions

4.9.1 Screening of Relevant Natura 2000 Sites and Qualifying Interests/Special Conservation Interests

Potential impacts, although improbable, have been identified for the Blackwater River (Cork/Waterford) SAC. Screening conclusions with regard to the qualifying species and habitats for these Natura 2000 sites is provided in **Table 12**. No significant effects on the conservation objectives for Kilcolman Bog SPA or any other European site will occur.

Table 12. Identification of relevant Natura 2000 sites. All Natura 2000 sites and QI's screened in for AA are highlighted (in bold).

Natura 2000 site	Qualifying Interest/Special Conservation Interest* (*Screened in QI's/SCI's In Bold)	Potential Impacts	Screened In/Out
Blackwater River (Cork/Waterford) SAC	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Perennial vegetation of stony banks [1220] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	These habitats are located over 50km downstream of the proposed development site. Given that there are no significant aqueous discharges associated with the proposed development and the dilution available within the River Blackwater, no significant impact on these qualifying habitats is predicted to occur. Therefore no significant impact on these QIs have been identified.	Screened Out
	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	The Caherduggan South Stream is located c. 50m west of the proposed development site and the site slopes west towards the stream. This stream is a 1st order tributary of the River Blackwater with its confluence located 1.6km downstream of the proposed development site. Therefore, the proposed development site is hydrologically connected to the Blackwater River (Cork/Waterford) SAC A deterioration in water quality (surface water runoff/discharges and wastewater) as well as invasive species impacts arising from the project have the potential to adversely affect the Conservation Objectives for this Qualifying Interest	Screened in

Natura 2000 site	Qualifying Interest/Special Conservation Interest* (*Screened in QI's/SCI's In Bold)	Potential Impacts	Screened In/Out
	Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	It is noted that there are no 91E0 *Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) mapped in the vicinity of the proposed development site (NPWS 2012). The closest area of this habitat is located approximately 6km downstream of Mallow town. There is no riparian vegetation in the vicinity of the proposed development site. There are no Old sessile oak woods with Ilex and Blechnum in British Isles habitat in the vicinity of the proposed development site and this habitat was not recorded within the proposed development site. Therefore no significant impact on these QIs have been identified.	Screened out
	Margaritifera margaritifera **(Freshwater Pearl Mussel) [1029]** ***Austropotamobius pallipes*** **(White-clawed Crayfish) [1092]** ***Petromyzon marinus*** **(Sea Lamprey) [1095]** ***Lampetra planeri*** **(Brook Lamprey) [1096]** ***Lampetra fluviatilis*** **(River Lamprey) [1099]** ***Salmo salar*** **(Salmon) [1106]** ***Lutra lutra*** **(Otter) [1355]**	A deterioration in water quality (surface water runoff/discharges and wastewater) as well as invasive species impacts arising from the project have the potential to adversely affect the Conservation Objectives for these Qualifying Interests These species inhabit and/or migrate through freshwater and thus could be affected by impacts on water quality. Impacts on prey availability (due to impacts on water quality) along with noise and disturbance during construction could impact on Otter.	Screened In

Natura 2000 site	Qualifying Interest/Special Conservation Interest* (*Screened in QI's/SCI's In Bold)	Potential Impacts	Screened In/Out
	Alosa fallax fallax (Twaite Shad) [1103]	Twaite Shad spend their adult life at sea or in estuaries and spawn in freshwater in early summer. This species is known to exist in the River Blackwater and Cappoquin is the likely spawning area (NPWS, 2007). They do not occur in proximity to the proposed development. Therefore no significant impact on this QI has been identified.	Screened Out
	Trichomanes speciosum (Killarney Fern) [1421]	Killarney fern generally requires specific habitat requirements which are found in dripping caves, cliffs, crevices and gullies by waterfalls, crevices in woodland, and occasionally on the floor of damp woodland - all deeply shaded humid habitats. Based on the habitats present within the proposed development area this species will not occur. Therefore no significant impact on this QI has been identified	Screened Out
Kilcolman Bog SPA	Whooper Swan *Cygnus cygnus* [A038] Teal *Anas crecca* [A052] Shoveler *Anas clypeata* [A056]	There are no valuable habitats for these SCI species within the proposed development site. Therefore no significant impact on these SCIs have been identified.	Screened out

4.9.2 Screening conclusion

The aims of this screening section of this report were as follows:

- Determine whether the proposed development, alone or in combination with other projects, is likely to have significant effects on Natura 2000 sites in view of their conservation objectives.
- Provide information on and assess the potential for the proposed development to significantly impact on Natura 2000 Sites (also known as European sites).
- Determine whether the proposed development is directly connected with, or necessary to the conservation management of any Natura 2000 sites.

It has been objectively concluded that:

- The proposed development is not directly connected with, or necessary to the conservation management of any Natura 2000 sites.
- On the basis of objective information, the possibility of significant effects from the proposed development on European sites cannot be ruled out. There is potential for the proposed development to significantly impact the Blackwater River (Cork/Waterford) SAC via impacts on water quality during construction and operation.
- The proposed development, alone or in combination with other projects could potentially impact on the qualifying interests for the Blackwater River (Cork/Waterford) SAC

On the basis of objective information and in view of best scientific knowledge, the possibility of significant effects from the proposed project on a European site, the Blackwater River (Cork/Waterford) SAC, cannot be ruled out and therefore an Appropriate Assessment is required.

The NIS has been prepared to inform and assist the competent authority to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effect on this European site.

5. Stage 2 – Natura Impact Statement

5.1 Introduction

The main objective of this stage (Stage 2, Natura Impact Statement) in the Appropriate Assessment process is to determine whether the proposed residential development at Ard and Ghleanna, Mallow, Co. Cork (either alone or in combination with other plans, programmes and projects) will result in significant adverse impacts to the integrity of the Natura 2000 sites identified in the previous section i.e., Blackwater River (Cork/Waterford) SAC with respect to the site's structure, function and/or conservation objectives. This stage also outlines the mitigation measures that should be taken in order to avoid any negative impacts associated with the proposed development.

5.2 Status of qualifying species and habitats potentially affected by the proposed development – Blackwater River (Cork/Waterford) SAC

5.2.1 Otter

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Direct which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES).

Although rare in parts of Europe they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for Otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting placing or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called “couches” are formed. (NRA, 2005b). Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and Otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season.

It is noted that Otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of Otters in the centre of Cork and Limerick City. Thus, Otters are able to adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower.

Otters are also known to frequent sections of the River Blackwater downstream of the proposed development site (See **Section 4.5.2**).

Otters commonly occur along the River Blackwater and are listed as a QI for the Blackwater River (Cork/Waterford) SAC. However, no holts or couches were recorded within 150m of the proposed development site.

5.2.2 White-clawed Crayfish (*Austropotamobius pallipes*)

White-clawed Crayfish was recorded from six sites on the River Awbeg in the 1960’s and surveys undertaken between 1990 and 2003 also confirmed a population of White-clawed

Crayfish in the River Awbeg (Demers *et al*. 2005). NS (2010) notes that this species was recorded in the Blackwater for the first time in September 2009. The NBDC has records of this species from Longfield's Bridge in 2015 approximately 4km upstream of Mallow Town Park. There is evidence that this species is currently expanding its range within the Blackwater with reports of this species occurring along the main channel upstream of Mallow and downstream of the confluence of the Awbeg and main River Blackwater channel (Sweeney & Sweeney 2017). White Clawed Crayfish were recorded within the Blackwater at Mallow and Fermoy in 2020/2021 during instream works (DixonBrosnan, 2021). However, recent surveys along the River Blackwater have found that previously established popluations have disappeared, most likely due to Crayfish Plague (Ross Macklin pers.comm). This species does not occur in the Caherduggan South Stream.

5.2.3 Lamprey species (*Petromyzon marinus, Lampetra planeri, Lampetra fluviatilis*)

The distribution of Lamprey species in the Blackwater River (Cork/Waterford) SAC is detailed in King & Linnane (2004). Juvenile River/Brook and Sea Lamprey have been recorded from the main Blackwater channel and from the following watercourses: Licky, Bride, Araglin, Clyda, Allow, Owenkeal, Finnow, Owentaraglin, Awanaskirtaun River, Crooked River and Awbeg 2. Relatively high numbers of all three lamprey species were recorded from the main channel. Petit (2004) noted that "*The sea lamprey is commonly seen as far upstream as Mallow, where it has been observed spawning. River lamprey has been commonly encountered in the R. Blackwater, and brook lamprey adults have been caught in the upper reaches of the river."*

King & Linnane (2004) noted the following in relation to surveys of the River Blackwater:

Direct observation was used to observe and record locations and extent of sea lamprey spawning Long segments of the main channel between Mallow and Cappoquin were examined by boat over the period 3-16th July 2003. A number of areas with suitable bed type for sea lamprey, based on observations in other channels, were observed. A single redd was recorded opposite Mallow castle, 7 downstream of Killavullen and 3 downstream of Ballyhooly. The majority of sea lamprey spawning sites recorded by boat were observed downstream of Fermoy Bridge and weir. A further 18 redds were observed in small clusters of twos and threes between Careysville and Cappoquin. A total of 65 redds were counted by boat along the entire stretch.

The majority of Sea Lamprey spawning sites were observed downstream of Fermoy Bridge and weir. Maitland and Campbell (1992) list the threats to lamprey as water pollution, barriers to migration and habitat degradation. In Ireland the single biggest factor limiting the distribution of anadromous lamprey are upstream barriers. Although the data available to date are limited, the impact of artificial barriers on the distribution of lampreys on a number of major rivers is evident. Whilst weirs downstream of Mallow are probably passable under certain flow conditions, they do form an impediment and large-scale spawning of Sea Lamprey or River Lamprey within the works area is not considered probable.

It is noted that juvenile River/Brook Lamprey were recorded from a small stream/millrace which discharges to the Blackwater immediately upstream of Mallow Bridge (*Electrofishing survey for lamprey in two minor watercourses as part of the Munster Blackwater River (Mallow South and West) Drainage Scheme*, DixonBrosnan, 2011).

Typically, the substrate for juveniles, which is similar for all three species, varies in depth from a few centimetres to 30cm or more; it often contains a relatively high organic content and has been variously described as composed of mud, silt, or silt and sand (Hardisty & Potter 1971). Especially in slow-flowing stretches, the more favourable habitats include, in addition to sand and silt, a clay fraction forming an open-structured sediment (Potter 1970).

Stream flow, water temperature and streambed composition can have a major effect on the distribution of spawning sea lamprey (Haro & Kynar 1997). Physical barriers can impact on Sea Lamprey and River Lamprey which are anadramous. The distribution of larvae is affected most by the location of spawning sites, stream flow, water temperature, streambed pollution and downstream migrations.

An aquatic survey of the Blackwater River was carried out by Ecofact in late-September /early October, 2018 (Ecofact, 2018). The survey was focused primarily on Freshwater Pearl Mussel but also assessed the presence/absence of significant examples of the qualifying habitat Watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation and identified suitable habitat for Atlantic Salmon, Brook Lamprey, River Lamprey and Sea Lamprey.

Sea Lamprey

The 2018 Ecofact report noted that sea lamprey adults would not have been present in the study area at the time of the survey. In relation to sea lamprey distribution the Ecofact report noted the following:

Downstream of Mallow at Fermoy and Clondulane there are two weirs that are partial barriers to lamprey attempting to migrate upstream. King & Linnane (2004) did record Sea Lampreys spawning in the Mallow castle area – however the majority of spawning sea lamprey were below Fermoy weir. Juvenile Sea Lampreys have also been found in the Mallow area and upstream from here. King & Linnane (2004) also carried out an electric fishing study where 18 sites on the Blackwater (Munster) main channel were surveyed, 5 sites were located upstream of Mallow and the remainder were located between Mallow and Cappoquin. Of these 18 sites, juvenile lamprey sp were found at 16. Juvenile sea lamprey made up approximately 30% of the population on the River Blackwater (Munster) main channel and one sixth of the population in the overall catchment.

Extensive areas of suitable micro-habitat for sea lamprey were observed during the survey. Areas of heavy siltation in particular with overhanging trees and woody debris which are suitable nursery habitat were present in several areas. Gravel areas suitable for spawning were also present. The most suitable habitat was in the back channel behind the island upstream of Mallow Bridge. Just upstream of Mallow Railway bridge there is heavily silted areas with over hanging trees. Downstream of the current discharge by approximately 200m is a deeply silted pool. The silt is a result of the collapsed walls and has resulted in good lamprey habitat. The collapsed wall has also reduced the complexity of habitat available for lamprey.

Potential spawning habitat for Sea Lampreys is present in the main channel of the River Blackwater the vicinity of Mallow town. However, no nursery habitat is present in this area.

Brook Lamprey

In relation to Brook Lamprey the Ecofact report noted the following:

Brook lampreys are likely to be the most common lamprey species in the study area. There are lamprey micro-habitats along the entire study area, and numerous potential spawning areas. Also, areas with overhanging trees such as upstream of Mallow Railway bridge where flow in reduced and there is a pool on the south bank. The best lamprey habitat was observed on the left side of the river upstream of Mallow bridge (at the island). The habitats are in the same areas as described above for Sea Lamprey. King & Linnane (2004) electric fishing survey on the River Blackwater found that juvenile river/brook lamprey were the most abundant juvenile lamprey species in the River Blackwater catchment. The study found that larger lamprey were well represented across most of the study are but downstream of Mallow they tended to be older and larger.

Potential spawning habitat for Brook Lampreys is present the main channel of the River Blackwater the vicinity of Mallow town. No nursery habitat is present in this area.

River Lamprey

In relation to River Lamprey the Ecofact report noted the following:

River lampreys are migratory and may not reach the Mallow area due to the presence of the downstream weirs – but it is possible that some pass them during flood conditions. In the King & Linnane (2004) survey river lamprey redds were only recorded in the lower reaches of the Blackwater and none were recorded in the vicinity of mallow.

In 2013 IFI carried out a fish stock survey on the River Blackwater. Lamprey species were not differentiated in the study. Three sites were electric fished on the River Blackwater and Lamprey sp were recorded at two. Lamprey were found at the site 9km downstream of Mallow and at Nohaval br. upstream from Mallow at a density of 0.005 no./m^2 (Kelly et al., 2014).

Potential spawning habitat for River Lampreys is present the main channel of the River Blackwater the vicinity of Mallow town. No nursery habitat is present in this area.

5.2.4 Atlantic salmon (*Salmo salar*)

Salmon are anadromous migratory fish. Adult fish migrate from the sea to river/stream spawning areas, where the young fish live out their juvenile life stages before migrating as adults to the sea. The Blackwater system is considered one of the most important and prolific salmon rivers in Ireland and the main channel is a designated salmonid water (European Communities (Quality of Salmonid Waters) Regulations, 1988. Tributaries including relatively minor watercourses provide important spawning and nursery habitat.

The 2018 Ecofact report noted the following in respect of Atlantic Salmon:

Significant numbers of juvenile salmon Salmo salar were recorded during the survey and abundant numbers of Minnows Phoxinus phoxinus were present. In 2013 IFI carried out a fish stock survey of the River Blackwater (Munster). They surveyed three sites 9km downstream of Mallow at Killavullen Bridge and two sites further downstream. Salmon were recorded at

every site (Kelly et al., 2014). There are spawning and nursery habitats throughout the surveyed area.

Potential spawning habitat for Atlantic Salmon is present the main channel of the River Blackwater the vicinity of Mallow town. This is also a juvenile salmon nursery area.

5.2.5 Freshwater Pearl Mussel (*Margaritifera margaritifera*)

Freshwater pearl mussel (*Margaritifera margaritifera*) is listed on Annexes II and V of the EU Habitats Directive (1992). Annex II of the Habitats Directive requires that listed species' habitats are maintained or, where appropriate, restored to favourable conservation status. Under Annex V of the Habitats Directive this species is listed as 'a species of community interests whose taking in the wild and exploitation may be subject to management measures.' This species is also listed on Appendix III of the Bern Convention which requires that 'any exploitation of wild fauna specified in Appendix III must be regulated in order to keep the populations out of danger (temporary or local prohibition of exploitation, regulation of transport or sale, etc.)'. The Freshwater pearl mussel is listed as 'Critically Endangered' in the Republic of Ireland according to the 'Ireland Red List No. 2: Non-Marine Molluscs' (Byrne et al., 2009).This species is legally protected in Ireland under Schedule 1 of the Wildlife Act (1976) (Protection of Wild Animals) (S.I. No. 112, 1990) as per the requirements of Section 23 of the Wildlife Act (1976), amended under Section 31 of the Wildlife Act (2000).

The transposition of the EU Water Framework Directive (2000) into Irish legislation, as the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) and the more recent European Communities Environmental Objectives (Surface Waters) Regulations (S.I. No. 272 of 2009) require the achievement of 'good ecological status' in Irish waterbodies by 2015. Further measures for the protection of Freshwater pearl mussel are set out in the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations (S.I. 296 of 2009). This legislation sets environmental quality objectives for 'the habitats of the Freshwater pearl mussel populations that are within the boundaries of a site notified in a candidate list of European sites, or designated as a Special Area of Conservation, under the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94/1997). The purpose of these Regulations is to support the achievement of favourable conservation status for Freshwater pearl mussels. To that end they:

> (a) Set environmental quality objectives for the habitats of the Freshwater pearl mussel populations named in the First Schedule to these Regulations that are within the boundaries of a site notified in a candidate list of European sites, or designated as a Special Area of Conservation, under the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94/1997).
>
> (b) Require the production of sub-basin management plans with programmes of measures to achieve these objectives.
>
> (c) Set out the duties of public authorities in respect of the sub-basin management plans and programmes of measures.

Habitat requirements for sustainable populations of Freshwater Pearl Mussel (DEHLG, 2010)

The habitat of *Margaritifera margaritifera* in Ireland is restricted to near natural, clean flowing waters, often downstream of ultra-oligotrophic lakes. A small number of records are from the lakes themselves. The pearl mussel requires stable cobble and gravel substrate with very little fine material below pea-sized gravel. Adult mussels are two-thirds buried and juveniles up to five to ten years old are totally buried within the substrate. The lack of fine material in the riverbed allows for free water exchange between the open river and the water within the substrate. The free exchange of water means that oxygen levels within the substrate do not fall below those of the open water. This is essential for juvenile recruitment, as this species requires continuous high oxygen levels.

The clean substrate must be free of inorganic silt, organic peat, and detritus, as these can all block oxygen exchange. Organic particles within the substrate can exacerbate the problem by consuming oxygen during the process of decomposition. The habitat must be free of filamentous algal growth and rooted macrophyte growth. Both block the free exchange of water between the river and the substrate and may also cause night-time drops in oxygen at the water-sediment interface.

The open water must be of high quality with very low nutrient concentrations, in order to limit algal and macrophyte growth. Nutrient levels must be close to the reference levels for the river they inhabit. Phosphorus must never reach values that could allow for sustained, excessive filamentous algal growth. The presence of sufficient salmonid fish to carry the larval glochidial stage of the pearl mussel life cycle is essential.

The conservation targets for sustainable mussel populations include maintenance of free water exchange between the river and the substrate and minimal coverage by algae and weed. The particular emphasis is on maintenance of recruitment i.e. the riverbed structure required to breed the next generation.

Table 14 shows the sustainable pearl mussel habitat attributes, with ecological quality objectives for pearl mussel sites as set out in the draft European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. (The targets set out in these Regulations are interim targets that may be revised in line with the results of monitoring programmes).

Table 14. Ecological Quality Objectives for Freshwater Pearl Mussel Sites

Element Notes	Objective	Notes
Macroinvertebrates	EQR ≥0.90	High status
Filamentous algae(Macroalgae)	Trace or Present (<5%)	Any filamentous algae should be wispy and ephemeral and never form mats.
Phytobenthos (Microalgae)	EQR ≥0.93	High status
Macrophytes - rooted higher Plants	Trace or Present (<5%)	Rooted macrophytes should be absent or rare within the mussel habitat.

Siltation	No artificially elevated levels of siltation	No plumes of silt when substratum is disturbed

Ecological quality ratio" (EQR) is an expression of the relationship between the values of the biological parameters observed for a given body of surface water and the values for those parameters in the reference conditions applicable to that body. The ratio is expressed as a numerical value between zero and one, with high ecological status represented by values close to one and bad ecological status by values close to zero.

Status of Freshwater Pearl Mussel Blackwater River (Cork/Waterford) SAC

The Blackwater [Munster] River (MBW) catchment is the largest Freshwater Pearl Mussel (FPM) catchment in Ireland, totalling 2,333.83km^2. It is located in the South-Western River Basin District (SWRBD). The MBW River flows through the counties Kerry, Cork and Waterford. The Blackwater River (Cork/Waterford) Special Area of Conservation (SAC) encompasses the entire length of the catchment and part of the Galtee Mountains. The catchment contains 103 river water bodies, along 2,232.07km. Twelve of these 103 rivers are listed in the draft Munster Blackwater Sub-Basin Management Plan, as having a population of Freshwater Pearl Mussel.

The Munster Blackwater is ranked 24 out of the 27 for the status of its FPM SAC population in Ireland. This rank is based on population status, habitat condition and current pressures, culminating in the Blackwater FPM population being classed in an "unfavourable" conservation status (Anon, 2010a). The Blackwater catchment fails to meet all five Environmental Quality Objectives (EQOs) listed in **Table 14**.

The Munster Blackwater population of Freshwater Pearl Mussel was reported to be in unfavourable conservation status. The Blackwater population is believed to be composed entirely of aged adults, with no evidence of recruitment for at least 20 years (DEHLG, 2010). It is generally considered that a scattered population exists over a wide area from upstream of Mallow to Fermoy. The findings of surveys are given in DoEHLG (2010) for the Mallow area summarised as follows:

- Two living mussels and 300 dead mussels from a 500m stretch of river, 2km upstream of Mallow in 2004. Siltation of the mussels attributed to instream works was believed to be the cause of the mussel kill

- In a presence/absence non-continuous survey of the River Blackwater 6km upstream and 6km downstream of Mallow in 2008, 19 out of the 38 sites examined had mussels. All sites upstream of Mallow town had mussels, some in relatively high density and only one site downstream had *M. margaritifera* present. At a location along the north bank of the river adjacent to the former Sugar Factory, an estimated density of up to 50-60 individuals per m^2 were found beneath overhanging trees

- Furthermore, two more surveys were carried out in 2014. Ross (2014) carried out FPM surveys on the upper River Blackwater (Munster) in Mallow in 2014. Six live mussels were recorded in total. Heavy siltation was noted.

- An aquatic survey of the River Blackwater at Mallow was carried out by Ecofact in late-September /early October 2018. The report concluded that generally the habitat in the

study area and within the survey sections was considered to be unsuitable both for adult FPM and juvenile FPM recruitment. This is mainly due to heavy siltation, unsuitable and unstable substrate and eutrophication. Only one live freshwater pearl mussel was found at the most downstream point of the study area, downstream of the existing outfall for the Mallow WWTP.

The decline of FPM populations in Ireland is primarily related to the continuous failure to produce new generations of mussels because of the loss of clean gravel beds, which have become infiltrated by fine sediment and/or over-grown by algae or macrophytes. Macrophytes smother the juvenile habitat even further, and trap more sediment, exacerbating the problem in the long term. Juvenile mussels require well-oxygenated and silt-free substrate and riffled habitats in low gradient watercourses frequently provide a suitable mix of rock, cobble and sand substrates.. This is severely affected by siltation, algal growth and decomposition of organic material.

The key improvements needed for the Munster Blackwater Catchment are to restore juvenile habitats to appropriate condition by simultaneously reducing nutrient and silt inputs to the river (DEHLG, 2010).

The most recent date for FPM in the vicinity of main channel of the River Blackwater at Mallow town suggests they could occur downstream of the proposed development site, however given the significant population declines there are unlikely to be more than a few individuals.

5.2.6 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.

The EU (2003) definition of the habitat water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation is very broad. There is no satisfactory definition of the habitat and its sub-types or their distribution in Ireland and a lack of relevant monitoring data concerning the habitat. This habitat can occur over a wide range of physical conditions, from acid, oligotrophic, flashy upland streams dominated by bryophytes to more eutrophic, slow flowing streams dominated by Ranunculus and Callitriche species. While the former will be sensitive to diffuse pollution the latter, especially in shallow streams, will be relatively more resistant.

This habitat type is commonly distributed along the main Blackwater channel and within tributaries and includes species such as Pond Watercrowfoot (Ranunculus peltatus), Water-crowfoot (Ranunculus sp.), Canadian Waterweed (Elodea canadensis), Broad-leaved Pondweed (Potamogeton natans) and Water Milfoil (Myriophyllum spp.).

The NPWS conservation objectives for the Blackwater River (Cork/Waterford) SAC (NPWS 2012) notes the following in relation to this habitat:

The full distribution of this habitat and its sub-types in this site are currently unknown. The basis of the selection of the SAC for the habitat was the presence of plant species listed in the Interpretation Manual (European Commission, 2007), recorded during the Natural Heritage Area (NHA) survey of the river (internal NPWS files). Further records of these and other aquatic plant species in the Blackwater can be found in Green (2008) and O'Mahony (2009). The dominant floating leaved species appears to be the common and widespread stream water-crowfoot (Ranunculus penicillatus subsp. Penicillatus). No high conservation value

subtypes are known to occur in the SAC and further survey is required to determine whether any such are present. Only one rare/threatened vascular plant species is known to occur in the SAC, the protected opposite-leaved pondweed (Groenlandia densa), which is abundant in the tidal stretches around Cappoquin.

Examples of this habitat type may be located downstream of the proposed development site within the main channel of the River Blackwater.

5.2.7 Qualifying interests potentially impacted by the proposed development

Based on the information outlined above, in the absence of mitigation measures, potential impacts could theoretically arise in relation to Atlantic Salmon, Brook Lamprey, Sea Lamprey, River Lamprey, Otter, Freshwater Pearl Mussel and Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation. Impacts on White clawed Crayfish are also possible although less likely to occur. No significant potential risk to the remaining qualifying species and habitats has been identified. The NPWS conservation objectives for the Blackwater River (Cork/Waterford) SAC (NPWS 2012) details the following targets for these species and habitats (**Tables 15 and 16**).

Table 15. QI species for which a potential impact has been identified – specific targets

Species	Attribute	Measure	Target
White Clawed Crayfish	Distribution	Occurrence	No reduction from baseline.
	Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in at least 50% of positive samples
	Negative indicator species	Occurrence	No alien crayfish species
	Disease	Occurrence	No instances of disease
	Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA
	Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline in heterogeneity or habitat quality
Sea Lamprey	Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary.

Species	Attribute	Measure	Target
	Population structure of juveniles	Number of age/size groups	At least three age/size groups present
	Juvenile density in fine sediment	Juveniles/m²	Juvenile density at least 1/m²
	Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds
	Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive.
Brook Lamprey	Distribution	% of river accessible	Access to all water courses down to first order streams
	Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present
	Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of brook/river lamprey at least 2/m²
	Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive.

Species	Attribute	Measure	Target
River Lamprey	Distribution	% of river accessible	Access to all water courses down to first order streams
	Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present
	Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of brook/river lamprey at least 2/m²
	Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds
	Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive.
Atlantic Salmon	Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary
	Adult spawning fish Number	Number	Conservation Limit (CL) for each system consistently exceeded
	Salmon fry Abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling
	Out-migrating smolt abundance	Number	No significant decline
	Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes
	Water quality	EPA Q value	At least Q4 at all sites

Species	Attribute	Measure	Target
			sampled by EPA
Otter	Distribution	Percentage positive survey sites	No significant decline
	Extent of terrestrial Habitat	Hectares	No significant decline. Area mapped and calculated as 103ha above high water mark (HWM); 1165.7ha along river banks/ around ponds
	Extent of marine Habitat	Hectares	No significant decline. Area mapped and calculated as 647.2ha
	Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 599.54km
	Extent of freshwater (lake) habitat	Hectares	No significant decline. Area mapped and calculated as 25.06ha
	Couching sites and Holts	Number	No significant decline
	Fish biomass Available	Kilograms	No significant decline
	Barriers to Connectivity	Number	No significant increase
Freshwater Pearl Mussel	Distribution	Kilometres	Maintain at 161km.
	Population size	Number of adult mussels	Restore to 35,000 adult mussels
	Population Structure:	Percentage per size class	Restore to least 20% of population no more than

Species	Attribute	Measure	Target
	recruitment		65mm in length; and at least 5% of population no more than 30mm in length
	Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution
	Habitat extent	Kilometres	Restore suitable habitat in more than 35km (see map 8) and any additional stretches necessary for salmonid spawning
	Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality-macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93

Table 16. QI habitats for which a potential impact has been identified – specific targets

Habitats	Attribute	Measure	Target
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Habitat distribution	Occurrence	No decline, subject to natural processes
	Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes
	Hydrological regime: tidal influence	Daily water level fluctuations- metres	Maintain natural tidal regime
	Substratum composition: particle size range	Millimetres	The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (typically sands, gravels and cobbles)
	Water quality:	Milligrammes per litre	The concentration of nutrients in the water

Habitats	Attribute	Measure	Target
	nutrients		column should be sufficiently low to prevent changes in species composition or habitat condition
	Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition
	Floodplain connectivity: area	Hectares	The area of active floodplain at and upstream of the habitat should be maintained

6. Assessment of Potential Impacts

All potential impacts relate to potential surface water runoff and discharges during the construction and operational phase. Based on the *Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC* (European Commission (EC), 2018 and CIEEM guidelines '*Guidelines for Ecological Impact Assessment'* (CIEEM, 2019) impacts are listed as significant using a combination of professional judgement and criteria or standards where available, if impacts have the potential to have a significant impact on the ecological integrity on the habitats and species for which the site is designated.

The potential impacts associated with the proposed development are discussed in the following section with respect to their likelihood to have significant impacts on European sites.

As part of the assessment direct, indirect and in-combination impacts were considered. Direct impacts refer to habitat loss or fragmentation arising from land-take requirements for development. Indirect and secondary impacts do not have a straight-line route between cause and effect, and it is potentially more challenging to ensure that all the possible indirect impacts of the project/plan - in combination with other plans and projects have been established.

Potential impacts were identified as follows:

- Impacts from surface water runoff during construction;
- Impacts from surface water runoff (discharges) during operation;
- In-combination Impacts

6.1 Impacts on Water Quality

6.1.1 Impacts on Water Quality during Construction

Potential impacts on aquatic habitats which can arise from this type of development include increased silt levels in surface water run-off, silt from dewatering of excavations, concrete spillage and hydrocarbon spillage. In the absence of appropriate design and mitigation, high levels of silt in surface water run-off from construction works, could theoretically impact on fish species. If of sufficient severity, adult fish could theoretically be affected by increased silt levels as gills may become damaged by exposure to elevated suspended solids levels. Excessive siltation can cause eggs and fry to be smothered. In particular impacts on spawning lamprey and salmonids can be significant. If of sufficient severity, aquatic invertebrates may be smothered by excessive deposits of silt from suspended solids. In areas of stony substrate, silt deposits may result in a change in the macro-invertebrate species composition, favouring less diverse assemblages and impacting on sensitive species. Aquatic plant communities may also be affected by increased siltation. Submerged plants may be stunted and photosynthesis may be reduced.

Inadvertent spillages of hydrocarbons during construction could introduce toxic chemicals into the aquatic environment via surface water run-off or groundwater contamination and have a direct toxicological impact on habitats and fauna.

The Caherduggan South Stream, a 1st order tributary of the River Blackwater is located c.50m west of the proposed development site. The site slopes west towards this stream and in the absence of mitigation, contaminated surface water runoff could potentially flow into the Caherduggan South Stream and impact on sensitive aquatic receptors downstream. During construction there may be an increased probability of silt discharging from the proposed development site as well as potential spillage of hydrocarbons and cementous materials. As part of the proposed construction process, several mitigation measures have been specified to ensure that water quality within the Caherduggan South Stream and other watercourses downstream are not impacted during construction works (**Section 7**). It is noted that no instream works are proposed. Following mitigation, there will be no adverse effects on surface water from the from the proposed development during the construction phase.

6.1.2 Impacts on Water Quality during Operational Phase – Surface water

Chemical contaminants in operational surface water runoff such as hydrocarbons could potentially impact on water quality and thus could impact on water quality within the Caherduggan South Stream and qualifying species/habitats for the Blackwater River. (Cork/Waterford) SAC. The increase in hard surfaces at the site i.e., car parks, road surfaces pathways could increase the rate of runoff from the proposed development site, which could impact on the hydrological regimes of the Caherduggan South Stream.

The Cork County Development Plan 2022-2028 includes digital flood mapping where projected Flood zones A & B can be turned on as layers to assess a site's potential vulnerability to flooding. As with the OPW maps, projected flood extents near the site are limited to the banks of the Spa Stream and along the N72. These vulnerable locations and watercourses are at significantly lower elevations than the development site, however, and it is clear from all maps available that the site lies outside any areas that have a probability of flooding in any event, whether fluvial, coastal or groundwater, up to and including a 1 in 1000-

year storm. This places the site in flood zone C where residential development is appropriate without requiring a justification test.

As per Sustainable Drainage Systems (SuDS) principles, management of surface water run-off during operation of the proposed residential development has been built into the plans (See **Section 3.3**). The surface water system for the development is a single network including extensive SuDS measures falling generally from south to north and exiting the site in the northwest. It is intended to discharge the attenuated stormwater into the Spa Stream that flows in a southward direction, beside the N72, adjacent to the site. SuDS measures are proposed for the development in both public and private areas in accordance with the guidance from the County Development Plan 2022 Advice Note 1 on Surface Water management and the CIRIA SuDS Manual C753. The Measures proposed will decrease the impact of the development on the receiving environment and also provide amenity and biodiversity in many cases. Regular maintenance of the SuDS measures will be required to ensure that they are effective throughout their design life. The following paragraphs describe the SuDS features proposed: detention basins, permeable paving, under-drained roadside swales, bio-retention tree pits, bio-retention raingardens and water butts.

Given the operational surface water design measures will ensure there are no significant impact on local water quality or hydrological regimes and therefore there will be no adverse effects on the conservation objectives of the Blackwater River (Cork/Waterford) SAC from operational surface water discharges.

7. Mitigation Measures

7.1 Construction phase mitigation measures

The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage and mitigation measures will function effectively in preventing significant ecological impacts, such that adverse effects on site integrity of the Blackwater River (Cork/Waterford) SAC does not occur.

Mitigation measures are set out in accordance with the European Commission guidance on the: 'Assessment of plans and projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, (2001)'. and 'Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive (2018).'

The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage. These mitigation measures are designed to achieve a lowering or reducing of the risk of impact to acceptable levels. The following mitigation measures will be implemented.

Construction best practice measures (of relevance in respect of any potential ecological impacts) will be implemented throughout the project, including the preparation and implementation of detailed method statements. The works will incorporate the relevant elements of the guidelines outlined below:

- NRA (2010) *Guidelines for the Management of Noxious Weeds and Non- Native Invasive Plant Species on National Roads*. National Roads Authority, Dublin.

- Murphy, D. (2004) *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*. Eastern Regional Fisheries Board, Dublin.

- IFI (2016) *Guidelines on protection of fisheries during construction Works in and adjacent to waters* (IFI, 2016)

- IFI (2021). *Planning for watercourses in the urban environment.*

- E. Murnane, A. Heap and A. Swain. (2006) *Control of water pollution from linear construction projects. Technical guidance (C648). CIRIA.*

- E. Murnane et al., (2006) *Control of water pollution from linear construction projects. Site guide (C649). CIRIA.*

All personnel involved with the project will receive an on-site induction relating to operations and the environmentally sensitive nature of the proximity the Caherduggan South Stream and its connectivity to the Blackwater River (Cork/Waterford) SAC to re-emphasize the precautions that are required as well as the mitigation to be implemented.

All personnel involved with the project will receive an on-site induction relating to operations and the environmentally sensitive nature of Natura 2000 sites and to re-emphasize the precautions that are required as well as the precautionary measures to be implemented. All staff and subcontractors have the responsibility to:

- Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts,

- Understand the importance of avoiding pollution on-site, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;

- Respond in the event of an incident to avoid or limit environmental impact;

- Report all incidents immediately to their line manager;

- Monitor the workplace for potential environmental risks and alert the immediate line manager if any are observed; and

- Co-operate as required, with site inspections.

7.2 Earthworks

Once surface water management measures are in place and topsoil has been stripped, earthworks operations can commence. This will consist of moving fill from the higher ground at the east to the lower ground to the west. Material will be excavated by 360° excavators and transported to the deposition area by articulated dumpers. The fill will then be placed by dozers and compacted using vibratory rollers. A testing regime will be implemented to ensure the acceptability of the fill and that the degree of compaction is sufficient. Fill will be brought to the required level across the site to allow construction of roads and foundations. An overall earthworks balance has been targeted i.e., no imported fill will be required for the bulk earthworks and no soil will be removed from the site.

7.3 Protection of Water Quality

The subject site is on high ground that falls generally from south to North but also from the eastern boundary towards the western boundary. There is a steep, wooded embankment from the western boundary down towards the small stream that runs southwards alongside the N72 roadway.

Surface water will naturally tend to flow away from the higher boundaries with the existing Aldworth Heights, Castle Heights and Castle Grove estates in the south, towards the western boundary. Roughly half of the western boundary (southern half) is shared with lands in the same ownership as the subject site whereas the northern half bounds lands in different ownership. The most sensitive part of the site in terms of surface water will be the western boundary due to the natural flow path towards that boundary and onwards to the stream.

Run-off into excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. All run-off will be prevented from directly entering any water courses as no construction will be undertaken directly adjacent to open water.

No significant dewatering will be required during the construction phase which would result in the localised lowering of the water table. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept safe and relatively dry.

The measures outlined in the following sections will be put in place during the construction phase to ensure protection of surface waterbodies. Construction works will be informed by best practice guidance from Inland Fisheries Ireland on the prevention of pollution during development projects. These measures comply with the following relevant CIRIA and Inland fisheries guidance documents:

- Control of Water Pollution from construction Sites, Guidance for consultants and contractors (C532)
- Environmental Good Practice on Site (3rd edition) (C692)
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)

7.4 Pollution Control

7.4.1 Suspended Solids

Prior to the commencement of topsoil stripping and earthworks operations, the following site-specific surface water management measures will be put in place:

Where possible, significant earthworks operations should be limited to the summer months.

Silt fencing will be installed around the perimeter of the site. The location of the silt fencing will be determined in the construction stage CEMP and will be subject to a detailed assessment of the area or phase to be developed. The purpose of the silt fencing is to prevent silt laden

water leaving the site and entering neighbouring land with the potential to impact nearby watercourses. A typical silt fencing arrangement is shown below in **Figure 7**. It will consist of a double layer of geotextile membrane fixed to wooden stakes approximately 600mm high. The membrane will be anchored into the ground to form a continuous barrier to silt laden water from the works site. Silt fences will be monitored via a silt inspection log (to be maintained by the Environmental Manager/ECoW) and periodically maintained during the construction period. Typical maintenance will consist of repairs to damaged sections of membrane and removal of a build-up of silt on the upslope side of the fence. Daily silt fence inspections are recommended as part of their operation ensuring that any necessary repairs can be expedited.

Figure 7 - Typical Silt Fencing Arrangement

Drainage ditches will be installed to intercept surface water where there is a risk of significant water flow into excavations or onto adjoining lands. There will also be a requirement to periodically pump water from excavations. All collected and pumped water will have to be treated prior to discharge. The run-off will be directed through appropriately sized settlement ponds in series to remove suspended solids before being discharged, see **Figure 8**.

Figure 8. Settlement Ponds in Series

Emergency contact numbers for the Local Authority Environmental Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same.

The Environmental Manager or ECoW will be responsible for the implementation of these measures. They will be inspected on at least a daily basis for the duration of the works, and a record of these inspections will be maintained.

Any temporary storage of soil, hardcore, crushed concrete or similar material will be stored 50m from any surface water drains. All temporary storage areas should also have surface runoff controls in place to prevent migration of possible materials. There can be no direct pumping of silty water from the works directly to any watercourse. All water from excavations must be treated by infiltration over lands or via settlement ponds, silt busters etc.

7.4.2 Flooding

The subject site is elevated and sloping to a degree that flooding is not anticipated in any event. The flood extent map drawn up as part of the Southwestern CFRAM Study (floodinfo.ie) shows the stream to the west overflowing its normal channel during fluvial flood events but this is significantly below the level of the site's lowest point. The site is not in any risk category in the CFRAM Study Maps.

7.4.3 Control of Cement Run-off

The washing out of concrete delivery vehicles is a potential source of pollution and shall be carried out in designated wash out areas only, see **Figure 9**.

Wash-out areas on site will be located more than 50m from any natural watercourse and properly designed with an impermeable liner to contain all cement laden water. No wash-out of ready-mix concrete vehicles shall be located within 10 metres of any temporary or permanent drainage features. Signage shall be erected to clearly identify the wash-out areas. Sufficient wash-out areas shall be provided to cater for all vehicles at peak delivery times.

On-site batching of concrete is not envisaged, but ready to use mortar silos are often used for housing developments. These systems involve the delivery and storage of dry cement and aggregates in silos, water is added at the point of delivery to make mortar or plaster. The following controls shall be put in place for the on-site batching of concrete, mortar and render:

- The plant shall be maintained in good condition,
- Delivery of cement shall be means of a sealed system to prevent escape of cement,
- The plant shall be situated on a paved area at least 20m from any temporary or permanent drainage features,

- Emergency procedures shall be in place to deal with accidental spillages of cement or mortar.

Figure 9. Concrete Truck Washout Area with Impermeable Liner

7.4.4 Accidental Leaks or Spills

No bulk chemicals will be stored within the active construction areas. Temporary oil and fuel storage tanks may be kept in the material storage area in suitable containers and will be stored on appropriately bunded spill pallets as required. Any fuel and oil stored on site shall be stored on bunded spill pallets (approved under BS EN 1992-3:2006). All bunds will be impermeable and capable of retaining a volume of equal to or greater than 1.1 times (>110%) capacity of the containers stored on them. In the event of a spillage, excess oil or fuel will be collected in the bund.

Refuelling of vehicles and the addition of hydraulic oils or lubricants to vehicles will be undertaken off site where possible. Where this is not possible, filling and maintenance will take place in a designated material storage compound, which is located at least 10 metres from any temporary or permanent drainage features. Spill protection equipment such as absorbent mats, socks and sand will be available in clearly marked bins/silos and in construction vehicles to be used in the event of an accidental release during refuelling. Training will be given to site workers in how to manage a spill event.

The following mitigation measures will be taken at the construction site to prevent any spillages to ground of fuels during machinery activities and prevent any resulting soil and/or groundwater quality impacts:

1. Refuelling will be undertaken off site where possible,

2. Where mobile fuel bowsers are used the following measures will be taken:
3. Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use.
4. Any pump or valve will be fitted with a lock and will be secured when not in use.
5. All bowsers to carry a spill kit and operatives must have spill response training; and
6. Portable generators or similar fuel containing equipment will be placed on suitable drip trays.
7. Weekly checks of spill kits will be carried out to ensure they are sufficiently stocked.

7.4.5 Monitoring

Daily checks will be carried out and recorded in a Surface Water Management Log to ensure surface water drains are not blocked by silt, or other items, and that all storage is located the required distance from surface water receptors. A daily log of inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur

8. In-combination impacts

As described in **Section 4.7.6** of this report, any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. A review of planning applications in the vicinity of the proposed development is included in **Table 11**. In the absence of mitigation, the potential for significant in-combination effects on Blackwater River (Cork/Waterford) SAC with certain projects identified in **Table 11** from emissions to water during construction and operation could not be ruled out.

High negative pressures, threats and activities identified for the Blackwater River (Cork/Waterford) SAC include grazing, fertilisation, mowing and cutting of grassland. The area surrounding Mallow town is heavily agriculturalized. Intensive agriculture in particular can have significant impacts on aquatic ecology by increasing nutrients and sediment loads. Medium impact pressures identified include urbanized areas, landfill and land reclamation, forestry, and the spread of non-native invasive species.

Mitigation measures outlined in **Section 7** will ensure there is no impact on the Blackwater River (Cork/Waterford) SAC from surface water runoff during the construction phase of the proposed development. A range of design measures (and mitigation measures) have been included in the project to ensure there will be no impact on local water quality during operation of the proposed development. Following the implementation of these mitigation measures, the proposed development no significant in-combination impacts on Blackwater River (Cork/Waterford) SAC are predicted to occur.

9. Conclusions

The AA screening concluded, on the basis of objective information and in view of best scientific knowledge, the possibility of significant effects from the proposed project on European sites could not be ruled out and therefore an Appropriate Assessment was required. The AA screening concluded that there was potential for the proposed development to significantly impact the Blackwater River (Cork/Waterford) SAC, via surface water runoff during construction and operation.

The NIS has been prepared to inform and assist to assess, in view of best scientific knowledge, if the proposed development, individually or in combination with another plan or project is likely to have a significant effect on the Blackwater River (Cork/Waterford) SAC or any other European sites.

This NIS has examined and analysed, in light of the best scientific knowledge, with respect to Blackwater River (Cork/Waterford) SAC within the potential zone of influence of the proposed development, the potential effect pathways, how these could impact on qualifying species or habitats and whether the predicted effects would adversely affect the integrity of the Blackwater River (Cork/Waterford) SAC.

Mitigation measures are set out in **Section 7** of the NIS and they ensure that any effects on the conservation objectives of the Blackwater River (Cork/Waterford) SAC will be avoided during the proposed development such that there will be no risk of adverse effects on the integrity of these European sites.

It has been objectively concluded following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted effects from the proposed development and with the implementation of the mitigation measures proposed, that the construction, operation and decommissioning of the proposed development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects. There is no reasonable scientific doubt in relation to this conclusion. The competent authority will make the final determination in this regard.

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Appendices

Appendix 1 – Site synopses

Blackwater River (Cork/Waterford) SAC (Site Code 2170) Site Synopsis

The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and five ranges of mountains. In times of heavy rainfall the levels can fluctuate widely by more than 12 feet on the gauge at Careysville. The peaty nature of the terrain in the upper reaches and of some of the tributaries gives the water a pronounced dark colour. The site consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond, the tidal stretches as far as Youghal Harbour and many tributaries, the larger of which include the Licky, Bride, Flesk, Chimneyfield, Finisk, Araglin, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, Owentaraglin and Awnaskirtaun. The portions of the Blackwater and its tributaries that fall within this SAC flow through the counties of Kerry, Cork, Limerick, Tipperary and Waterford. Nearby towns include Rathmore, Millstreet, Kanturk, Banteer, Mallow, Buttevant, Doneraile, Castletownroche, Fermoy, Ballyduff, Rathcormac, Tallow, Lismore, Cappoquin and Youghal.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [1130] Estuaries
- [1140] Tidal Mudflats and Sandflats
- [1220] Perennial Vegetation of Stony Banks
- [1310] Salicornia Mud
- [1330] Atlantic Salt Meadows
- [1410] Mediterranean Salt Meadows
- [3260] Floating River Vegetation
- [91A0] Old Oak Woodlands
- [91E0] Alluvial Forests*
- [1029] Freshwater Pearl Mussel (Margaritifera margaritifera)
- [1092] White-clawed Crayfish (Austropotamobius pallipes)
- [1095] Sea Lamprey (Petromyzon marinus)
- [1096] Brook Lamprey (Lampetra planeri)
- [1099] River Lamprey (Lampetra fluviatilis)
- [1103] Twaite Shad (Alosa fallax)
- [1106] Atlantic Salmon (Salmo salar)
- [1355] Otter (Lutra lutra)
- [1421] Killarney Fern (Trichomanes speciosum)

The conservation objectives for the site are detailed in: NPWS (2012) Conservation Objectives: Blackwater River (Cork/Waterford) SAC 002170, Version 1. NPWS, Department of Arts, Heritage & the Gaeltacht (dated 31 July 2012). The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest.

The Blackwater rises in boggy land in east Kerry, where Namurian grits and shales build the low heather-covered plateaux. Near Kanturk the plateaux enclose a basin of productive Coal Measures. On leaving the Namurian rocks the Blackwater turns eastwards along the northern slopes of the Boggeragh Mountains before entering the narrow limestone strike vale at Mallow. The valley deepens as first the Nagles Mountains and then the Knockmealdowns impinge upon it. Interesting geological features along this stretch of the Blackwater Valley include limestone cliffs and caves near the villages and small towns of Killavullen and Ballyhooly; the Killavullen caves contain fossil material from the end of the glacial period. The associated basic soils in this area support the growth of plant

communities which are rare in Cork because in general the county's rocks are acidic. At Cappoquin the river suddenly turns south and cuts through high ridges of Old Red Sandstone. The Araglin valley is predominantly underlain by sandstone, with limestone occurring in the lower reaches near Fermoy.

Wet woodlands are found where river embankments have broken down and channel edges are subject to daily inundation. This is particularly evident in the steep-sided valley of the River Bride, between Cappoquin and Youghal. The river side of the embankments was often used for willow growing in the past (most recently at Cappoquin) so that the channel is lined by narrow woods of White and Almondleaved Willow (Salix alba and S. triandra), with isolated Crack Willow (S. fragilis) and Osier (S. viminalis). Rusty Willow (S. cinerea subsp. oleifolia) spreads naturally into the sites and occasionally, as at Villierstown on the Blackwater and Sapperton on the Bride, forms woods with a distinctive mix of woodland and marsh plants, including Gypsywort (Lycopus europaeus), Guelder-rose (Viburnum opulus), Bittersweet (Solanum dulcamara) and various mosses and algae. These wet woodlands form one of the most extensive tracts of the wet woodland habitat in the country.

A small stand of Yew (Taxus baccata) woodland occurs within the site. This is on a limestone ridge at Dromana, near Villierstown. While there are some patches of the wood with a canopy of Yew and some very old trees, the quality is generally poor due to the dominance of non-native and invasive species such as Sycamore (Acer pseudoplatanus), Beech (Fagus sylvatica) and Douglas Fir (Pseudotsuga menzsisii). However, it does have the potential to develop into a Yew dominated stand in the long term and the site should continue to be monitored.

Marshes and reedbeds cover most of the flat areas beside the rivers and often occur in mosaic with the wet woodland. Common Reed (Phragmites australis) is ubiquitous and is harvested for thatching. There is also much Marsh-marigold (Caltha palustris) and, at the edges of the reeds, the Greater and Lesser Pond-sedge (Carex riparia and C. acutiformis). Hemlock Water-dropwort (Oenanthe crocata), Wild Angelica (Angelica sylvestris), Reed Canary-grass (Phalaris arundinacea), Meadowsweet (Filipendula ulmaria), Common Nettle (Urtica dioica), Purple Loosestrife (Lythrum salicaria), Common Valerian (Valeriana officinalis), Water Mint (Mentha aquatica) and Water Forget-me-not (Myosotis scorpioides) are all also found.

At Banteer there are a number of hollows in the sediments of the floodplain where subsidence and subterranean drainage have created isolated wetlands, sunk below the level of the surrounding fields. The water rises and falls in these holes depending on the water table and several different communities have developed on the acidic or neutral sediments. Many of the ponds are ringed with Rusty Willow, rooted in the mineral soils but sometimes collapsed into the water. Beneath the densest stands are woodland herbs like Yellow Pimpernel (Lysimachia nemorum), with locally abundant Common Water-starwort (Callitriche stagnalis) and Marsh Ragwort (Senecio aquaticus). One of the depressions has Silver Birch (Betula pendula), Ash (Fraxinus excelsior), Crab Apple (Malus sylvestris) and a little Pedunculate Oak (Quercus robur) in addition to the willows.

Floating river vegetation is found along much of the freshwater stretches within the site. The species list is quite extensive, with species such as water-crowfoots, including Pond Water-crowfoot (Ranunculus peltatus), Canadian Pondweed (Elodea canadensis), pondweed species, including Broad-leaved Pondweed (Potamogeton natans), water-milfoil species (Myriophyllum spp.), Common Club-rush (Scirpus lacustris), water-starwort species (Callitriche spp.), Lesser Water-parsnip (Berula erecta) particularly on the Awbeg, Water-cress (Nasturtium officinale), Hemlock Waterdropwort, Fine-leaved Water-dropwort (O. aquatica), Common Duckweed (Lemna minor), Yellow Water-lily (Nuphar lutea), Unbranched Bur-reed (Sparganium emersum) and the moss Fontinalis antipyretica all occurring.

The grasslands adjacent to the rivers of the site are generally heavily improved, although liable to flooding in many places. However, fields of more species-rich wet grassland with species such as Yellow Iris (Iris pseudacorus), Meadowsweet, Meadow Buttercup (Ranunculus acris) and rushes (Juncus spp.) occur occasionally. Extensive fields of wet grassland also occur at Annagh Bog on the Awbeg. These fields are dominated by Tufted Hair-grass (Deschampsia cespitosa) and rushes.

The Blackwater Valley has a number of dry woodlands; these have mostly been managed by the estates in which they occur, frequently with the introduction of Beech and a few conifers, and sometimes of the invasive species Rhododendron (Rhododendron ponticum) and Cherry Laurel (Prunus laurocerasus). Oak woodland is well developed on sandstone about Ballinatray, with the acid oak woodland community of Holly (Ilex aquifolium), Bilberry (Vaccinium myrtillus), Great Wood-rush (Luzula sylvatica) and the ferns Dryopteris affinis and D. aemula occurring in one place. Irish Spurge (Euphorbia hyberna) continues eastwards on acid rocks from its headquarters to the west, but there are also many plants of richer soils, for example Wood Violet (Viola reichenbachiana), Goldilocks Buttercup (Ranunculus auricomus), Broad-leaved Helleborine (Epipactis helleborine) and Red Campion (Silene dioica). Oak woodland is also found in Rincrew, Carrigane, Glendine, Newport and Dromana. The spread of Rhododendron is locally a problem, as is over-grazing. A few limestone rocks stand over the river in places showing traces of a less acidic woodland type with Ash, False Brome (Brachypodium sylvaticum) and Early-purple Orchid (Orchis mascula).

In the vicinity of Lismore, two deep valleys cut in Old Red Sandstone join to form the Owenashad River before flowing into the Blackwater at Lismore. These valleys retain something close to their original cover of oak with Downy Birch (Betula pubescens), Holly and Hazel (Corylus avellana) also occurring. There has been much planting of Beech (as well as some of coniferous species) among the oak on the shallower slopes and here both Rhododendron and Cherry Laurel have invaded the woodland.

The oak wood community in the Lismore and Glenmore valleys is of the classic upland type, in which some Rowan (Sorbus aucuparia) and Downy Birch occur. Honeysuckle (Lonicera periclymenum) and Ivy (Hedera helix) cover many of the trees while Great Wood-rush, Bluebell (Hyacinthoides non-scripta), Wood-sorrel (Oxalis acetosella) and, locally, Bilberry dominate the ground flora. Ferns present on the site include Hard Fern (Blechnum spicant), Male Fern (Dryopteris filix-mas), the bucklerferns D. dilatata and D. aemula, and Lady Fern (Athyrium felix-femina). There are many mosses present and large species such as Rhytidiadelphus spp., Polytrichum formosum, Mnium hornum and Dicranum spp. are noticeable. The lichen flora is important and includes 'old forest' species which imply a continuity of woodland here since ancient times. Tree Lungwort (Lobaria spp.) is the most conspicuous and is widespread.

The Araglin valley consists predominantly of broadleaved woodland. Oak and Beech are joined by Hazel, Wild Cherry (Prunus avium) and Goat Willow (Salix caprea). The ground flora is relatively rich, with Pignut (Conopodium majus), Ramsons (Allium ursinum), Garlic Mustard (Alliaria petiolata) and Wild Strawberry (Fragaria vesca). The presence of Ivy Broomrape (Orobanche hederae), a local species within Ireland, suggests that the woodland, along with its attendant Ivy, is long established.

Along the lower reaches of the Awbeg River, the valley sides are generally cloaked with mixed deciduous woodland of estate origin. The dominant species is Beech, although a range of other species are also present, e.g. Sycamore, Ash and Horsechestnut (Aesculus hippocastanum).

In places the alien invasive species Cherry Laurel dominates the understorey. Parts of the woodlands are more semi-natural in composition, being dominated by Ash, with Hawthorn (Crataegus monogyna) and Spindle (Euonymus europaea) also present. However, the most natural areas of woodland appear to be the wet areas dominated by Alder and willows (Salix spp.). The ground flora of the dry woodland areas features species such as Pignut, Wood Avens (Geum urbanum), Ivy and Soft Shield-fern (Polystichum setiferum), while the ground flora of the wet woodland areas contains characteristic species such as Remote Sedge (Carex remota) and Opposite-leaved Golden-saxifrage (Chrysosplenium oppositifolium). In places along the upper Bride, scrubby, semi-natural deciduous woodland of willow, oak and Rowan occurs, with abundant Great Wood-rush in the ground flora.

The Bunaglanna River passes down a very steep valley, flowing in a north-south direction to meet the Bride River. It flows through blanket bog to heath and then scattered woodland. The higher levels of moisture here enable a vigorous moss and fern community to flourish, along with a well-developed epiphyte community on the tree trunks and branches.

At Banteer a type of wetland occurs near the railway line which offers a complete contrast to the others. Old turf banks are colonised by Royal Fern (Osmunda regalis) and Eared Willow (Salix aurita), and between them there is a sheet of Bottle Sedge (Carex rostrata), Marsh Cinquefoil (Potentilla palustris), Bogbean (Menyanthes trifoliata), Marsh St. John's-wort (Hypericum elodes) and the mosses Sphagnum auriculatum and Aulacomnium palustre. The cover is a scraw (i.e. floating vegetation) with characteristic species like Marsh Willowherb (Epilobium palustre) and Early Marshorchid (Dactylorhiza incarnata).

The soil high up the Lismore valleys and in rocky places is poor in nutrients but it becomes richer where streams enter and also along the valley bottoms. In such sites Wood Speedwell (Veronica montana), Wood Anemone (Anemone nemorosa), Enchanter's-nightshade (Circaea lutetiana), Barren Strawberry (Potentilla sterilis) and shield-fern (Polystichum sp.) occur. There is some Ramsons, Three-nerved Sandwort (Moehringia trinervia) and Early-purple Orchid (Orchis mascula) locally, with Opposite-leaved Golden-saxifrage, Meadowsweet and Bugle (Ajuga reptans) in wet places. A stand of Hazel woodland at the base of the Glenakeeffe valley shows this community well.

The area has been subject to much tree felling in the recent past and re-sprouting stumps have given rise to areas of bushy Hazel, Holly, Rusty Willow and Downy Birch. The ground in the clearings is heathy with Heather (Calluna vulgaris), Slender St John's-wort (Hypericum pulchrum) and the occasional Broom (Cytisus scoparius) occurring.

The estuary and the habitats within and associated with it form a large component of the site. Very extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. The main expanses occur at the southern end of the site, with the best examples at Kinsalebeg in Co. Waterford, and between Youghal and the main bridge north of it across the river in Co. Cork. Other areas occur along the tributaries of the Licky in east Co. Waterford, and Glendine, Newport, Bride and Killahaly Rivers in Waterford west of the Blackwater. There are also large tracts along the Tourig River in Co. Cork. There are narrow bands of intertidal flats along the main river as far north as Camphire Island. Patches of green filamentous algae (Ulva sp. and Enteromorpha sp.) occur in places, while fucoid algae are common on the more stony flats, even as high upstream as Glenassy or Coneen.

The area of saltmarsh within the site is small. The best examples occur at the mouths of the tributaries and in the townlands of Foxhole and Blackbog. Those found are generally characteristic of Atlantic salt meadows. The species list at Foxhole consists of Common Saltmarsh-grass (Puccinellia maritima), small amounts of Greater Seaspurrey (Spergularia media), glasswort (Salicornia sp.), Sea Arrowgrass (Triglochin maritima), Annual Sea-blite (Suaeda maritima) and Sea Purslane (Halimione portulacoides) - the latter a very recent coloniser. Some Sea Aster (Aster tripolium) occurs, generally with Creeping Bent (Agrostis stolonifera). Sea Couch (Elymus pycnanthus) and small isolated clumps of Sea Club-rush (Scirpus maritimus) are also seen. On the Tourig River additional saltmarsh species found include sea-lavenders (Limoniun spp.), Thrift (Armeria maritima), Red Fescue (Festuca rubra), Common Scurvygrass (Cochlearia officinalis) and Sea Plantain (Plantago maritima). Oraches (Atriplex spp.) are found on channel edges. Species such as Saltmarsh Rush (Juncus gerardi) and Sea Rush (J. maritimus) are found in places in this site also, and are indicative of Mediterranean salt meadows. Areas of Salicornia mud are found at the eastern side of the townland of Foxbole above Youghal, at Blackbog, along the Tourig and Kinsalebeg esturaies.

The shingle spit at Ferrypoint supports a good example of perennial vegetation of stony banks. The spit is composed of small stones and cobbles and has a well-developed and diverse flora. At the lowest part, Sea Beet (Beta vulgaris subsp. maritima), Curled Dock (Rumex crispus) and Yellow Horned-poppy (Glaucium flavum) occur, while at a slightly higher level Sea Mayweed (Matricaria maritima), Cleavers (Galium aparine), Rock Samphire (Crithmum maritimum), Sea Sandwort (Honkenya peploides), Spear-leaved Orache (Atriplex prostrata) and Babington’s Orache (A. glabriuscula). Other species present include Sea Rocket (Cakile maritima), Herb-Robert (Geranium robertianum), Red Fescue and Kidney Vetch (Anthyllis vulneraria). The top of the spit is more vegetated and supports lichens and bryophytes, including Tortula ruraliformis and Rhytidiadelphus squarrosus.

The site supports several Red Data Book plant species, i.e. Starved Wood-sedge (Carex depauperata), Killarney Fern (Trichomanes speciosum), Pennyroyal (Mentha pulegium), Bird's-nest Orchid (Neottia nidus-avis), Golden Dock (Rumex maritimus) and Bird Cherry (Prunus padus). The first three of these are also protected under the Flora (Protection) Order, 2015, while the Killarney Fern is also listed on Annex II of the E.U. Habitats Directive. The following plants, relatively rare nationally, are also found within the site: Toothwort (Lathraea squamaria) - associated with woodlands on the Awbeg and Blackwater; Summer Snowflake (Leucojum aestivum) and Flowering Rush (Butomus umbellatus) on the Blackwater; Common Calamint (Calamintha ascendens), Red Campion, Sand Leek (Allium scorodoprasum) and Wood Club-rush (Scirpus sylvaticus) on the Awbeg.

The site is also important for the presence of several E.U. Habitats Directive Annex II animal species, including Sea Lamprey (Petromyzon marinus), Brook Lamprey (Lampetra planeri), River Lamprey (L. fluviatilis), Twaite Shad (Alosa fallax fallax), Freshwater Pearl Mussel (Margaritifera margaritifera), Otter (Lutra lutra) and Salmon (Salmo salar). The Awbeg supports a population of White-clawed Crayfish (Austropotamobius pallipes). This threatened species has been recorded from a number of locations and its remains are also frequently found in Otter spraints, particularly in the lower reaches of the river. The freshwater stretches of the Blackwater and Bride Rivers are designated salmonid rivers. The Blackwater is noted for its enormous run of salmon over the years. The river is characterised by significant pools, streams, glides, and generally, a good push of water coming through except in very low water. Spring salmon fishing can be carried out as far upstream as Fermoy and is highly regarded especially at Careysville. The Bride, main Blackwater upstream of Fermoy, and some of the tributaries are more associated with grilse fishing.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger and Irish Hare. The bat species Natterer's Bat, Daubenton's Bat, Whiskered Bat, Brown Long-eared Bat and Pipistrelle, can be seen feeding along the river, roosting under the old bridges and in old buildings.

Common Frog, a Red Data Book species that is also legally protected (Wildlife Act, 1976), occurs throughout the site. The rare bush cricket Metrioptera roselii (Order Orthoptera) has been recorded in the reed/willow vegetation of the river embankment on the Lower Blackwater River. The Swan Mussel (Anodonta cygnea), a scarce species nationally, occurs at a few sites along the freshwater stretches of the Blackwater.

Several bird species listed on Annex I of the E.U. Birds Directive are found on the site. Some use it as a staging area, others are vagrants, while others use it more regularly. Internationally important numbers of Whooper Swan (average peak 174, 1994/95-95/96) and nationally important numbers Bewick's Swan (average peak 5, 1996/97-2000/01) use the Blackwater Callows. Golden Plover occur in regionally important numbers on the Blackwater estuary (average peak 885, 1984/85-86/87) and on the River Bride (absolute maximum 2,141, 1994/95). Staging Terns visit the site annually, with >300 Sandwich Tern and >200 Arctic/Common Tern (average peak 1974-1994). The site also supports populations of the following: Red Throated Diver, Great Northern Diver, Barnacle Goose, Ruff, Wood Sandpiper and Greenland Whitefronted Goose. Three breeding territories for Peregrine Falcon are known along the Blackwater Valley. This, the Awbeg and the Bride River are also thought to support at least 30 pairs of Kingfisher. Little Egret breed at the site (12 pairs in 1997, 19 pairs in 1998).

The site holds important numbers of wintering waterfowl. Both the Blackwater Callows and the Blackwater Estuary Special Protection Areas (SPAs) hold internationally important numbers of Black-tailed Godwit (average peak 847, 1994/95-95/96 on the callows, average peak 845, 1974/75-93/94 in the estuary). The Blackwater Callows also hold Wigeon (average peak 2,752), Teal (average peak 1,316), Mallard (average peak 427), Shoveler (average peak 28), Lapwing (average peak 880), Curlew (average peak 416) and Black-headed Gull (average peak 396) (counts from 1994/95-95/96). Numbers of birds using the Blackwater Estuary, given as the mean of the highest monthly maxima over 20 years (1974-94), are Shelduck (137 +10 breeding pairs), Wigeon (780), Teal (280), Mallard (320 + 10 breeding pairs), Goldeneye (11-97), Oystercatcher (340), Ringed Plover (50 + 4 breeding pairs), Grey Plover (36), Lapwing (1,680), Knot (150), Dunlin (2,293), Snipe (272), Black-tailed Godwit (845), Bar-tailed Godwit (130), Curlew (920), Redshank (340), Turnstone (130), Black-headed Gull (4,000) and Lesser Black-backed Gull (172). The greatest numbers (75%) of the wintering waterfowl of the estuary are located in the Kinsalebeg area on the

east of the estuary in Co. Waterford. The remainder are concentrated along the Tourig estuary on the Co. Cork side.

The river and river margins also support many Heron, non-breeding Cormorant and Mute Swan (average peak 53, 1994/95-95/96 in the Blackwater Callows). Heron occurs all along the Bride and Blackwater Rivers: 2 or 3 pairs at Dromana Rock; approximately 25 pairs in the woodland opposite; 8 pairs at Ardsallagh Wood and around 20 pairs at Rincrew Wood have been recorded. Some of these are quite large and significant heronries. Significant numbers of Cormorant are found north of the bridge at Youghal and there are some important roosts present at Ardsallagh Wood, downstream of Strancally Castle and at the mouth of the Newport River. Of note are the high numbers of wintering Pochard (e.g. 275 individuals in 1997) found at Ballyhay quarry on the Awbeg, the best site for Pochard in Co. Cork.

Other important species found within the site include Long-eared Owl, which occurs all along the Blackwater River, and Barn Owl, a Red Data Book species, which is found in some old buildings and in Castlehyde, west of Fermoy. Reed Warbler, a scarce breeding species in Ireland, was found for the first time in the site in 1998 at two locations. It is not known whether or not this species breeds on the site, although it breeds nearby to the south of Youghal. Dipper occurs on the rivers.

Land use at the site is mainly centred on agricultural activities. The banks of much of the site and the callows, which extend almost from Fermoy to Cappoquin, are dominated by improved grasslands which are drained and heavily fertilised. These areas are grazed and used for silage production. Slurry is spread over much of this area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the populations of E.U. Habitats Directive Annex II animal species within it. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the Blackwater and its tributaries, and there are a number of angler associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. Other recreational activities such as boating, golfing and walking are also popular. Water skiing is carried out at Villierstown. Parts of Doneraile Park and Anne's Grove are included in the site: both areas are primarily managed for amenity purposes. There is some hunting of game birds and Mink within the site. Ballyhay quarry is still actively quarried for sand and gravel. Several industrial developments, which discharge into the river, border the site.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, dredging of the upper reaches of the Awbeg, over-grazing within the woodland areas, and invasion by non-native species, for example Rhododendron and Cherry Laurel.

Overall, the River Blackwater is of considerable conservation significance for the occurrence of good examples of habitats and populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively. Furthermore, it is of high conservation value for the populations of bird species that use it. Two Special Protection Areas, designated under the E.U. Birds Directive, are also located within the site - Blackwater Callows and Blackwater Estuary. Additionally, the importance of the site is enhanced by the presence of a suite of uncommon plant species.

Kilcolman Bog SPA (Site code 004095)

Kilcolman Bog is situated on the southern foothills of the Ballyhoura Mountains in Co. Cork. It occupies a glacially eroded hollow in Carboniferous limestone. The site comprises a quaking fen fed by calcareous groundwater, with areas of reed swamp, freshwater marsh and wet grassland. The reed swamp is made up of Bottle Sedge (*Carex rostrata*) and Water Horsetail (*Equisetum fluviatile*) with some Bulrush (*Typha latifolia*). This grades into stands of Bogbean (*Menyanthes trifoliata*) and Marsh Cinquefoil (*Potentilla palustris*) with many associated species including Ragged-Robin (*Lychnis flos-cuculi*), Marsh Willowherb (*Epilobium palustre*) and Greater Spearwort (*Ranunculus lingua*). There is a small permanent lake but in winter a large flooded area is usual.

This site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation for the following species: Whooper Swan, Teal and Shoveler. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

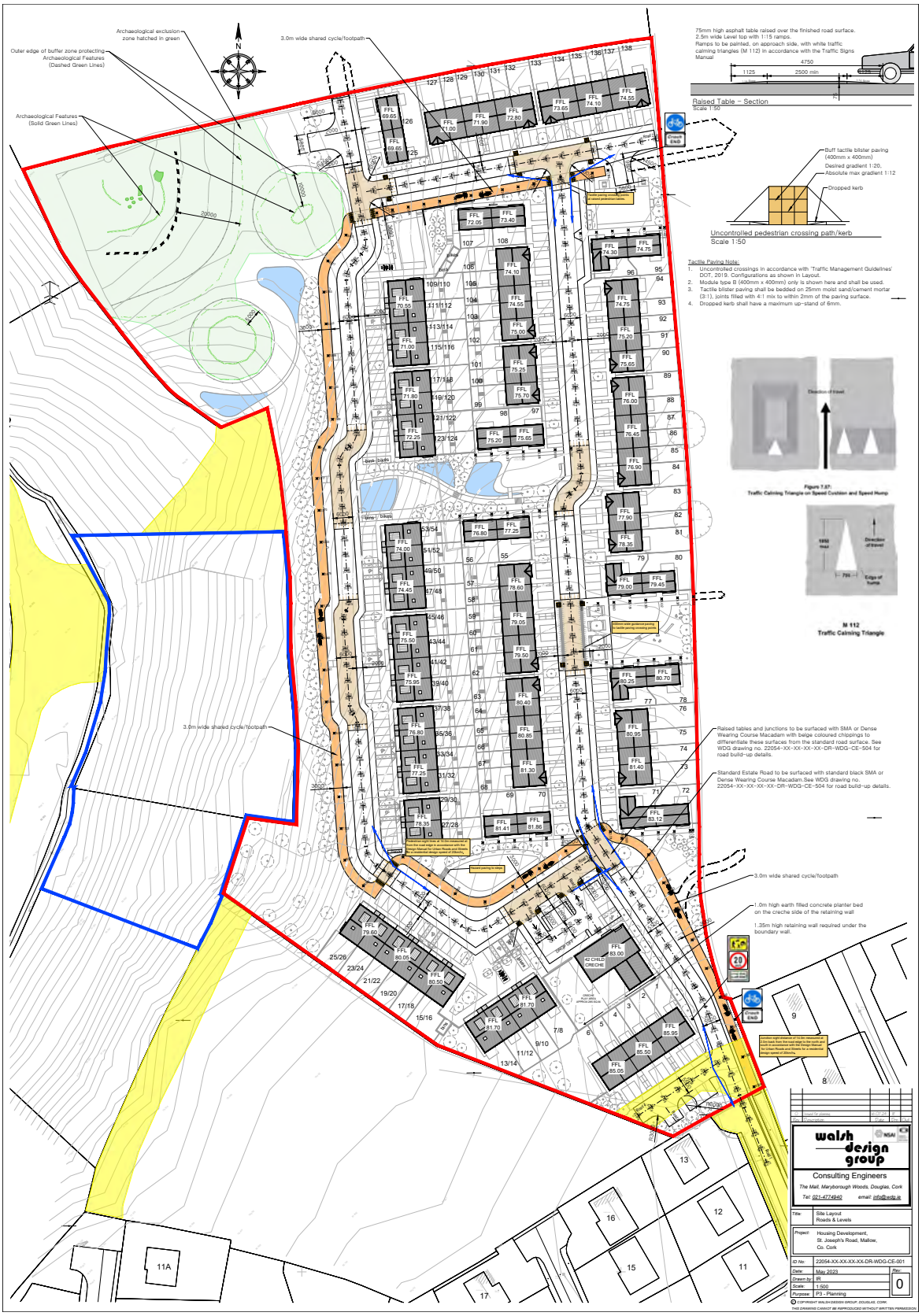
Kilcolman Bog is an important site for wintering waterfowl, with nationally important populations of Whooper Swan (95), Teal (690) and Shoveler (150) – all figures are mean peaks for the 5 year period 1995/96-1999/2000. The Shoveler population is of particular note as it comprises 5% of the national total. Other species that occur include Wigeon (590), Mallard (188), Pintail (4), Pochard (39), Tufted Duck (27), Little Grebe (14), Coot (98), Golden Plover (162) and Lapwing (740). In the past very small numbers of Greenland White-fronted Goose (1-5) were recorded at the site but not in recent years. Gulls are also winter visitors, mainly Black-headed Gull (133) and Lesser Black-backed Gull (131).

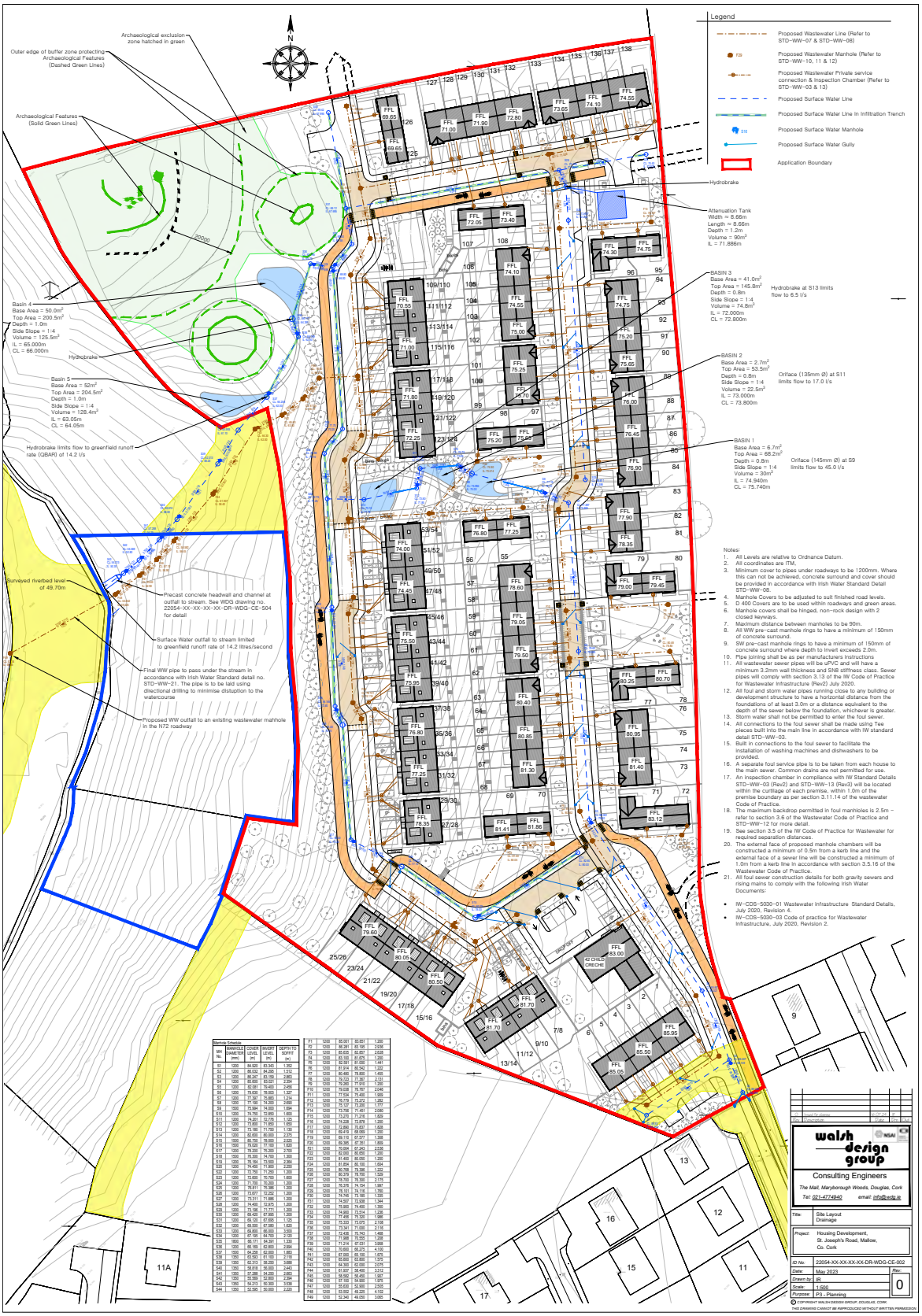
Breeding birds include Little Grebe, Mute Swan, Coot and, on occasions, Shoveler. A population of feral Greylag Goose uses the site.

Kilcolman Bog is a privately-owned Nature Reserve and Wildfowl Sanctuary that has been managed for conservation since the 1970s. Management includes control of the water levels and supplementary feeding of the waterfowl during hard weather. The bird populations have been intensively monitored since the 1970s.

The site is of ornithological interest because it supports nationally important numbers of three species. Of particular note is the regular presence of Whooper Swan and Golden Plover, two species that are listed on Annex I of the E.U. Birds Directive. The site is notable as being one of the few sites in the country where almost daily observations have been made over a long period.

Appendix 2. Drawings




Legend
Proposed Wastewater Line (Refer to STD-WW-07 & STD-WW-08)
Proposed Wastewater Manhole (Refer to STD-WW-10, 11 & 12)
Proposed Wastewater Private service connection & Inspection Chamber (Refer to STD-WW-03 & 13)
Proposed Surface Water Line
Proposed Surface Water Line in Infiltration Trench
Proposed Surface Water Manhole
Proposed Surface Water Gully
Application Boundary
Archaeological exclusion zone hatched in green
Outer edge of buffer zone protecting Archaeological Features (Dashed Green Lines)
Archaeological Features (Solid Green Lines)
Hydrobrake
Attenuation Tank
Width = 8.66m
Length = 8.66m
Depth = 1.2m
Volume = 90m³
IL = 71.886m
BASIN 3
Base Area = 41.0m²
Top Area = 145.8m²
Depth = 0.8m
Side Slope = 1:4
Volume = 74.8m³
IL = 72.000m
CL = 72.800m
Hydrobrake at S13 limits flow to 6.5 l/s
BASIN 2
Base Area = 2.7m²
Top Area = 53.5m²
Depth = 0.8m
Side Slope = 1:4
Volume = 22.5m³
IL = 73.000m
CL = 73.800m
Orifice (135mm Ø) at S11 limits flow to 17.0 l/s
BASIN 1
Base Area = 6.7m²
Top Area = 68.2m²
Depth = 0.8m
Side Slope = 1:4
Volume = 30m³
IL = 74.940m
CL = 75.740m
Orifice (145mm Ø) at S9 limits flow to 45.0 l/s
Basin 4
Base Area = 50.0m²
Top Area = 200.5m²
Depth = 1.0m
Side Slope = 1:4
Volume = 125.5m³
IL = 65.000m
CL = 66.000m
Hydrobrake
Basin 5
Base Area = 52m²
Top Area = 204.5m²
Depth = 1.0m
Side Slope = 1:4
Volume = 128.4m³
IL = 63.05m
CL = 64.05m
Hydrobrake limits flow to greenfield runoff rate (QBAR) of 14.2 l/s
Surveyed riverbed level of 49.70m
Precast concrete headwall and channel at outfall to stream. See WDG drawing no. 22054-XX-XX-XX-XX-DR-WDG-CE-504 for detail
Surface Water outfall to stream limited to greenfield runoff rate of 14.2 litres/second
Final WW pipe to pass under the stream in accordance with Irish Water Standard detail no. STD-WW-21. The pipe is to be laid using directional drilling to minimise disruption to the watercourse
Proposed WW outfall to an existing wastewater mahhole in the N72 roadway
42 CHILD CRECHE
Notes:
1. All Levels are relative to Ordnance Datum.
2. All coordinates are ITM.
3. Minimum cover to pipes under roadways to be 1200mm. Where this can not be achieved, concrete surround and cover should be provided in accordance with Irish Water Standard Detail STD-WW-08.
4. Manhole Covers to be adjusted to suit finished road levels.
5. D 400 Covers are to be used within roadways and green areas.
6. Manhole covers shall be hinged, non-rock design with 2 closed keyways.
7. Maximum distance between manholes to be 90m.
8. All WW pre-cast manhole rings to have a minimum of 150mm of concrete surround.
9. SW pre-cast manhole rings to have a minimum of 150mm of concrete surround where depth to invert exceeds 2.0m.
10. Pipe joining shall be as per manufacturers instructions
11. All wastewater sewer pipes will be uPVC and will have a minimum 3.2mm wall thickness and SN8 stiffness class. Sewer pipes will comply with section 3.13 of the IW Code of Practice for Wastewater Infrastructure (Rev2) July 2020.
12. All foul and storm water pipes running close to any building or development structure to have a horizontal distance from the foundations of at least 3.0m or a distance equivalent to the depth of the sewer below the foundation, whichever is greater.
13. Storm water shall not be permitted to enter the foul sewer.
14. All connections to the foul sewer shall be made using Tee pieces built into the main line in accordance with IW standard detail STD-WW-03.
15. Built in connections to the foul sewer to facilitate the installation of washing machines and dishwashers to be provided.
16. A separate foul service pipe is to be taken from each house to the main sewer. Common drains are not permitted for use.
17. An inspection chamber in compliance with IW Standard Details STD-WW-03 (Rev2) and STD-WW-13 (Rev3) will be located within the curtilage of each premise, within 1.0m of the premise boundary as per section 3.11.14 of the wastewater Code of Practice.
18. The maximum backdrop permitted in foul manholes is 2.5m - refer to section 3.6 of the Wastewater Code of Practice and STD-WW-12 for more detail.
19. See section 3.5 of the IW Code of Practice for Wastewater for required separation distances.
20. The external face of proposed manhole chambers will be constructed a minimum of 0.5m from a kerb line and the external face of a sewer line will be constructed a minimum of 1.0m from a kerb line in accordance with section 3.5.16 of the Wastewater Code of Practice.
21. All foul sewer construction details for both gravity sewers and rising mains to comply with the following Irish Water Documents:
- IW-CDS-5030-01 Wastewater Infrastructure Standard Details, July 2020, Revision 4.
- IW-CDS-5030-03 Code of practice for Wastewater Infrastructure, July 2020, Revision 2.
walsh design group
Consulting Engineers
The Mall, Maryborough Woods, Douglas, Cork
Tel: 021-4774940 email: info@wdg.ie
Title: Site Layout Drainage
Project: Housing Development, St. Joseph's Road, Mallow, Co. Cork
Id No: 22054-XX-XX-XX-XX-DR-WDG-CE-002
Date: May 2023
Drawn By: JR
Scale: 1:500
Purpose: P3 - Planning
Rev: 0
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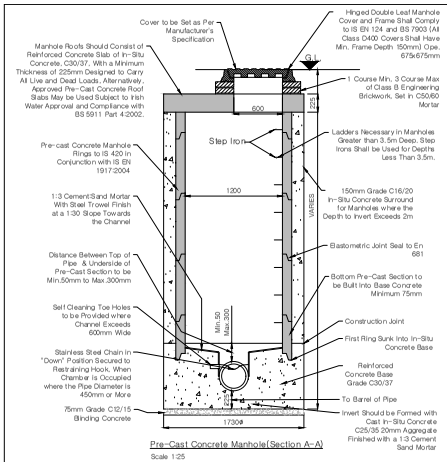
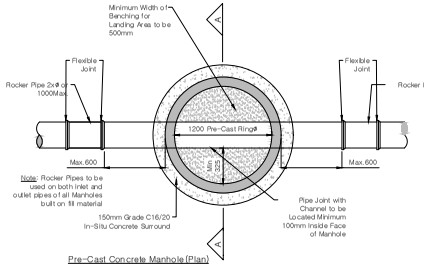


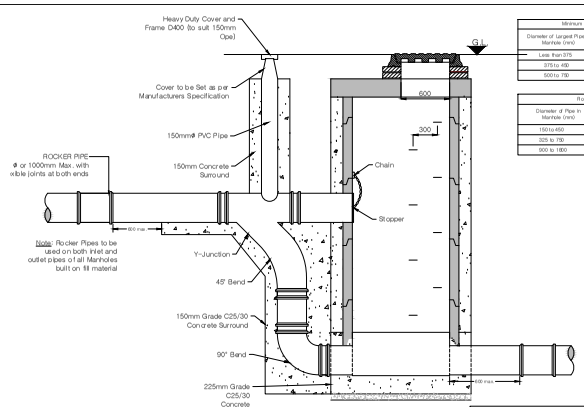
Pre-Cast Concrete Manhole(Section A-A)

Scale 1:25



Pre-Cast Concrete Manhole(Plan)

Scale 1:25



Backdrop Manhole

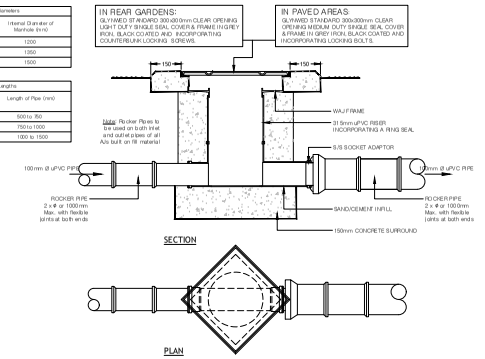
Scale 1:50

Minimum Manhole Diameters	
Diameter of Largest Pipe in Manhole (mm)	Internal Diameter of Manhole (mm)
Less than 375	1200
375 to 450	1350
500 to 750	1500

Rocker Pipe Lengths	
Diameter of Pipe in Manhole (mm)	Length of Pipe (mm)
150 to 450	500 to 750
525 to 750	750 to 1000
900 to 1800	1000 to 1500

IN REAR GARDENS:
GLYNWED STANDARD 300x600mm CLEAR OPENING LIGHT DUTY SINGLE SEAL COVER & FRAME IN GREY IRON, BLACK COATED AND INCORPORATING COUNTERBUNK LOCKING SCREWS.

IN PAVED AREAS
GLYNWED STANDARD 300x300mm CLEAR OPENING MEDIUM DUTY SINGLE SEAL COVER & FRAME IN GREY IRON, BLACK COATED AND INCORPORATING LOCKING BOLTS.



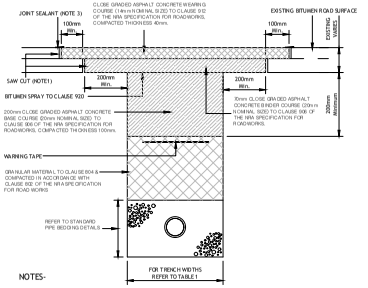
SECTION

PLAN

ACCESS JUNCTION DETAIL

SCALE: 1:10

PIPE BEDDING DETAILS
All pipe bedding materials and details shall be in accordance with Recommendations for Site Development Works for Housing Areas (DoEHLG 1998) & Sewers for Adoption 6 – A Design and Construction Guide for Developers.



NOTES-

1. ALL EDGES OF EXCAVATED AREA TO BE SAW CUT AS DETAILED.
2. 100°C HOT BITUMEN BINDER 50 PEN OR COLD THIXOTOPIC BITUMEN 30-70 PEN TO BE APPLIED TO ALL VERTICAL CUTS IN ACCORDANCE WITH BS 594 PRIOR TO THE APPLICATION OF SURFACE LAYERS.
3. JOINTS SEALED WITH HOT BITUMEN AND TOPPED WITH FINE SAND/GRIT TO GET A MINIMUM 35 SHORE RESISTANCE VALUE AS DETERMINED BY THE PORTABLE SHORE RESISTANCE PENDULUM SHALL NOT EXCEED 3mm THICKNESS AND A WIDTH OF 40mm.

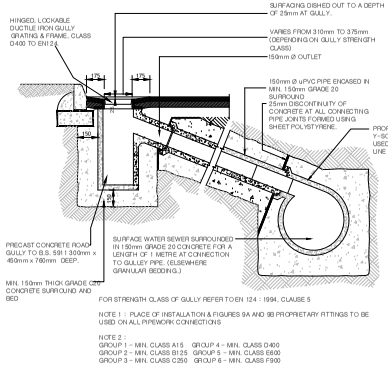
RIGID PIPE	NOMINAL PIPE DIAMETER (mm)	100	150	225	300	375	450	525	600	750	900	1050	1200	1300
	TRENCH WIDTH MIN (mm)	450	500	600	600	900	1050	1150	1250	1400	1950	2100	2300	2450
	TRENCH WIDTH MAX (mm)	650	700	800	900	1150	1250	1350	1450	1600	2150	2300	2500	2650

FLEXIBLE PIPE	NOMINAL PIPE DIAMETER (mm)	100	150	200	250	300
	TRENCH WIDTH MIN (mm)	450	450	600	600	700
	TRENCH WIDTH MAX (mm)	600	600	700	700	850

TABLE 1 - TRENCH WIDTHS

PAVEMENT REINSTATEMENT DETAILS

NOT TO SCALE



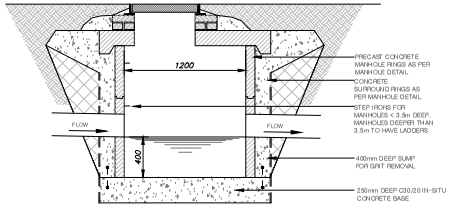
FOR STRENGTH CLASS OF GULLY REFER TO EN 124 : 1994, CLAUSE 5

NOTE 1 : PLACE OF INSTALLATION & FIGURES 9A AND 9B PROPRIETARY FITTINGS TO BE USED ON ALL PIPEWORK CONNECTIONS

NOTE 2 :
GROUP 1 – MIN. CLASS A15 GROUP 4 – MIN. CLASS D400
GROUP 2 – MIN. CLASS B125 GROUP 5 – MIN. CLASS E600
GROUP 3 – MIN. CLASS C250 GROUP 6 – MIN. CLASS F900

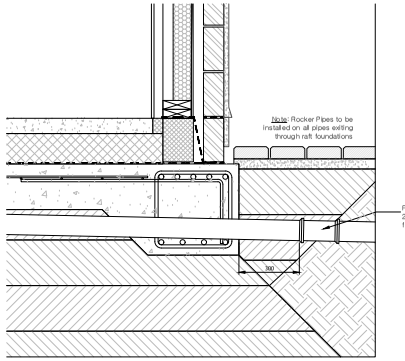
PRECAST CONCRETE GULLY IN MACADAM AREA

SCALE 1:20



TYPICAL SUMP MANHOLE

SCALE 1:20



RAFT FOUNDATION - ROCKER PIPE DETAIL

Scale 1:10

NOTES - General Pre-Cast Manhole

1. All dimensions are in millimetres, unless noted otherwise.
2. Pre-Cast Manhole Units: Complying with requirements of IS EN 1917 and BS 5911-Part 3.
3. Thicker Manhole bases required for sewers in excess of 3m deep where the size is greater than the standard minimum size.
4. Approved Pre-Cast Concrete Bases may be used incorporating channels, benching etc. subject to Irish Water for review.
5. Manhole roofs should consist of reinforced concrete slab of In-situ concrete, C30/37, with a minimum thickness of 225mm designed to carry all live and dead loads, alternatively, approved pre-cast concrete roof slabs may be used subject to Irish Water approval and compliance with BS 5911 Part 4:2002.
6. Covers and Frames shall be suitable for road and traffic conditions subject to approval from Cork County Council.
7. 200mm all around, 100mm deep concrete plinth with protective stainless steel metal band around covers in green areas.
8. All chambers to be checked for uplift by the developer based on ground conditions within the site. Should anti-floatation measures be required they shall be subject to approval from Irish Water.
9. All Concrete to be in Accordance with IS EN 206:2013.
10. Benching to be be formed of Grade 20/40 concrete and finished with a rendering of 25mm of Class 'B' cement mortar.
12. Concrete surround to be provided to manhole rings where depth to invert exceeds 2.0m or as directed by the Engineer.

NOTES - Backdrop Manhole

1. All dimensions are in millimetres, unless noted otherwise.
2. Rodding eye chamber shall be covered with approved heavy duty metal covers to IS 261 and BS 5834. Cover and frame shall be suitable for road and traffic conditions and is subject to the approval of Irish Water.
3. Manhole details to be in accordance with STD-WW-10 & 12 as set out in "Irish Water Connection and Developer Service (Wastewater Infrastructure Standard Details)"

P3	Issued For Planning	25.07.24	EF
Rev	Description	Date	Chkd

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Title	Surface Water Drainage Typical Details
Project	Housing Development, St. Joseph's Road, Mallow, Co. Cork
W No	22054-XX-XX-XX-DR-WDG-GE-600
Date	Feb 2024
Drawn by	IR
Scale	As shown
Status	P3 - Planning
Rev	0

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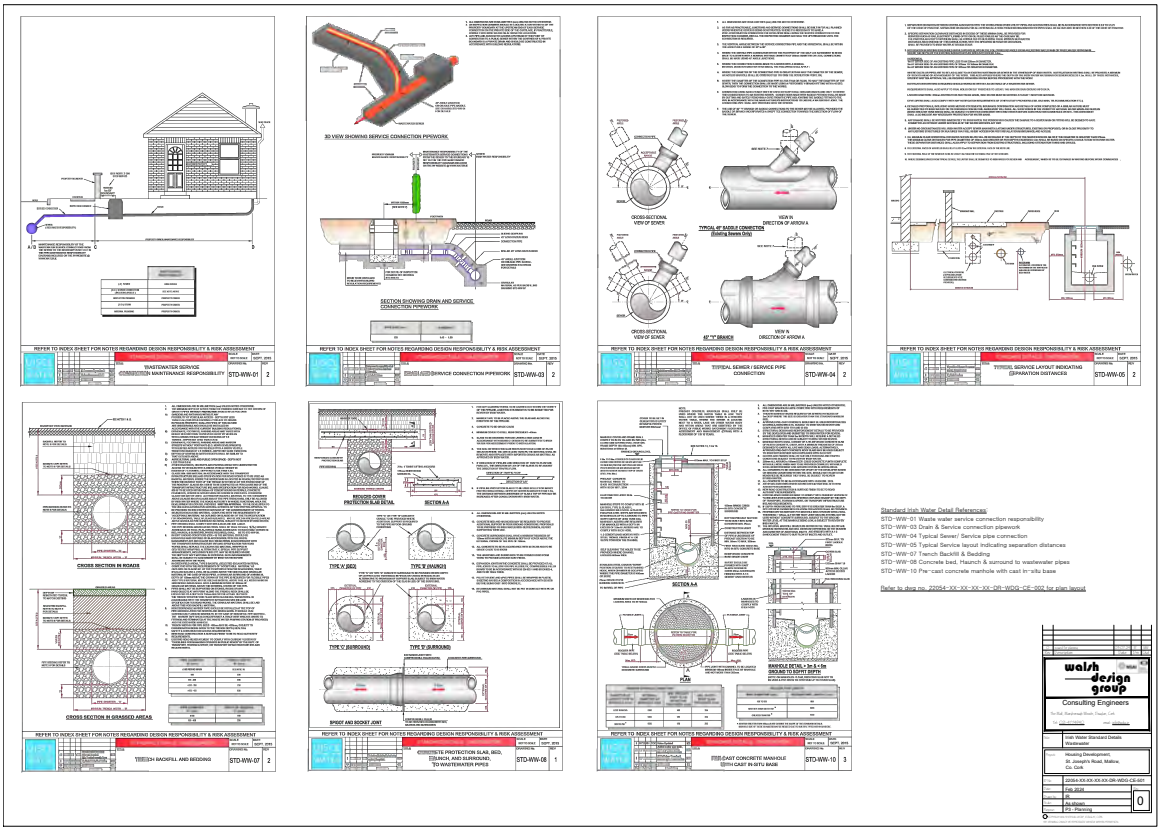

Standard Irish Water Detail References:

STD–WW–01 Waste water service connection responsibility
STD–WW–03 Drain & Service connection pipework
STD–WW–04 Typical Sewer/ Service pipe connection
STD–WW–05 Typical Service layout indicating separation distances
STD–WW–07 Trench Backfill & Bedding
STD–WW–08 Concrete bed, Haunch & surround to wastewater pipes
STD–WW–10 Pre–cast concrete manhole with cast in–situ base

Refer to dwg no. 22054–XX–XX–XX–XX–DR–WDG–CE–502 for plan layout

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Consulting Engineers
Irish Water Standard Details Wastewater
Housing Development, St. Joseph's Road, Mallow, Co. Cork.
22054-XX-XX-XX-XX-DR-WDG-CE-001
Feb 2024
JB
As shown
P3 - Planning
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