Deansgrange Loughlinstown FRS, Co. Dublin

Ecological Impact Assessment

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2020s0059

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Contract

This report describes work commissioned by Joseph Craig of Dún Laoghaire Rathdown County Council (DLRCC), by a letter dated 16th of December 2019. Michael Coyle and Mark Desmond of JBA Consulting carried out this work.

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Purpose

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Abbreviations

AA	Appropriate Assessment
BAP	Biodiversity Action Plan
BoCCI	Birds of Conservation Concern in Ireland
DLRCC	Dún Laoghaire Rathdown County Council
DoEHLG	Department of Environment, Heritage and Local Government
CEMP	Construction Environmental Management Plan
CFRAM	Catchment Flood Risk Assessment and Management
CIEEM	Chartered Institute of Ecology and Environmental Management
EC	European Communities
EcIA	Ecological Impact Assessment
ECoW	Ecological Clerk of Works
EPA	Environmental Protection Agency
EU	European Union
FRS	Flood Relief Scheme
GIS	Geographical Information Systems
IFI	Inland Fisheries Ireland
INNS	Invasive Non-Native Species
LAP	Local Area Plan
NBDC	National Biodiversity Data Centre
NPWS	National Parks and Wildlife Service
pNHA	Proposed Natural Heritage Area
QI	Qualifying Interest
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SoP	Standard of Protection
SPA	Special Protection Area
SuDS	Sustainable Drainage System
TWL	Total Water Level
WFD	Water Framework Directive
ZoI	Zone of Influence

1 Introduction

JBA Consulting Engineers and Scientists Ltd (hereafter JBA) has been commissioned by Dún Laoghaire Rathdown County Council (DLRCC) to undertake an Ecological Impact Assessment (EcIA) in relation to the Deansgrange Stream Flood Relief Scheme (FRS) of Deansgrange to Loughlinstown. The proposed development which will be submitted under Part 8 of the Planning and Development Act (2000) as amended, consists of development of a flood relief scheme to minimise the risks currently posed to people, the community, social amenity, environment and landscape.

1.1 Aims

The aims of this EcIA are to:

- Establish baseline ecological conditions to enable identification of potentially important ecological features within the zone of influence of the project
- Determine the ecological value of identified ecological features
- Assess the significance of impacts of the proposed project on ecological features of value
- Identify avoidance, mitigation or compensatory measures
- Identify residual impacts after mitigation and the significance of their effects
- Identify opportunities for ecological enhancement

1.2 Site location

The proposed scheme covers an area from Deansgrange to Killiney Strand. The area is approximately 325m wide, extending either side of the Deangsgrange Stream (sometimes referred to as the Kill of the Grange Stream), which flows for approximately 5.3km from Deansgrange in the northwest, through Clonkeen Park and Kilbogget Park, before turning eastwards along Loughlinstown. The furthermost downstream section is culverted until it has passed underneath the Dublin-Wexford rail line where it reaches the outfall, flowing into the Irish Sea at Killiney Bay.

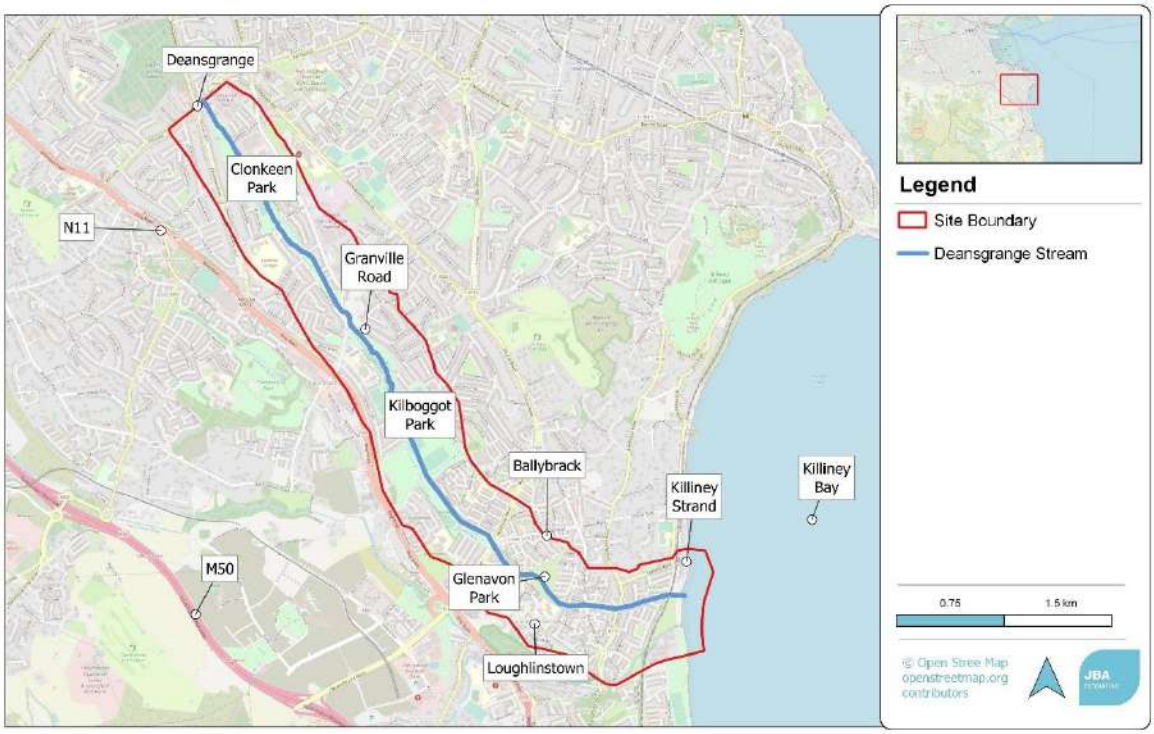

Figure 1-1: Site location and boundary of works (OSM, 2022)

2 Project Description

2.1 Proposed project

The works associated with the Deansgrange Flood Relief Scheme (FRS) extend through several locations across the Deansgrange Stream catchment, all at or in close proximity to the stream, between Johnstown Rd / Granville Rd and the environs of the Dublin-Wexford Rail line.

The proposed scheme consists of the installation of a 1200mm diameter tunnelled overflow culvert underneath the railway, the provision of additional storage in Glenavon Park, a series of flood containment walls upstream of the Killiney Hill Road Bridge, including upgrading the parapet of the existing bridge, upgrade works in the existing culvert at Granville Road, the upgrade of the existing screen at the entry of the Seafield culvert, installation of additional coarse screens and the provision for future adaptation of all the measures listed to the impact of climate change on the modelled flood levels.

The Deansgrange FRS' main objective is providing the required Standard of Protection (SoP) against floods caused by the 1 in 100 year design storms across the Deansgrange catchment. This area, studied as part of the wider Loughlinstown catchment, had been designated at risk of flooding in the Eastern Catchment Flood Risk Assessment and Management (CFRAM). The works undertaken within the Deansgrange FRS will manage this risk.

2.1.1 Johnstown Road

The flood protection measure required at Johnstown Road will consist of the relocation of an existing pedestrian entrance serving the walkway at the southwest in Clonkeen Park. A new entrance matching the characteristics of the existing entrance will be installed at a distance of 47m to the north. A short section of the existing masonry stone wall and railing will be removed to accommodate the new entrance. The new masonry stone wall and decorative railing will be constructed at the location of the existing entrance to match the existing masonry wall features.

To facilitate the continued circulation of pedestrians throughout the park, a new 4m wide footpath of length 30m will be installed at acceptable gradients (e.g. 1/21) to integrate Johnstown Road and the existing circulation route. The existing public cycle path will be extended north to facilitate continued access for cyclists to Clonkeen Park.

2.1.2 Granville Road

The flood relief measure required at Granville Road will consist of the replacement of 2 No. twin Concrete 1050mm dia. pipes which traverse beneath the existing road structure in a North-South direction with a new concrete culvert (inverted U shape) with dimensions of 1.2m high x 3m wide. New concrete headwalls will be constructed at the upstream and downstream face of the culvert. The culvert will extend the full width of the road carriageway including grass verge and footpaths, approximately 20m.

2.1.3 Glenavon Park

The flood relief measure proposed at Glenavon Park is an offline flood storage system within the existing greenspace adjoining the stream and the housing estate at Gleanntan. Two offline detention basins and a new flood defence embankment at the southern section of the park will provide a storage capacity of up to 9,615m3 during flood events. The Total Water Level (TWL) within the park will be controlled by a flow control structure which will be installed on the existing stream and also form part of the flood defence embankment structure. The new detention basins will be sloped at a gradient of 1:3 and include a new wetland which will seek to generate habitat opportunities along with some native planting. Included will be a series of meandering swales lined with stone to provide the permanent water to the sedimentation pond and wetland. The swales will be fed by a nearby surface water source to the north and local drainage.

The new flood defence embankment will be constructed to a level of 14.00mOD and will be integrated into the existing landscape to the east and west of the park. Integration of the embankment with existing levels will include new pedestrian pathways with viewing areas, promoting active travel from Gleanntan along the existing pathways on the east of the stream. The top of the embankment will be relatively flat and will be graded at a slope of 1:3 to meet

existing ground levels. To traverse the stream from one side of the park to the other at the footpath, a new pedestrian bridge is proposed. This will be installed directly over the spillway.

Where the flood defence embankment adjoins the stream, a pipe will convey the main channel flow with a new bespoke headwall with rip rap or similar at either face. Directly above the main channel flow, the flow control weir and spillway will be installed to limit the top water level during a storm event. The wing walls for the new pipe within the river channel and spillway will also act as retaining walls for the flood defence embankments. The existing footpaths and bridge will be removed.

2.1.4 Killiney Hill Road

The proposed flood defence measure at Killiney Hill Road will consist of new walls of up to 1.5m in height along the boundaries of the properties upstream of the bridge and an upgrade to the existing bridge parapet. The new flood defence walls will be constructed of reinforced concrete and supported by precast or cast in situ piles with an interconnecting ground beam/ pile cap. This foundation has been specifically designed to mitigate any impact the foundations may have on the existing mature tree roots. In locations where the trees are not impacted, the walls will be supported by a conventional strip foundation. The new walls will be constructed to a total length of 240m; 103m and 130m on the northern and southern embankments respectively. At the upstream face of the existing bridge, c.13m of stone parapet and c.8m windward boundary wall will be upgraded and reinforced. The walls will be clad on both façades and hand railings will be installed as required. A 7m long embankment will be also added at the northwest end of walls.

2.1.5 Seafield Screen

A series of proposed works to upgrade and install new screens have been included as part of the FRS. These will include the following works:

- A new debris screen is proposed at the entrance to the existing Seafield culvert. The works will include the replacement of adjoining walls and the onsite installation of a debris screen manufactured offsite. A horizontal and an inclined panel will provide the screening with a new working platform for maintenance.
- A new coarse screen is proposed to be installed at the pedestrian bridge adjoining the Abberley estate and upstream of Killiney Hill Road.
- The existing screens at Shanganagh Road and the Fish Pass in the environs of St. Columbanus National School are proposed to be upgraded. The existing screens and associated ancillaries will be demolished and replaced with new foundations, support structures and screens.

2.1.6 Seafield Railway Culvert

The current proposal allows for the installation of an overflow to the Seafield Culvert, consisting of the following elements:

- A 1200mm concrete pipe jacked sewer c.47m, installed underneath the existing railway line, including entry and exit shafts and temporary surcharge zones.
- A 1800mm concrete pipe c.119m section installed using open cut techniques between the exit shaft and the outfall.

Additional works to connect the trenchless and open cut sections of the overflow sewer, including a flow control weir and an outfall structure to the Deansgrange Stream.

2.1.7 Site compounds and access pathways.

Site compounds will be located on the amenity green spaces of the various housing estates and urban park within the site area. These compounds will be located +50m from the nearest watercourse. Access route will be along existing pathways and suburban roads for the majority of the scheme, with some access routes present through parkland.

Access pathways may require the use of a bailey bridge crossing the Deansgrange stream at Glenavon and a supporting bailey bridge on top of the existing bridge over the Shanganagh River near the WWTP so that heavy machinery are supported. The bailey bridge over the Shanganagh River will require piled foundations to support the weight of the bridge.

Vegetation removal will be restricted to removal of a low number of immature sycamore trees at Seafield Ct to facilitate entry for the proposed site compound within this amenity green space.

2.1.8 Plans

An overview of the proposed works is shown in the Buildability Report (JBB, 2023) which accompanies this report

2.1.9 Excavations

Maximum depths of 8.0m will be reached during the construction of culvert pipe under the railway near the stream outfall, however the majority of excavations will not be as deep as this.

2.1.10 Duration of the Works

Works are expected to take approximately 18 months in total and will be completed in phases following environmental constraints such as breeding birds and seasonal restrictions to instream works. Works are expected to last until July 2026.

3 Methodology

3.1 The EcIA Team

This EcIA was completed by Ecologist Mark Desmond BSc (Hons), MSc and Assistant Ecologist Michael Coyle BSc (Hons), MSc and the report has been reviewed by Project Ecologist William Mulville BSc (Hons), MSc, ACIEEM and JBA Senior Ecologist Patricia Byrne BSc (Hons), PhD, MCIEEM.

Ecological site surveys were performed by JBA Senior Ecologist Patricia Byrne, JBA Ecologist Malin Lundberg, Dr Niamh Burke of Coiscéim Consulting, Harry Jones of JB Barry, and JBA Ecologists Mark Desmond, William Mulville and Dominic Tilley.

These staff members thus fulfil the Environmental Impact Assessment (EIA) Directive personnel requirements of 'competent persons'.

3.2 Policy and Legislation

Policy and legalisation for nature conservation, protected and priority species relevant to the proposed project is provided in Appendix D.

3.3 Methods

This EcIA assesses the ecological features present within the site and its surrounding area (the Zone of Influence (ZoI)) in relation to the proposed works. This allows for identification of the potential impacts of the proposed works upon the ecological features of the site at an early stage, whilst identifying the potential ecological constraints upon the proposed works. The assessment is based on a desk-based assessment, which determines the baseline conditions at the site of the proposed works, and site surveys, which provided information on habitats and species present on the site and its surroundings.

This EcIA will outline the findings of the desk-based assessment and the surveys and identify any potential impacts of the proposed works on ecological features within the ZoI of the site; and propose mitigation measures to avoid or reduce impacts where necessary.

3.4 Guidance

This assessment was conducted in accordance with the following guidance documents:

- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009a).
- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, (CIEEM, 2018, updated 2022).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft) Environmental Protection Agency (EPA, 2022).

3.5 Baseline

To determine the baseline conditions at the site a review of all available information was made. When determining the pre-work conditions on-site, including the presence or absence of protected habitats and/or species, the precautionary principle was used where limited information was available.

A desk-based assessment was carried out to collate information regarding protected/notable species and statutorily designated nature conservation sites in, or within close proximity to, the study area. This included a data search for protected and notable species conducted using the National Biodiversity Data Centre Mapping System (National Biodiversity Data Centre, 2022). A customised polygon was created to extract all the species data from the set Zone of Influence for this project.

Information for statutory designated sites including Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar Sites, Natural Heritage Areas (NHAs) and proposed

NHAs (pNHA) was collected from the online resources provided by the National Parks and Wildlife Service (NPWS).

Other information on the local area was obtained, including:

- NPWS, 2019a. The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report Edited by: Deirdre Lynn and Fionnuala O'Neill.
- NPWS, 2019b. The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitats Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
- NPWS, 2019c. The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessment Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
- Environmental Protection Agency online databases on water quality (Available online at https://gis.epa.ie/EPAMaps/).
- Aerial photography available from www.osi.ie and Google Maps http://maps.google.com/ ;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie
- National Biodiversity Data Centre, 2022 – Species Distribution Maps; Available online at www.biodiversityireland.ie Accessed on various dates;
- All Ireland Red Data lists for vascular flora, mammals, butterflies, non-marine molluscs, dragonflies & damselflies, amphibians and fish;
- Water Framework Directive water maps (available online at http://www.wfdireland.ie/maps.html and https://www.catchments.ie/); and
- International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species (available online at http://www.iucnredlist.org).

3.5.1 Zone of Influence

The Zone of Influence (ZoI) for the project is based on a judgement of the likely extent of the ecological impacts. This will vary for different ecological features, depending on their sensitivities to environmental change. The Zone of Influence for this project has been assessed based on the Source-Pathway-Receptor model following the most recent OPR practice note (OPR, 2021);

- OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management

As the scale of proposed works are considered of 'Project' status, Ecological receptors (including but not limited to Natura 2000 sites) within a 5km range of the proposed scheme were examined in relation to surface water and groundwater / ground-to-surface water pathways (i.e., local surface water sub-catchments and groundwater bodies / aquifers), with an extended 15km range for those with a downstream hydrological connection. As the project involves instream works within the Deansgrange Stream, all ecological receptors including but not limited to Natura 2000 sites, sensitive habitats and species within 100m of the stream and within 5km of the stream's outfall have been considered in relation to project associated impacts.

In respect to ZoI for air pollution (emissions and dust), ecological receptors sites within a 500m buffer zone of the scheme were considered as per the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014),

This means the final 'Zone of Influence' can be a complex shape not easily defined by a simple distance figure, but in this way the assessment includes all relevant sites whilst avoiding unnecessary inclusion of other sites.

3.5.2 Field Surveys

To inform this EcIA, ecological site surveys were performed by JBA Ecologist Patricia Byrne, and Harry Jones of JB Barry on the 27th of February 2020, and by JBA Ecologist Malin Lundberg, and Dr Niamh Burke of Coiscéim Consulting on the 20th of August in 2020.

JBA Ecologist Patricia Byrne conducted a bird survey of Glenavon Park and upstream of Kilbogget Park by the ponds. A further survey of areas where vegetation and/or trees are to be removed was conducted by Ecologist Mark Desmond on the 30th of September 2022.

An instream survey for Otter was conducted upstream of Killiney Hill Road Bridge by JBA ecologists William Mulville and Mark Desmond in November 2022. A Camera trap survey was conducted in association with this instream survey. Bat emergence and activity surveys along the treeline locate at Killiney Hill Road Bridge were conducted by JBA Ecologists Patricia Byrne and William Mulville on the 11th of May 2023.

A riparian bird survey was conducted by JBA Ecologists Mark Desmond and Dominic Tilley on the 19th of May. These riparian bird surveys were conducted instream between the inlet of the Seafield Culvert and the northern boundary of Glenavon Park, as well as 50m upstream and 100m downstream of Granville Road culvert

A survey of the pedestrian bridge crossing the Shanganagh River was conducted to assess impact resulting from the proposed placement of a bailey bridge on the 14th of June 2023.

The ecological walkover surveys recorded habitats and protected species, following the methods outlined in the documents below:

- Heritage Council (2011). Best Practice Guidance for Habitat Survey and Mapping (Smith et al. 2011).
- Fossitt, J. (2000). A Guide to Habitats in Ireland. The Heritage Council, Kilkenny (Fossitt 2000).
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009b).

Aerial photographs and site maps assisted the survey. Habitats have been named and described following Fossitt (2000). Nomenclature for higher plants principally follows that given in The New Flora of the British Isles 4th Edition (Clive Stace 2019). Identification of Irish plants generally follows Webb's An Irish Flora (Parnell and Curtis, 2012).

3.6 Limitations and Constraints

This Ecological Impact Assessment is based on ecological site surveys and existing data from the above-mentioned sources. The assessment necessarily relies on some assumptions and is inevitably subject to some limitations as detailed below. These do not affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- Information on the works and conditions on site are based on current knowledge at the time of writing. Changes to the site since surveys were undertaken cannot be accounted for.
- However, the site surveys have followed CIEEM (2019) Advice note on the lifespan of ecological reports and surveys.
- Where field data and desktop data are limited, the precautionary principle is utilised when determining potential ecological sensitivities within the proposed schemes ZoI.
- Certain field surveys were restricted to the zone of influence of proposed works, should the proposed works change, further field surveys may be required.

3.7 Water Framework Directive

In response to the increasing threat of pollution and the increasing demand from the public for cleaner rivers, lakes and beaches, the EU developed the Water Framework Directive (WFD). This Directive is unique in that, for the first time, it establishes a framework for the protection of all waters including rivers, lakes, estuaries, coastal waters and groundwater, and their

dependent wildlife/habitats under one piece of environmental legislation for all European member states.

The WFD (Directive 2000/60/EC) is a substantial piece of EU water legislation that came into force in 2000. The overarching objective of the WFD is for the water bodies in Europe to attain Good or High Ecological Status. The Environment Protection Agency (EPA) is the competent authority in Ireland responsible for delivering the WFD. River Basin Management Plans (RBMP) have been created which set out measures to ensure that water bodies in the country achieve 'Good Ecological Status'.

Good Ecological Quality will depend on the quality of the individual quality elements on which the Ecological status is scored; namely the biological, chemical and morphological condition in a particular water body. Any reduction in any of these elements will result in a reduction of the overall ecological status.

3.7.1 Water Framework Status and Objectives

It is understood that the River Basin Management Plan (2018-2021) has been adopted by all local authorities in order to achieve the aims of the WFD. The Plan sets out the new approach that Ireland will take to enhance protection, prevention, and monitoring of Irish waterbodies. The main actions include:

- Improve waste water treatment;
- Conservation and leakage reduction;
- Scientific assessment of water bodies and implementation of local measures;
- A new collaborative Sustainability and Advisory Support Programme;
- Dairy Sustainability Initiative;
- Development of water and planning guidance for local authorities;
- Extension of Domestic Waste Water Treatment Systems grant Schemes; and
- A new Community Water Development Fund

Regardless of their current quality, surface waters should be treated the same in terms of the level of protection and mitigation measures employed, i.e., there should be no negative change in status.

3.8 Screening of Ecological Features

The ecological features identified during the walkover surveys and from desk-based assessments were reviewed.

An informal screening process is presented at the end of baseline conditions section to ensure that the assessment focuses only on features where the impact could have important consequences for biodiversity (valued ecological features). Any features which are important beyond the site level were identified for further evaluation. Ecological features with little or no value beyond the site level were screened out and a short statement explaining this is given in the screening section.

An Appropriate Assessment (AA) Screening report has been produced separate to this EcIA (JBA, 2022a), to assess the potential for effects on Designated Natura 2000 sites. The AA Screening Report concluded there was no potential for adverse significant effects on European sites arising from the proposed project, either alone or in-combination with other plans or projects.

3.9 Assessment of the Effects on Features

Ecological features include nature conservation sites, habitats, species assemblages/ communities, populations or groups of species. The assessment of the significance of predicted impacts on ecological features is based on both the 'value' of a feature, and the nature and magnitude of the impact that the project will have on it. The impact is based on the project which includes a certain amount of designed-in mitigation, including construction best practice measures that will be implemented with a high degree of certainty.

3.10 Valuation of Receptors

The value of designated sites, habitats and species populations is assessed with reference to:

- Their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations).
- Any social benefits that habitats and species deliver (e.g. relating to enjoyment of flora and fauna by the public).
- Any economic benefits that they provide.

The valuation of designated sites considers different levels of statutory and non-statutory protection. Assessment of habitat value depends on several factors, including the size of the habitat, its conservation status and quality. The assessment also takes account of connected off-site habitat that has the potential to increase the value of the on-site habitat through association. Valuation of species depends on a number of factors including distribution, status, rarity, vulnerability, and the population size present. Designated sites, habitats and species populations have been valued using the scale in Table 3-1 below.

Table 3-1:Examples of criteria used to define the value of ecological features (NRA, rev. 2009a)

Level of Value	Examples of Criteria
International	An internationally important site e.g. Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar (or a site considered worthy of such designation). A regularly occurring substantial population of an internationally important species (listed on Annex IV of the Habitats Directive). Designated shellfish waters. Major fisheries area.
National	A nationally designated site e.g. Natural Heritage Area (NHA), a proposed Natural Heritage Area (pNHA), statutory Nature Reserve, or a site considered worthy of such designation. A viable area of a habitat type listed in Annex I of the Habitats Directive or of smaller areas of such habitat which are essential to maintain the viability of a larger whole. A regularly occurring substantial population of a nationally important species, e.g. listed on The Wildlife Act 1976 or The Wildlife (Amendment) Act 2000. A species included in the Irish Red Data Lists/Books. Significant populations of breeding birds.
Regional/County (Co. Dublin)	Species and habitats of special conservation significance within County Dublin, as identified in Dublin City Biodiversity Action Plan 2015-2020. An area subject to a project/initiative under the County 's Biodiversity Action Plan. A regularly occurring substantial population of a nationally scarce species.
Local (works site and its vicinity)	Areas of internationally or nationally important habitats which are degraded and have little or no potential for restoration. A good example of a common or widespread habitat in the local area. Species of national or local importance, but which are only present very infrequently or in very low numbers within site area.
Less than local	Areas of heavily modified or managed vegetation of low species diversity or low value as habitat to species of nature conservation interest.

Level of Value	Examples of Criteria
	Common and widespread species.

Ecological Valuation may also be considered of Local Importance (higher value) or Local Importance (lower value) as shown in Table 3-2 below.

Table 3-2: Examples of criteria used to define the value of ecological features when subdivided at a local level (NRA, rev. 2009a)

Level of Value	Examples of Criteria
Local Importance (higher value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan (BAP), if this has been prepared Resident or regularly occurring populations (assessed to be important at the Local level) 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

Guidance published by CIEEM (2018) recommends breaking down the importance of ecological features in a geographic context similar to the NRA guidance shown in Table 3-1 with the following frame of reference to be adapted to local circumstances.

- International and European
- National
- Regional
- Metropolitan, County , vice-County or other local authority-wide area
- River Basin District
- Estuarine system/Coastal cell
- Local.

The NRA (rev. 2009a) guidance is congruent with this CIEEM (2018) guidance and includes a 'Less than local' level. The NRA (rev. 2009a) guidance on geographic criteria for ecological valuation, as described in Table 3-1 is followed in this report.

3.10.1 Descriptive Terminology

Ecological effects or impacts can be described and categorised in a number of ways. Examples of relevant terms are listed in Table 3-3.

Table 3-3: Categories of Effects (derived EPA, 2022).

Description	Categories of Effects
Quality of Effects	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects	**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 Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects	**Extent** Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

Description	Categories of Effects
Describing the Probability of Effects	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects	**Momentary Effects** Effects lasting from seconds to minutes
	Brief Effects Effects lasting less than a day
	Temporary Effects Effects lasting less than a year
	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years.
	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary or Off-site Effects)** Effects on the environment, which are not a direct result of the project, often produced away from the project site of because of a complex pathway
	Cumulative Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	Do-nothing Effects The environment as it would be in the future should the subject project not be carried out.

Description	Categories of Effects
	Worst Case Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

3.10.2 Significance of impacts

The total description of the effect includes the character, magnitude, probability and consequences of the effect as described in Table 3-4 which are combined to give a general magnitude of the effect on an ordinal scale from Negligible to High. The sensitivity and significance of the receptor is also described on an ordinal scale from Negligible to High. Professional judgement is used to assign the general magnitude of the effect into one of four classes of which exist on an ordinal scale. The four classes (in order) are Negligible, Low, Medium and High, with each step of the scale having an upper or lower bound (+/-) allowing for more precise interpretation by the suitably qualified person.

The overall significance of an impact can be derived from the total description of the effect compared against the sensitivity and significance (value) of the receptor as shown below in Figure 3-1 which is taken from the EPAs EIAR Guidelines (2022). The context and character of the receptor must also be assessed, such as its position in relation to the effect and its connectivity to the effect, however this should be determined before assessing the significance of the impact.

The placement of the general description of the effect, and the sensitivity/significance of the receptor on this scale is determined by a Competent Person (a qualified ecologist in this case) as they interpret the qualities of the effect from the categories listed in Table 3-1 and the receptor's sensitivity and significance. Level of significance, also described as value of the receptor, is previously set out in Section 3.10 above. Sensitivity of the receptor is assessed by the Competent Person based on the receptor's characteristics and how susceptible to impact they are from the type of effect.

The overall significance of an effect is then categorised into one of the following seven classifications:

- Imperceptible
- Not Significant
- Slight
- Moderate
- Significant
- Very Significant

- Profound.

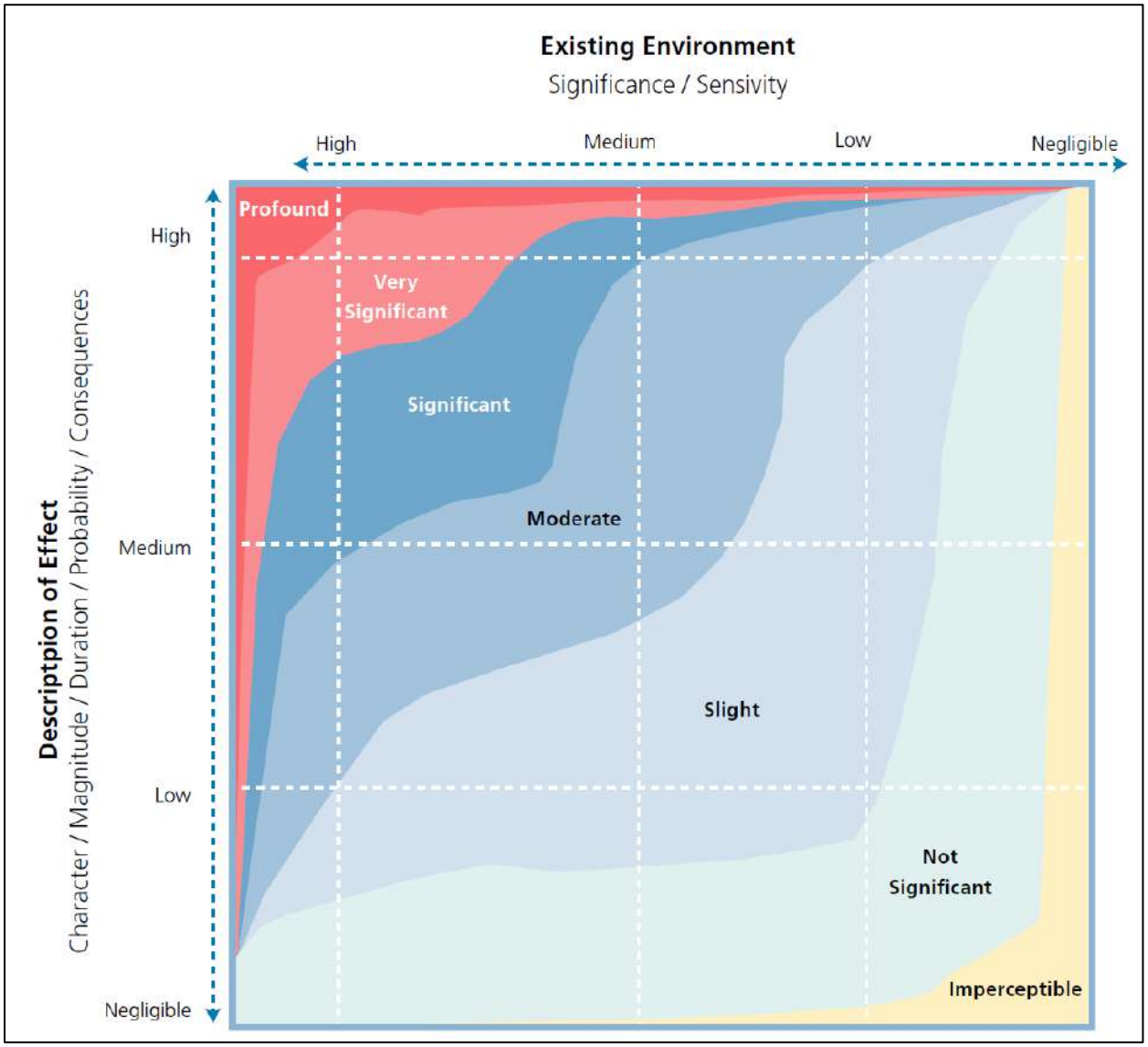

Figure 3-1: Chart showing the typical classifications of the significance of effects (EPA, 2022).

This chart has been interpreted in Table 3-4 significance of impacts matrix below, the scale has been ordered into an upper and lower bound for each qualitative category, so that degrees of significance within subcategories can be interpreted by the Competent Person.

Table 3-4 Significance of impacts matrix

Magnitude of impact	Sensitivity/ Value of Receptor							
	High +	High -	Medium +	Medium -	Low +	Low -	Negligible +	Negligible -
High +	Profound	Very significant	Very significant	Significant	Moderate	Moderate	Not Significant	Imperceptible
High -	Very Significant	Very significant	Significant	Moderate	Moderate	Slight	Not Significant	Imperceptible
Medium +	Very Significant	Significant	Moderate	Moderate	Slight	Slight	Not Significant	Imperceptible
Medium -	Significant	Moderate	Moderate	Moderate	Slight	Slight	Not Significant	Imperceptible
Low +	Moderate	Slight	Slight	Slight	Slight	Slight	Not Significant	Imperceptible
Low -	Slight	Slight	Slight	Slight	Slight	Not Significant	Not Significant	Imperceptible
Negligible +	Not Significant	Not Significant	Not significant	Not Significant	Not Significant	Not Significant	Not Significant	Imperceptible
Negligible -	Not Significant	Not Significant	Not significant	Not Significant	Not Significant	Imperceptible	Imperceptible	Imperceptible

4 Baseline Conditions

These baseline conditions present information gathered from existing reports and desk-based sources as detailed in Section 3.6.

4.1 Desk-based Assessment

4.1.1 Designated Sites

This section lists the designated sites of international and national importance. The ZoI for this project is a **5**km general radius and any downstream hydrological connection (including transitional waters buffer) for statutory sites; and a general **5**km radius for non-statutory sites. Table 4-1 below lists these designated sites with their respective importance and distance from the proposed site development. Figure 4-1 overleaf displays the locations of the statutory designated sites, with Figure 4-2 displaying the non-statutory (proposed and existing Natural Heritage Area) designated sites within the ZoI of the Table 4-2 and Table 4-3 describe site descriptions and their respective ecological features.

Table 4-1: Proximity and importance of designated sites within their respective ZoI buffers.

Natura 2000 site	Site Code	Approximate direct distance from site	Approximate hydrological distance from site
South Dublin Bay and River Tolka Estuary SPA	004024	1.8 km	9.1 km
South Dublin Bay SAC	000210	1.8 km	7.2 km
Dalkey Islands SPA	004172	2.6 km	2.6 km
Rockabill to Dalkey Island SAC	003000	1.3 km	1.3 km
Ballyman Glen SAC	000713	4.8 km	No Connection
Dalkey coastal Zone and Killiney Hill pNHA	001206	Inside Site Boundary	Inside Site Boundary
Loughlinstown Wood pNHA	001211	Inside Site Boundary	Inside Site Boundary
South Dublin Bay pNHA	000210	1.8 km	No Connection
Dingle Glen pNHA	001207	2.9 km	No Connection
Booterstown Marsh pNHA	001205	4.0 km	No Connection
Fitzsimons Wood pNHA	001753	4.3 km	No Connection
Ballyman Glen pNHA	000713	4.6 km	No Connection

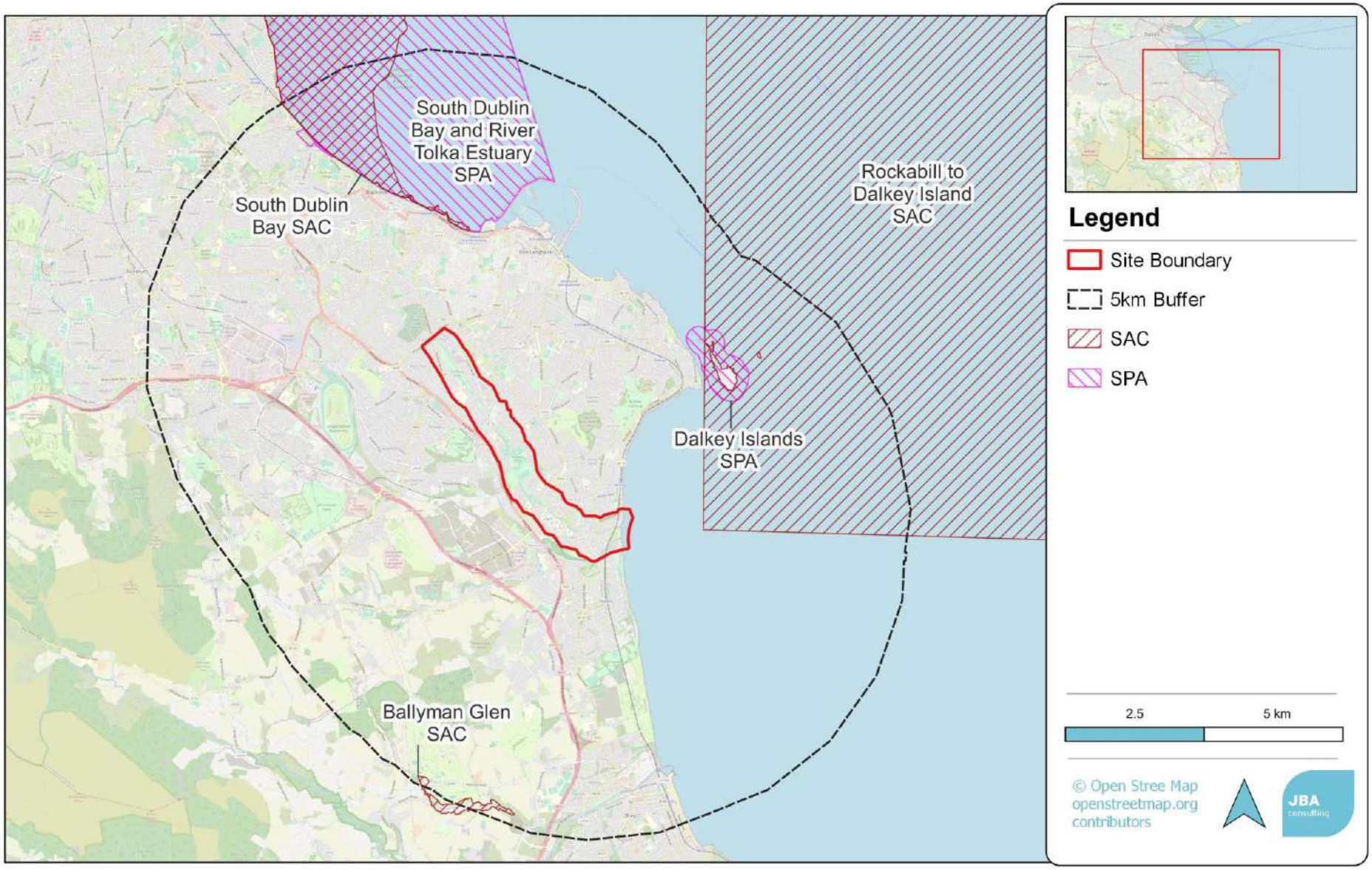

Figure 4-1: Statutory designated sites within the ZoI of the development (OSM, 2022)

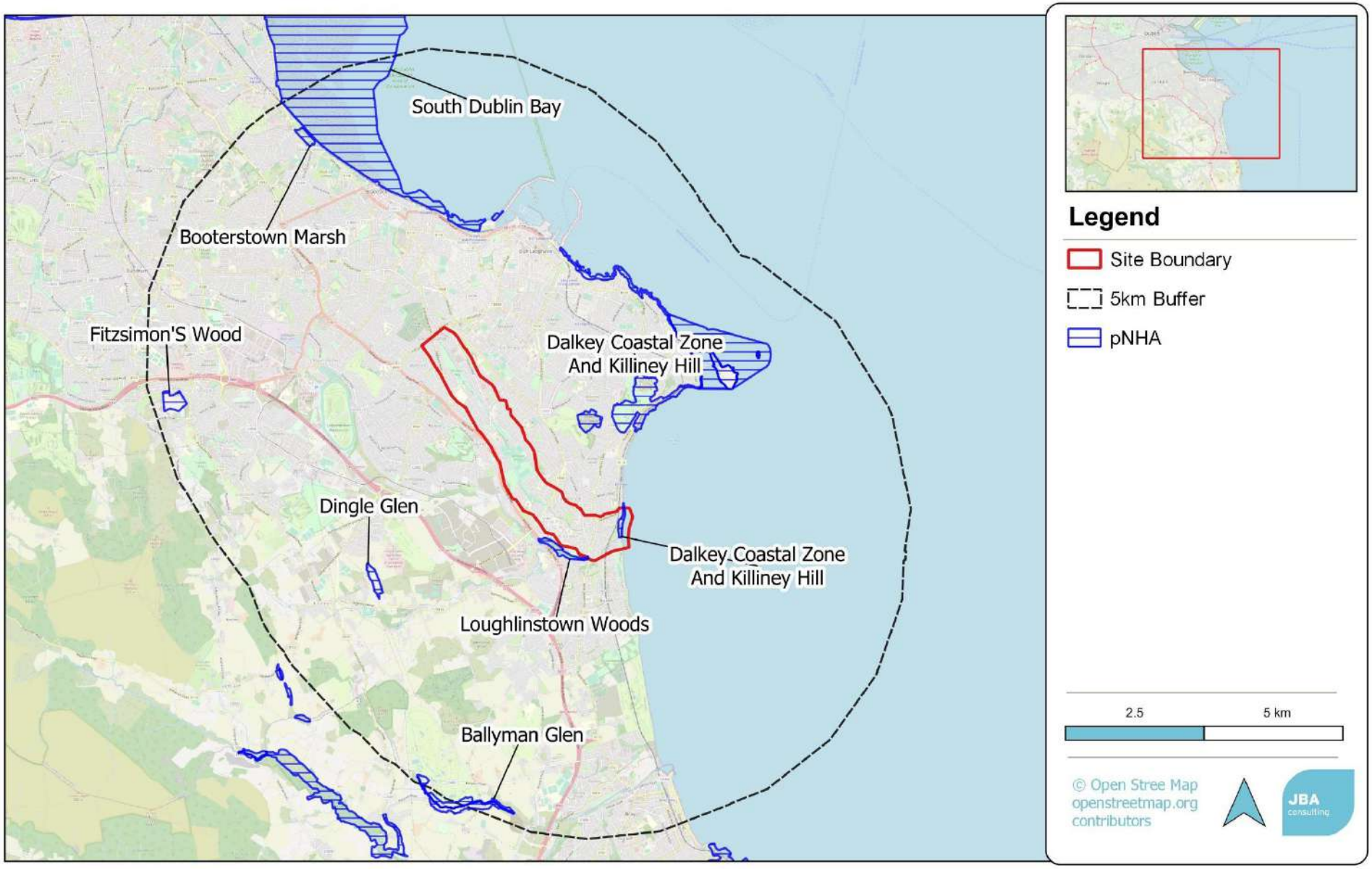

Figure 4-2: Non-statutory designated sites within their respective ZoI of the site works (OSM, 2022)

Table 4-2: Site briefs; Qualifying Interests; and project-relevant threats /pressures and their impacts and sources in relation to the Natura 2000 sites within the 5km ZoI (plus hydrological connectivity extension).

Site Name	Brief	Qualifying Interests	Project Relevant Threats / Pressures: Impact (Source)
South Dublin Bay and River Tolka Estuary SPA (004024)	This designated site comprises a substantial part of Dublin Bay. It includes virtually all of the intertidal area in the south bay, as well as much of the Tolka Estuary to the north of the River Liffey. The site possesses extensive intertidal flats which support wintering waterfowl which are part of the overall Dublin Bay population. It regularly has an internationally important population of Brent Geese, which feeds on Dwarf Eelgrass in the autumn. It has nationally important numbers of a further 6 species including: Oystercatcher *aematopus ostralegus*, Ringed Plover *Charadrius hiaticula*, Red Knot *Calidris canutus*, Sanderling *Calidris alba*, Dunlin *Calidris alpina* and Bar-tailed Godwit *Limosa lapponica*. It is an important site for wintering gulls, especially Black-headed Gull *Chroicocephalus ridibundus* and Common Gull *Larus canus*. South Dublin Bay is the premier site in Ireland for Mediterranean Gull *Larus melanocephalus*, with up to 20 birds present at times. Is a regular autumn roosting ground for significant numbers of terns, including Roseate Terns *Sterna dougallii*, Common Tern *Sterna hirundo* and Artic Tern *Sterna paradisaea* (NPWS 2015a) .	- Light-bellied Brent Goose *Branta bernicla hrota* [A046] - Oystercatcher *Haematopus ostralegus* [A130] - Ringed Plover *Charadrius hiaticula* [A137] - Grey Plover *Pluvialis squatarola* [A141] - Red Knot *Calidris canutus* [A143] - Sanderling *Calidris alba* [A144] - Dunlin *Calidris alpina* [A149] - Bar-tailed Godwit *Limosa lapponica* [A157] - Redshank *Tringa totanus* [A162] - Black-headed Gull *Chroicocephalus ridibundus* [A179] - Roseate Tern *Sterna dougallii* [A192] - Common Tern *Sterna hirundo* [A193] - Arctic Tern *Sterna paradisaea* [A194] - Wetland and Waterbirds [A999] (NPWS 2015b) .	**Discharges:** High Impact (inside) (Full list of threats / pressures - EEA, 2023a)
South Dublin Bay SAC (000210)	This intertidal site extends from the South Wall at Dublin Port to the West Pier at Dun Laoghaire, a distance of c. 5km. The seaward boundary is marked by the low tide mark, while the landward boundary is now almost entirely artificially embanked. A small sandy beach occurs at Merrion Gates, while some bedrock shore occurs near Dun Laoghaire. The designated site possesses a fine and fairly extensive example of intertidal flats. Sediment type is predominantly sand, with	- Mudflats and sandflats not covered by seawater at low tide [1140] - Annual vegetation of drift lines [1210] - Salicornia and other annuals colonising mud and sand [1310]	**Discharges:** Moderate Impact (both) **Accumulation of organic material:** High Impact (inside) (Full list of threats / pressures - EEA, 2023b))

Site Name	Brief	Qualifying Interests	Project Relevant Threats / Pressures: Impact (Source)
	muddy sands in the more sheltered areas. A typical macro-invertebrate faunal assemblage exists within the SAC. The SAC has the largest stand of Dwarf Eelgrass *Zostera nolti* on the east coast. It also supports part of the important wintering waterfowl populations of Dublin Bay (NPWS, 2015c)	- Embryonic shifting dunes [2110] (NPWS, 2013a)	
Rockabill to Dalkey Island SAC (003000)	The selected site forms a strip of dynamic inshore and coastal waters in the western Irish Sea, extending approximately 40 km in length and encompassing a range of comparatively shallow marine habitats, including diverse seabed structures, reefs, islets and islands. The area selected for designation represents a key habitat for the Annex II species - harbour porpoise, within the Irish Sea. The species occurs year-round within the site and comparatively high group sizes have been recorded. Porpoises with young (i.e. calves) are observed at favourable, typical reference values for the species. The selected site contains a wide array of habitats believed to be important for harbour porpoise including inshore shallow sand and mud-banks and rocky reefs scoured by strong current flow. The site also contains two Annex II seal species – Harbour seal *Phoca vitulina vitulina*, Grey seal *Halichoerus grypus* for which terrestrial haul-out sites occur in immediate proximity to the site. Bottlenose dolphin *Tursiops truncatus* has also occasionally been recorded in the area. Along the eastern seaboard the habitat type Reef is uncommon due to prevailing geology and hydrographical conditions. Expansive surveys of the Irish coast have indicated that the greatest resource of this habitat within the Irish Sea is found fringing offshore islands which are concentrated along the Dublin coast. These Reefs are subject to strong tidal currents with an abundant supply of suspended matter resulting in good representation of filter feeding fauna such as sponges, anemones and echinoderms. (NPWS, 2014)	- Reefs [1170] - *Phocoena phocoena* Harbour Porpoise [1351] (NPWS, 2013b)	Discharges: High Impact (outside) Siltation rate changes, dumping, depositing of dredged deposits: Low Impact (outside) (Full list of threats / pressures - EEA, 2023c)
Dalkey Islands SPA (004172)	The site comprises Dalkey Island, Lamb Island, Maiden Rock, the intervening rocks and reefs between Dalkey Island, Lamb Island and Clare Rock, and the sea area around Maiden Rock to a distance of 100 m. The site is	- Roseate Tern *Sterna dougallii* [A192] - Common Tern *Sterna*	N/A (Full list of threats / pressures - EEA, 2023d)

Site Name	Brief	Qualifying Interests	Project Relevant Threats / Pressures: Impact (Source)
	of importance for both breeding and staging *Sterna* terns. There is a well-established colony of Sterna hirundo and smaller numbers of *Sterna paradisaea. Sterna dougallii* bred in 2003 and 2004, one of only three known sites in the country - this came about after several years of conservation management aimed at attracting the species. The site along with other parts of south Dublin Bay is used by the three Sterna tern species as a major post-breeding/pre-migration autumn roost area. (NPWS, 2015d)	*hirundo* [A193] - Arctic Tern *Sterna paradisaea* [A194] (NPWS, 2022)	
Ballyman Glen SAC (000713)	This site is situated approximately 3km north of Enniskerry and is along the border of Dublin and Wicklow, oriented from the east to west with a stream running through the centre. The Glen contains a strip of alkaline fen which is associated with petrifying spring/seepage areas that have thick deposits of marl. The site is notable for orchids and twenty species of sedge. Wet woodland and scrub occurs along the margins of the stream for most of the length of the glen, extending outwards that creates inaccessible and species-rich patches of woodland with a dense shrub layer. Wetter areas of the stream, particular the western end of the site, contain marshes. The steeper, southern slopes of the glen has an area of broadleaved woodland (NPWS 2013c).	-Petrifying springs with tufa formation (Cratoneurion) [7220] -Alkaline fens [7230] (NPWS, 2019)	Continuous urbanisation: High Impact (outside) Discontinuous urbanisation Moderate Impact (outside) (Full list of threats/pressures EEA, 2023e)

Table 4-3: Site briefs and ecological features of conservation concern of proposed Natural Heritage Areas within the ZoI.

Site Name	Brief	Ecological Features of Conservation Concern
Dalkey coastal Zone and Killiney Hill [001206]	This site includes the coastal stretch from Scotman's Bay to south of White Rock, the Dalkey Island group and Dalkey Sound, and Killiney Hill. Dalkey Sound and environs is noteworthy for the occurrence of west and south coast invertebrates. Species taken include squat lobsters *Galathea* spp., swimming crabs *Portunus* spp. and the crawfish *Palinurus vulgaris*. The area is also noted for the occurrence of gymnoblastic hydroids, with the rare *Antedon bifida* being taken regularly. Some rare European species which occur are members of the Order *Nudibranchia* and the Spiny Starfish *Marthasterias glacialis*. Dalkey Island lies c. 400m off Sorrento Point. Soil cover on Dalkey Island consists mainly of a thin peaty layer, though in a few places there are boulder clay deposits. Vegetation cover is low, consisting mainly of grasses. No woody plants have become established, probably due to constant grazing by goats. Dense patches of bracken *Pteridium aquilinum* and Hogweed *Heracleum sphondylium* occur in places. Lamb Island lies to the north of Dalkey Island, It has a thin	- Drift Lines (1210) - Vegetated Shingle (1220) - Reefs (1170) - Scrub woodland - Roseate Tern *Sterna dougallii* [A192] - Common Tern *Sterna hirundo* [A193] - Arctic Tern *Sterna paradisaea* [A194] - Other roosting sea birds - Kestrel *Falco tinnunculus* - Fulmar *Fulmarus glacialis*

	soil cover and some vegetation, mainly grasses, Common Nettle *Urtica dioica* and Hogweed. Further north lies Maiden Rock, a bare angular granite rock up to 5m high. There is no vegetation cover. Killiney Hill is a complex of coastal heath and mixed woodland. The woods are mostly planted species. The ground flora is mainly Ivy *Hedera helix* and bramble *Rubus* spp but there are some areas with more typical woodland species such as Wood-sorrel *Oxalis acetosella* and Herb-Robert *Geranium robertianum.* There are open rock faces and areas of low lying scrub with plants such as Wood Vetch *Vicia sylvatica*, Climbing Corydalis *Corydalis claviculata* and Wild Madder *Rubia peregrina* growing amongst the Gorse *Ulex europaeus*. The shallow soils overlying the rock support a community of winter annuals and early flowering perennials such as Spring Squill *Scilla verna* and Wild Onion *Allium vineale*. The drift banks above and below the railway have warm shallow soils. Here grow scarce plants such as Bloody Crane's-bill (*Geranium sanguineum*, Bee Orchid *Ophrys apif*era, Sea Stork's-bill *Erodium maritimum* and clovers (*Trifolium ornithopodioides, T. striatum and T. scabrum)*. The naturalised Silver Ragwort *Senecio cineraria* is widespread. Bird populations for Dalkey Island are described above in Table 4-2 Dalkey Island SPA. Up to five pairs of Fulmar *Fulmarus glacialis* breed on the cliffs below the railway line near Killiney Hill. Kestrel *Falco tinnunculus* breeds in the area, as well as Stonechat *Saxicola rubicola*	- Harbour seal *Phoca vitulina vitulina*, Grey seal *Halichoerus grypus*
Loughlinstown Wood [001211]	This site is located about 4km north of Bray, on the east side of the main Dublin-Bray road. It is on the north bank of the Shanganagh River at Loughlinstown. The wood was originally planted but following substantial regeneration, has produced woodland of natural character in age structure and form. The western end retains a high canopy of Beech *Fagus sylvatica*, Sycamore *Acer pseudoplatanus* and some Elm *Ulmus* spp., with Holly *Ilex aquifolium* and Cherry Laurel *Prunus laurocerasus* below. There is little regeneration in this part of the wood. There is a gradation into a dense thicket of Bramble *Rubus* spp., and trees such as Ash *Fraxinus excelsior*, Blackthorn *Prunus spinosa* and Hazel *Corylus avellana* occur here. A stand of Gorse *Ulex europaeus* occurs at the eastern end of the site. The valley floor has much Alder *Alnus glutinosa* and some willows *Salix* spp.. The introduced Giant Hogweed *Heracleum mantegazzianum* has spread along the banks of the river. Recent reports indicate the presence of Alluvial Woodland which may correspond with the EU Annex I habitat, *Alluvial forests with Alnus glutinosa and Fraxinus excelsior* [91E0] as well as theoresence of Badger and various bat species.	- Potential EU Annex I habitat, *Alluvial forests with Alnus glutinosa and Fraxinus excelsior* [91E0] - Bats - Badger
South Dublin Bay [000210]	See descriptions for South Dublin SAC and South Dublin Bay and River Tolka Estuary SPA in Table 4-2.	- Mudflats and sandflats not covered by seawater at low tide [1140] - Annual vegetation of drift lines [1210]

		- Salicornia and other annuals colonising mud and sand [1310] - Embryonic shifting dunes [2110] - Various roosting birds
Dingle Glen [001207]	Dingle Glen is situated approximately 5km west of Killiney. It is a dry valley formed by a glacial lake overflow channel. Formerly cleared of vegetation, a woodland cover is now regenerating, with pioneer species of Holly *Ilex aquilifolium*, Blackthorn *Prunus spinosa*, and willows *Salix* spp.. Individual trees of Ash *Fraxinus excelsior*, Hazel *Corylus avellana*, Sessile Oak *Quercus petraea* and Spindle *Euonymus europaeus* occur. The woodland ground flora is represented by Foxglove *Digitalis purpurea*, Wood Avens *Geum urbanum*, Wood Melic *Melica uniflora* and Bugle *Ajuga reptans*. Trees and shrubs are mostly restricted to the valley bottom. On the slopes above, a heathy vegetation is dominated by Gorse *Ulex europaeus* and Bracken *Pteridium aquilinum*. Other species include Wood Sage *Teucrium scorodonia*, Bell Heather *Erica cinerea*, Navelwort *Umbillicus rupestris*, English Stonecrop *Sedum anglicum*, Heath Bedstraw *Galium saxatile*, Heath-grass *Danthonia decumbens*, Great Wood-rush *Luzula sylvatica* and Climbing Corydalis *Corydalis claviculata*.	- Immature Oak-Ash-Hazel seminatural woodland -Scrub Woodland
Booterstown Marsh [001205]	Marshland of ornithological importance for high-tide roost by a variety of waders and gulls with various aquatic plant species , freshwater communities in the north west with saline-tolerant flora in the south-east. This is the only saltmarsh in south Dublin and, despite some concerns about the increasing salinity of the site, it remains a valuable habitat for many birds as well as containing a diverse flora including the protected plant Borrer's Saltmarshgrass *Puccinellia fasciculata*.	- Saltmarsh habitat - Borrer's Saltmarshgrass *Puccinellia fasciculata* - Wading birds and Gulls
Fitzsimons wood [001753]	The woodland consists of mature birch (Betula spp.) with some oak (Quercus spp.), together with a well developed understorey of Holly (Ilex aquifolium). Natural regeneration is occurring and there is a profuse growth of young birch, Ash (Fraxinus excelsior), oak and other species. Some marshy areas also occur within the woodland. An area of heath, dominated by Gorse (Ulex europaeus) scrub is also included in the site. The underlying rock of the area is granite and where this outcrops it is often covered with ferns and mosses.	- Oak-Birch-Holly semi natural woodland
Ballyman Glen [000713]	See Ballyman Glen SAC description in Table 4-2.	-Petrifying springs with tufa formation (Cratoneurion) [7220] -Alkaline fens [7230] - Wet woodland

4.1.2 Screening of designated sites

An AA Screening has been carried out for this project by JBA (2023). Following initial screening, and based upon best scientific judgement it is concluded that **adverse significant effects are not anticipated** from the project on the following Natura 2000 sites within the Zone of Influence:

- South Dublin Bay and River Tolka Estuary SPA (004024)
- South Dublin Bay SAC (000210)
- Rockabill to Dalkey Island SAC (003000)
- Dalkey Islands SPA (004172)
- Ballyman Glen SAC (000713)

The below pNHA sites, are being **screened out** due to the lack of hydrological connectivity (surface water and groundwater) and distance from the proposed site:

- Loughlinstown Woods (001211)
- South Dublin Bay (000210)
- Dingle Glen (001207)
- Booterstown Marsh (001205)
- Fitzsimons Wood (001753)
- Ballyman Glen (000713)

The following pNHA sites of national ecological importance have been **screened in** and will be examined in detail in terms of potential impacts and required mitigations:

- Dalkey Coastal Zone and Killiney Hill (01206)

4.1.3 Protected Species

National Biodiversity Data Centre (NBDC)

Records of protected flora and fauna including invertebrates, amphibians, fish, birds and mammals collated from the NBDC (2022) database, present within 1km of the Deansgrange Stream since 2010 are listed in Appendix E. This list includes their level of protection, if they are red or amber listed on the International Union for the Conservation of Nature and Natural Resources (IUCN) Red List or the Birds of Conservation Concern in Ireland (2020-2026) and the date of the last record of this species at this location.

4.1.4 Invasive Non-native Species (INNS)

Invasive non-native species data collated from NBDC (2023) is displayed in Table 4-4 overleaf, in which it details a list of invasive species recently recorded (since 2010), present within 1km of the site area.

Table 4-4: Records of INNS within a 1km of Deansgrange Stream

Invasive Non-native Species	Impact	Regulation S.I. 477/2011
Invertebrates		
New Zealand Flatworm *Arthurdendyus triangulatus*	High	No
Jenkins' Spire Snail *Potamopyrgus antipodarum*	Medium	No
Harlequin Ladybird *Harmonia axyridis*	High	Yes
Reptiles		
Yellow Bellied Slider *Trachemys scripta scripta*	Medium	No
Mammals		
Brown Rat *Rattus norvegicus*	High	Yes (islands only)
Eastern Grey *Squirrel Sciurus carolinensis*	High	Yes

European Rabbit *Oryctolagus cuniculus*	Medium	No
House Mouse *Mus musculus*	High	No
Raccoon *Procyon lotor*	High	Yes
Plants		
American Skunk-cabbage *Lysichiton americanus*	Medium	Yes
Butterfly-bush *Buddleja davidii*	Medium	No
Cherry Laurel *Prunus laurocerasus*	High	No
Common Broomrape *Orobanche minor*	Medium	No
Floating Pennywort *Hydrocotyle ranunculoides*	High	Yes
Giant Hogweed *Heracleum mantegazzianum*	High	Yes
Himalayan Honeysuckle *Leycesteria formosa*	Medium	No
Japanese Knotweed *Fallopia japonica*	High	Yes
Sea-buckthorn *Hippophae rhamnoides*	Medium	Yes
Three-cornered Garlic *Allium triquetrum*	Medium	Yes
Traveller's-joy *Clematis vitalba*	Medium	No

4.2 Waterbodies within the Vicinity of the Proposed Site

The proposed site lies within the Water Framework Directive (WFD) Ovoca-Vartry catchment, and within the Dargle_SC_010 sub-catchment (EPA, 2022).There are 3 identified watercourses within the area of the project; Carrickmines Stream (Carrickmines Stream_010), Deansgrange Stream (Kill of the Grange Stream_010) and the Shanganagh River (Shanganagh_010). There is one watercourse that does not pass through the boundary of the project; Brewery Stream (Brewery Stream_010), however this watercourse will not be assessed further as it lies in a different subcatchment to the site. These watercourses along with their WFD status and current risk, are mapped below in Figure 4-3 (overleaf) and listed in Table 4-5. Meanwhile, these 3 rivers have their outfalls into the Irish Sea at Killiney Bay: this area is not a listed WFD transitional waterbody, and has no assessment of its quality (EPA, 2022).

Table 4-5: The WFD watercourses within the ZoI of the development

WFD Watercourse	WFD Status	WDF Risk
Brewery Stream_010	Moderate	Under Review
Carrickmines Stream_010	Moderate	Moderate
Kill of the Grange Stream_010	Poor	At Risk
Shanganagh_010	Moderate	At Risk

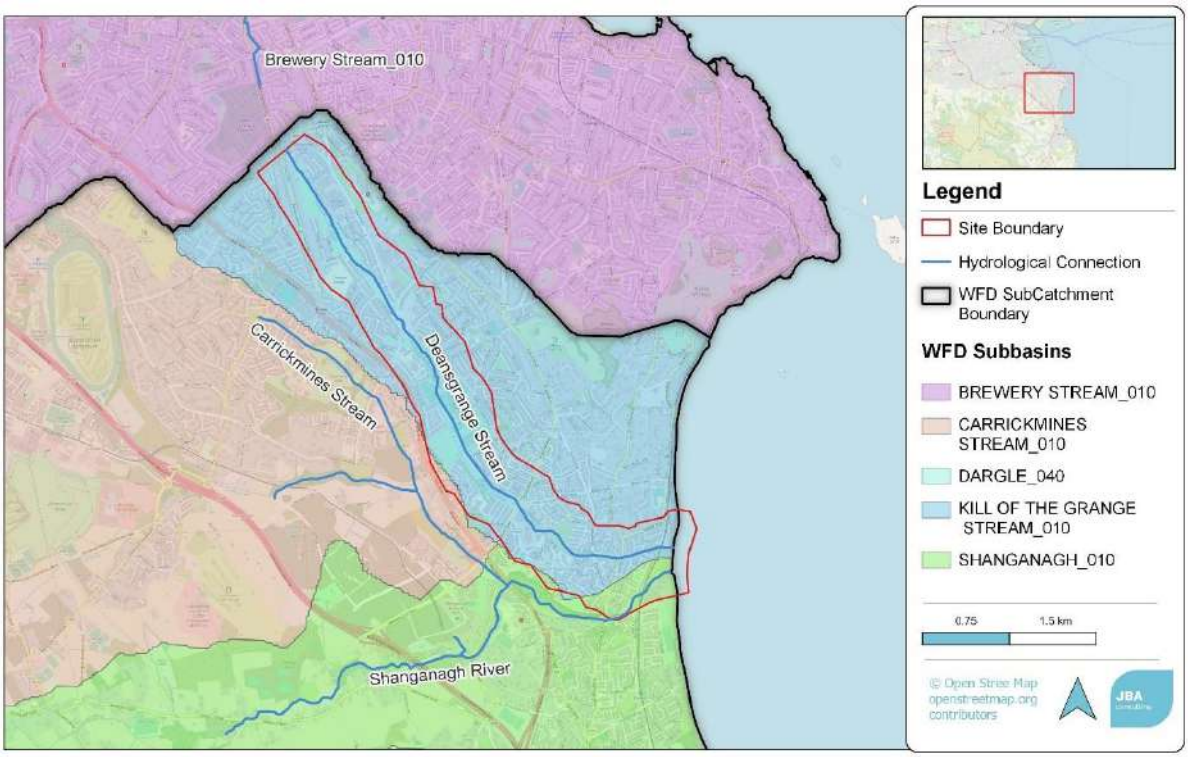

Figure 4-3: Waterbodies within the vicinity of the site area.

4.3 Groundwater

The majority of the site occurs within the Wicklow (IE_EA_G_076) groundwater body. However a small section occurs in the Industrial Facility (P0019-02) (IE_EA_G_091) groundwater body, and a small section of this site along the southeast of the site boundary is within the Kilcullen (IE_EA_G_003) groundwater body. The WFD status and current risk of these groundwater bodies are listed in Table 4-6 (EPA 2022). Local waterbodies are shown in Figure 4-4.

The bedrock of a large part of the site is granite with microcline phenocrysts, with a small section in the centre consisting of fine-grained granodiorite to granite, and the section between Loughlinstown and the coast being made of dark blue-grey slate, phyllite and schist, with a fault running along the coast within this rock bed. The site is dominated by Made/Built land, with sections of tills derived from limestone in areas of the site. The site has a range of coefficients, most of the site has a recharge coefficient of 20%, while the build-up areas around Loughlinstown had a recharge rate of 7.5%, and a high recharge rate along the coast, which is reflected in the overall low vulnerability of the aquifers on site, and the high vulnerability in the east of the site (Figure 4-5).

The site is split between two types of aquifers. Most of the site is "Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones", an aquifer with poor connections and a low permeability, low storage, short flow paths, and a very restricted discharge to streams. The site also contains a small area of "Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones" Vulnerability which also has poor connections, low permeability, discharge restricted to a few hundreds of metres and general restricted groundwater discharge to streams.

Table 4-6: : WFD Groundwater bodies Risks and Status in the vicinity of the site

WFD Ground waterbody	WFD Status	WDF Risk
Wicklow	Good	Under Review
Kilcullen	Good	At Risk
Industrial Facility (P0019-12)	Poor	At Risk

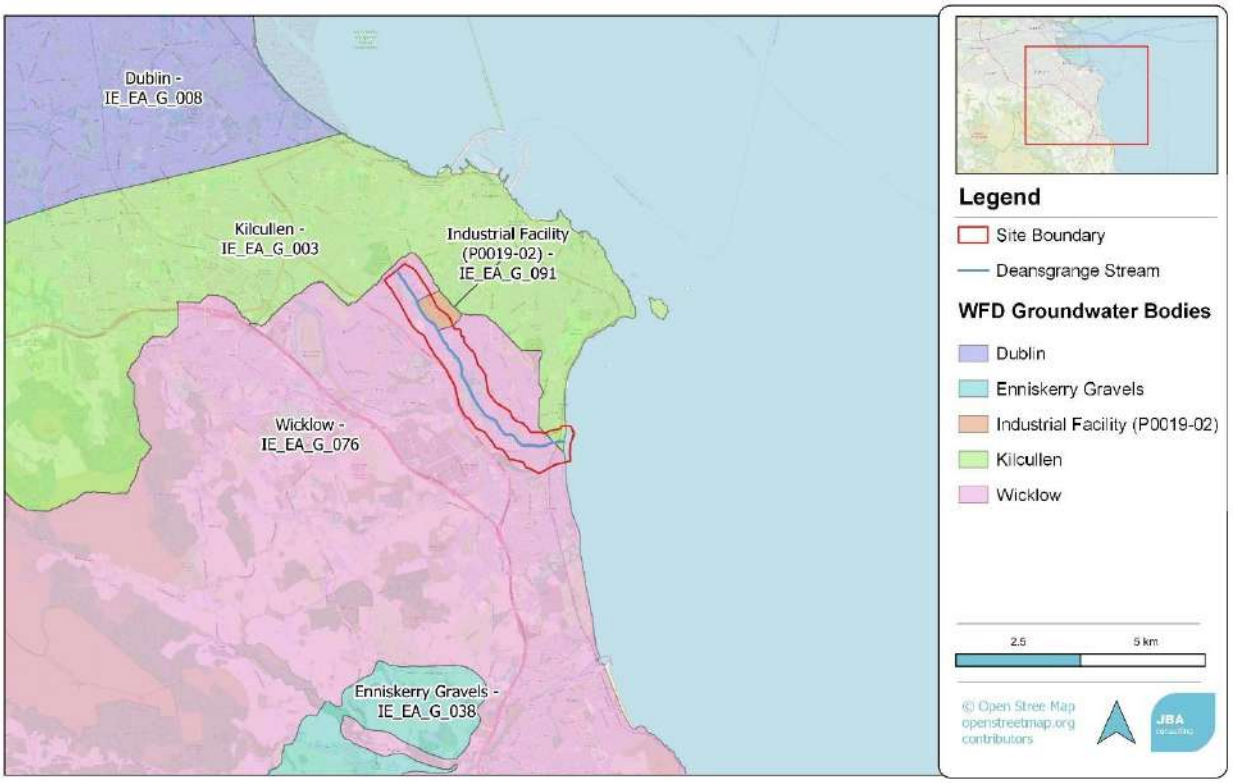

Figure 4-4: Groundwater bodies in the vicinity of the site

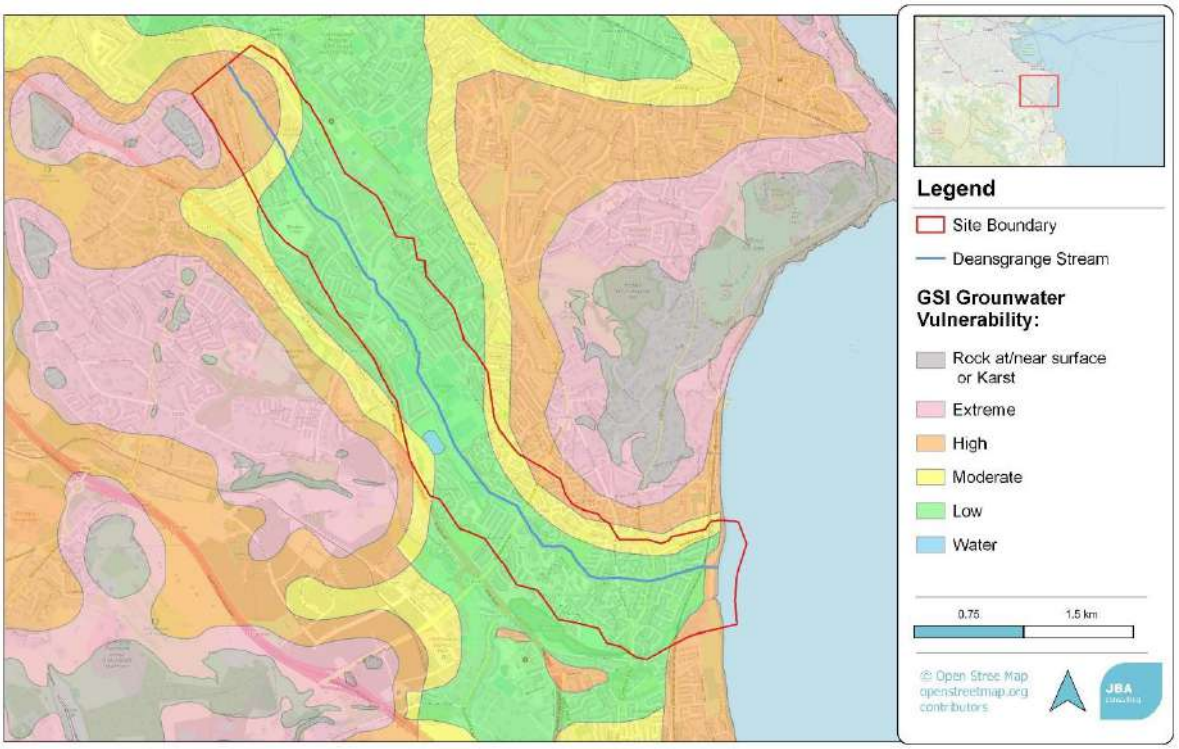

Figure 4-5: Aquifer vulnerability of the site

4.4 Site Surveys

To inform this EcIA, ecological site surveys were performed by JBA Ecologists Malin Lundberg and Dr Niamh Burke of Coiscéim Consulting on the 27th of February 2020, and JBA Ecologist Patricia Byrne on 27 March 2020, and on 20th of August in 2020 alongside Harry Jones of JB Barry which was a further survey to assess the extent of Invasive Non-Native Species presence. Further surveys with regard to vegetation removal were conducted by Ecologist Mark Desmond on the 30th of September 2022. JBA Ecologists Mark Desmond William Mulville conducted an Otter survey and subsequent camera trap survey along the riparian treeline and watercourse upstream of Killiney Hill Road Bridge in November 2022. A bat emergence and activity survey was conducted on the 11th of May 2023 at Killiney Hill Road Bridge by JBA Ecologists William Mulville and Patricia Byrne, with a static bat detector left in situ for eight nights following this date. A riparian bird survey was conducted on the 19th of May by JBA Ecologists Mark Desmond and Dominic Tilley.

4.5 Habitats

The value of each habitat is based on the site visit. Habitats recorded in and around the site boundary were recorded and are listed in Table 4-7 below and shown on an overview map in Figure 4-6 overleaf. The site area is broken down into a series of habitat maps (A-G) found in Appendix A.

Table 4-7: List of habitats recorded on site

Habitat	Fossitt Code	Link to Potential Annex I Habitat
Buildings and artificial surfaces	BL3	
Buildings and artificial surfaces/ Amenity grassland mosaic - Houses and gardens	BL3/GA2	
Shingle and gravel banks	CB1	*Perennial vegetation on stony banks* [1220]
Other artificial lakes and ponds	FL8	
Reed and large sedge swamps	FS1	
Reed and large sedge swamps/ Tall-herb swamps mosaic	FS1,FS2	
Depositing/lowland rivers	FW2	
Amenity grassland (improved)	GA2	
Dry meadows and grassy verges	GS2	
Shingle and gravel shores	LS1	*Annual vegetation of drift lines* [1210]
(Mixed) broadleaved woodland	WD1	
Scattered trees and parkland	WD5	
Riparian Woodland	WN5	
Hedgerows	WL1	
Treelines	WL2	
Scrub	WS1	

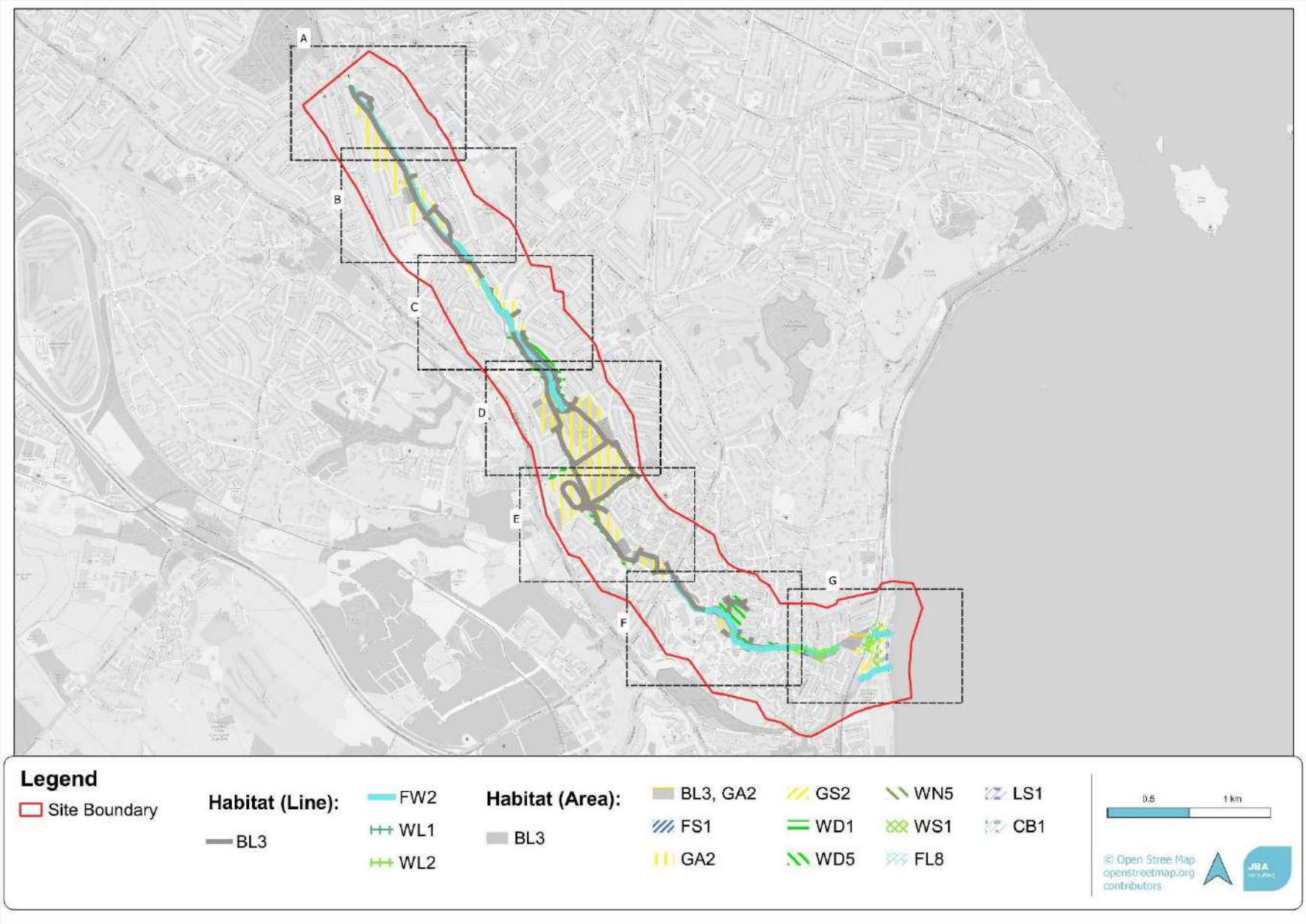

Figure 4-6: Overview of habitats, map subsets A-G found in Appendix A

4.5.1 Buildings and artificial surfaces (BL3)

Buildings and artificial surfaces include surrounding residential houses, a tennis club at the centre of the Clonkeen Park and footpath within the parks. In the context of this site and the lands immediately adjacent, this habitat type is **considered to be of less than local ecological importance.**

4.5.2 Buildings and artificial surfaces/ Amenity grassland mosaic - Houses and gardens (BL3/GA2)

This includes the residential houses and their gardens towards the lower reaches of the Deansgrange Stream. In the context of this site and the lands immediately adjacent, this habitat type is **considered to be of less than local ecological importance.**

4.5.3 Shingle and gravel banks - CB1

The dry meadow section along the coast begins to transition into a shingle and gravel bank as it approaches the waterfront (Figure 4-7). Within this area, species include Sea Rocket *Cakile maritima*, Babington Orache *Atriolex glabriuscula*, Annual Sea-blite *Suaeda maritima*, Sea Mayweed *Tripleurospermum maritima*, Sea-holly *Eryngium maritimum*, Wild Radish *Raphanus raphanistrum* ssp. *raphanistrum*, Sea Spurge *Euphorbia paralis* and Sea Sandwort *Honckenya peploides*. This habitat may correspond with the Annex I habitat *Vegetated shingle on stony banks* [1220] This habitat is considered to be of **International importance** given its links to Annex I habitat.

Figure 4-7: GS2 Dry meadow habitat grading into shingle and gravel banks habitats, with LS1 gravel shore in the background

4.5.4 Other artificial lakes and ponds (FL8)

There are a number of artificial ponds in Clonkeen Park for surface water attenuation (Figure 4-8). Vegetation fringing the ponds includes Willowherb *Epilobium* spp., Bulrush *Typha latifolia*, Pendulous Sedge *Carex pendula*, Purple Loosestrife *Lythrum salicaria*, Willow *Salix* spp., Dock *Rumex* spp., Soft Rush *Juncus effusus*, Hard Rush *Juncus inflexus,* Sharp rush *Juncus acutus* and Meadowsweet *Filipendula ulmaria.* These ponds add variety and habitat for waterbirds, e.g. Moorhen was recorded during the site visit. Amphibians such as Smooth Newt *Lissotriton vulgaris* and Common Frog *Rana Temporaria* were not recorded during the site visit howver they are conisdered to be present given the available habitat.

This habitat is considered to be of **high local level ecological value** given its capacity to provide refuge and drinking water for local fauna; as well as acting as a wildlife corridor. Both of the ponds are away from the proposed works and are not hydrologically connected to any of the works for the proposed scheme.

Figure 4-8: Artificial Pond in the north end of Clonkeen Park

4.5.5 Reed and large sedge swamps (FS1)

This habitat was found at the outfalls of the Deansgrange Stream and Shanganagh River where they both enter into Killiney bay. Both habitats are dominated by Common Reed *Phragmites australis* (Figure 4-9) This habitat is considered to be of **county level ecological value** due to its scarcity within Dun Laoghaire Rathdown area.

Figure 4-9: Common Reed dominating Reed habitat (FS1)

4.5.6 Reed and large sedge swamps / Tall-herb swamps (FS1/FS2)

A continuous reed and large sedge swamp / tall-herb swamp is present along the banks of the Deansgrange Stream throughout Loughlinstown Park. Plant species along the banks include Water-cress *Nasturtium officinale*, Bramble *Rubus fruticosus* agg., Nettle *Urtica dioca*, Cleavers *Galium aparine*, Willowherb, Sycamore *Acer pseudoplanatus*, Dock, Bulrush, Weeping Willow *Salix bablyonica*, Yellow Iris *Iris pseudacorus*, Bur-reed *Sparganium* spp., Alder *Alnus glutinosa*, Common Reed *Phragmites australis*, Starwort *Callitriche* spp., Butterfly-bush *Buddleja davidii*, Cherry Laurel *Prunus laurocerasus* and Winter Heliotrope *Petasites pyrenaicus.*

The bird species present in this area include Grey Wagtail *Motacilla cinerea*, Moorhen *Gallinula chloropus*, Mallard *Anas platyrhynchos*, Black-headed Gull *Larus ridibundus*, Teal *Anas crecca,* Robin *Erithacus rubecula*, Goldfinch *Carduelis carduelis*, Blackbird and Grey Heron *Ardea cinera*.

This habitat is considered to be of **county level ecological value** considering its importance as a refuge to waterfowl and amphibians on site, for providing habitat for invertebrates and also due to its scarcity within Dun Laoghaire Rathdown area. .

4.5.7 Depositing/lowland rivers (FW2)

The Deansgrange Stream (also known as Kill of the Grange Stream) is a depositing/lowland stream which passes through the various parks in a north-west to south-east direction (Figure 4-10). The stream is straightened and the downstream section in Clonkeen Park has a concreted bottom and banks before it is culverted under Johnstown Road. The stream is culverted under much of Kilbogget Playing Pitches and is of historically poor condition due to local surface water pollution and historic impacts on hydromorphology. The substrate is silty with some cobbles. Vegetation along the banks include Alexanders *Smyrnium olusatrum*, Nettle, Vetches *Vicia* spp., Bramble, Dock, Hazel *Corylus avellana*, Willowherb, Rushes *Juncus* spp., with some areas colonised by invasive species Winter Heliotrope and Cherry Laurel. Instream vegetation includes Fool's-water-cress *Apium nodiflorum,* Water Crowfoot *Ranuncululs* spp., Watercress*,* Starwort as well as the invasive Canadian Pondweed *Elodea canadensis.*

This habitat is considered to be of **county level ecological value** given its capacity to provide refuge and drinking water for local fauna; as well as acting as a wildlife corridor.

Figure 4-10: Scrub along the depositing/lowland stream, in the north of Clonkeen Park

4.5.8 Amenity grassland (improved) (GA2)

Most of the areas in Clonkeen Park, Kilbogget Park, and Glenavon Park consist of open amenity grassland which is managed and regularly mown. Within the mown grassy areas species include Perennial Ryegrass *Lolium perenne*, Nettle, Dandelion *Taraxacum* spp. and Creeping Buttercup *Ranunculus repens.*

Bird species witnessed within the amenity grassland include Wren *Troglodytes troglodytes*, Grey Wagtail, Pied wagtail *Motacilla alba yarrelli* and Blackbird *Turdus merula.*

In the context of this site and the lands immediately adjacent, this habitat type is **considered to be of less than local ecological importance.**

4.5.9 Dry meadow and grass verge (GS2)

There are dry meadows located near the coastline, east of the railway line. The edges of the habitat begin to merge into sections of Shingle. The plant species encountered in this area include Sea Sandwort, Yarrow *Achillea millefolium*, Ribwort Plantain *Plantago lanceolata*, Sea Radish *Raphanus raphanistrum* subs*. maritimus*, Burnet-saxifrage *Pimpinella saxifrage*, Sea Beet *Beta vulgaris* ssp. *maritima*, Wild Carrot *Daucus carota*, Lady's Bedstraw *Galium verum* and Red *F*escue *Festuca rubra.*

An area of amenity grassland east of the proposed overflow culvert has been left to grow into a dry meadow (Figure 4-11) with grass species such as Yorkshire Fog *Holcus lanatus*, Perennial Ryegrass, Cocksfoot *Dactylis glomerata*, Crested Dogs-tail *Cynosurus cristatus* and False oat-grass *Arrhenatherum elatius.* Red Clover *Trifolium pratense* and White Clover *Trifolium repens* were also both abundant. There was frequent presence of Meadow Buttercup *Ranunculus acris*, Hogweed *Heracleum sphondylium*, Silverweed *Potentilla anserina*, Daisy *Bellis perennis* and Dandelions *Taraxacum* sp., with patches of Black Medic *Medicago lupulina* and some small amounts of Cuckoo Flower *Cardamine pratensis*, Ragwort *Jacobaea vulgaris* and Dock *Rumex* sp. Pollinators were abundant in this habitat. The proposed culvert will not run through this patch of meadow.

This habitat is considered to be of **high local ecological value** as it contributes to the general habitat diversity within the local area.

Figure 4-11: Dry Meadow (GS2) to the east of the proposed Seafield overflow culvert.

4.5.10 Shingle and gravel shore (LS1)

The shingle and gravel banks grade into a shingle shore habitat which goes down to the waters' edge. Some Sea Spurge and Sea Sandwort is found on the upper limits of the shore, however the majority of the beach in this section is made up of shingle.

This habitat may correspond with the Annex I habitat *Annual vegetation of drift lines* [1210]. This habitat is considered to be of **International importance** given its links to Annex I habitat.

4.5.11 (Mixed) broadleaved woodland (WD1)

A linear mixed broadleaved woodland occurs along the north boundary of Clonkeen Park and the Deansgrange Business Park, adjacent to the stream. Plant species include Poplar *Populus* spp., Willow, Alder, Hazel and Beech *Fagus sylvatica*. The understory consists of Bramble, Willowherb, Nettle, Lords-and-ladies *Arum maculatum* and Pendulus Sedge.

Bird species present include Wren, Magpie *Pica pica*, Hooded crow *Corvus corone*, Grey Wagtail ands Little egret *Egretta garzetta*, meanwhile there were Rat *Rattus* spp. holes along the bank.

Further south, in Clonkeen Park, there are pockets of mixed woodland present which include plant species Passion Flower *Passiflora* spp., Plum *Prunus* spp., Tuja *Cupressaceae*, Birch *Betula* spp., *Eucalyptus*, Cherry Laurel, Winter Heliotrope, Sycamore and some garden escapees, Daffodils *Narcissus* spp., Bluebells *Hyacinthoides non-scripta*, Lords-and-ladies, Ivy *Hedare hibernica*, Cleavers, and Vetches *Vicia* spp.

Tree species in these areas include Poplar, Hazel, Beech, Willow., *Eucalyptus* spp., Alder, *Cotoneaster* spp. In the far east of the site, along the railway, there is a grassy area containing Elm *Ulmus procera.*

The invertebrates in this location include Bumblebee *Bombus* spp. Parts of this location were also identified as a potential area for bat roosting and for breeding birds.

This habitat is considered to be of **county wide ecological value** considering its high quality and its importance to the integrity of the wildlife corridor running along the Deansgrange Stream.

4.5.12 Scattered Trees and Parkland (WD5)

Scattered trees and parks are located within in the northern section of Kilbogget Park in the centre of the site, and further to the southeast in an open area near Glenavon Park and Ballybrack. The habitat in Ballybrack is present on both sides of the bank, one of which being a small stand, the other being 10m wide. Plant species in these areas include Ash *Fraxinus excelsior*, Oak *Quercus* spp, Sycamore, Beech, Hawthorn *Crataegus monogyna*, Butterfly-bush and Japanese Knotweed *Fallopia japonica*, while some of the Oak trees have hollows that have been identified for potential bat roosting. There are small areas of scattered trees to the west of the railway line among the amenity grass, which contain the tree species Sycamore, Bird Cherry *Prunus padus*, Lime *Tilia cordata x platphyllos* and Oak.

The bird Chaffinch *Fringilla coelebs* was also recorded in these areas of scattered trees.

This habitat is considered to be of **high local ecological value** given its capacity to provide refuge for local fauna and nesting opportunities for breeding birds.

4.5.13 Riparian Woodland (WN5)

An area of Riparian woodland is found along the Shanganagh River upstream of the bridge upon which a access bailey bridge will be placed for the period construction. This riparian woodland contains Willow, Sycamore. Creeping Buttercup, Nettle, Cleavers, Cow Parsley, Common Reed, Reed Canary-grass Phalaris arundinaceae, Rosebay Willowherb Epilobium angustifolium, Hogweed, Nipplewort *Lapsana communis* and the INNS Giant Hogweed *Heracleum mantegazzianum* (Figure 4-12).

This habitat is considered to be of **county level ecological value** considering its importance as a refuge to waterfowl on site, for providing habitat for invertebrates and also due to its scarcity within Dun Laoghaire Rathdown area.

Figure 4-9

Figure 4-12: Giant Hogweed on the right-hand bank of the Shanganagh River, 20m upstream of the embankment pathway bridge.

4.5.14 Hedgerow (WL1)

In the central area of Clonkeen Park (Figure 4-13), there is a hedgerow with Hawthorn , Bramble, Ivy and Alexanders. Woodpigeon were noted in the hedgerow. There is also a poor quaity hedgerow running perpendicular to the Treeline at Killiney Hill Road Bridge.

This habitat is considered to be of **high local ecological value** given its capacity to provide refuge for local fauna and nesting opportunities for breeding birds; as well as acting as a wildlife corridor.

Figure 4-13: Amenity grassland to the left of the stream and hedgerow to the right in the centre of Clonkeen Park.

4.5.15 Scrub (WS1)

There is a small area of scrub in the north end of Clonkeen Park including plant species such as Dogwood *Cornus sanguinea*, Apple *Malus* spp., Bramble, Ivy, Alexanders, Privet *Ligustrum vulgare*, Willow, Nettle, Birch, Lesser Celandine *Ficaria verna and* Hazel.

Invasive plants Traveller's Joy *Clematis vitalba*, Himalayan Knotweed *Persicaria wallichii* and Butterfly-bush were recorded here. Himalayan Knotweed is listed on the Third Schedule of the EC (Birds and Natural Habitats) Regulations 2011 S.I. No. 477/2011.

Bird species recorded here include Goldfinch, Long-tailed Tit *Aegithalos caudatus*, Starling *Sturnus vulgaris*, Blackbird, Wren and Woodpigeon *Columba palumbus*.

This habitat is considered to be of **high local ecological value** given its capacity to provide refuge for local fauna and nesting opportunities for breeding birds; as well as acting as a wildlife corridor.

4.5.16 Scrub/Treeline Mosaic (WS1/WL2)

A short section of scrub/treeline is present along the banks of Deansgrange Stream, southeast of Ashlawn Park. Within this area are Ash, Bramble, Ivy, Elder *Sambucus nigra*, Hart's tongue *Asplenium scolopendrium*, Sycamore, Pine trees *Pinus* spp., Three-cornered garlic *Allium triquetrum*. The bird species recorded here included House Sparrow *Passer domesticus.*

This habitat is considered to be of **high local ecological value** given its capacity to provide refuge for local fauna and nesting opportunities for breeding birds; as well as acting as a wildlife corridor.

4.5.17 Treeline (WL2)

Treelines are present throughout all the parks and contain Poplar, Willow, Hazel and Beech. The bird species Mallard was also recorded among the tree line adjacent to the river.

This habitat is considered to be of **high local ecological value** given its capacity to provide refuge for local fauna and nesting opportunities for breeding birds; as well as acting as a wildlife corridor.

4.6 Protected Flora

No protected floral species were recorded by the JBA Ecologist during the ecological walkover survey of the proposed site. Furthermore, the NBDC shows no record of any protected flora species being present within site or its immediate vicinity (NBDC, 2022).

4.7 Protected Fauna

4.7.1 Terrestrial Mammals (Badger; Red Squirrel, Pygmy Shrew; European Hedgehog and Otter)

Badger

Badger *Meles meles* was not recorded during any of the site walkover surveys, nor were there any field signs such as scat, snuffle holes or tracks. There has been a recent record in 2015 of a commuting Badger on Bayshore Lane, 250m northwest of the proposed works under the railway near the Deansgrange outfall (NBDC, 2022).

Given the importance of wildlife corridors within this suburban setting for this species, the proposed area of work is **considered to be of county level importance** given its use of for the local Badger population.

Red Squirrel

Red Squirrel *Sciurus vulgaris* was not recorded during any of the site walkover surveys, nor were there any indication of use such as presence of dreys. Although no record of Red Squirrel was found, the treeline and woodland habitat is ideal for this species and their presence should be presumed following the precautionary principle. There have also been a number of sightings of this species approximately 1km south of the Deansgrange Stream. There has also been great efforts in Killiney Hill Park to reduce the Grey Squirrel population to facilitate the reintroduction of the Red Squirrel.

The proposed area of works is **considered to be of county level importance** for the local Red Squirrel population, given their use of treelines and woodland.

Pygmy Shrew

Pygmy Shrew *Sorex minutus* was not recorded during any of the site walkover surveys, nor were there any field signs including scat or tracks. There have been records of this species within the locality (NBDC, 2022), the latest of which was in 2018. Pygmy Shrew may use hedgerows and vegetated corridors for commuting and foraging within a suburban environment, however most of the local population are likely found in Killiney Heath or the area of scrub near the coast.

The proposed area of works is **considered to be of high local ecological importance** for the local Pygmy Shrew population, give their use of vegetated corridors.

European Hedgehog

No field signs including scat or tracks of Hedgehog *Erinaceus europaeus* were recorded on site or in the surrounding area during the ecological walkover survey. Although no record of Hedgehog was found, the treeline, scrub and parkland habitats are ideal for this species and their presence should be presumed following the precautionary principle. There has also been a number of records within the locality within the last three years (NBDC, 2022). Hedgehog is afforded protection under the Wildlife Act 1976 (and subsequent amendments).

The proposed are of works is **considered to be of high local ecological importance** for the local Hedgehog population, given their use of vegetated corridors and woodlands

4.7.2 Otter

Otter *Lutra lutra* are known to use the Deansgrange Stream for foraging and for commuting. Comprehensive Otter surveys were conducted on behalf of DLRCC in 2019 where multiple records of Otter were recorded across the catchment. These records are further supplemented by those surveys conducted by JBA Consulting. No Otter holts, latrines or resting areas (couches) were recorded along the length of the stream. A number of spraints were recorded, as well as prints and a smear. The locations of these features are shown below in Figure 4-14, Figure 4-15, and Figure 4-16.

The proposed area of works is **considered to be of county level importance** for the local Otter population, given their use of the stream for foraging and commuting.

Figure 4-14: Records of Otter presence upstream of Granville Rd Culvert.

Figure 4-15: Records of Otter presence upstream of Kilbogget Park

Figure 4-16: Records of Otter presence downstream of Kilbogget Park.

4.7.3 Marine Mammals

Common Porpoise, Bottlenose Dolphin and Common Dolphin

While the proposed terrestrial area of works does not contain any suitable habitat for Common Porpoise *Phocoena phocoena*, Bottle-nosed Dolphin *Tursiops truncatus* or Common Dolphin *Delphinus delphis*, a number of sightings and stranding have been recorded been recorded within Killiney Bay (NBDC, 2022) where there is a known population of these cetaceans. Deep excavation works will be taking place within 100m of this site. Each of these cetaceans are afforded protection under the Wildlife Act 1976 (and subsequent amendments), as well as Annexes II and IV of the EU Habitats Directive. Common Porpoise are also a Qualifying Interest of the Rockabill to Dalkey Island SAC.

These species are assessed within the AA screening and are not considered further in this report.

4.7.4 Bats

Desk Study

Four species of bat, namely Common Pipistrelle *Pipistrellus pipistrellus*; Soprano Pipistrelle *Pipistrellus pygmaeus*; Leisler's Bat *Nyctalus leisleri*; and Brown Long-eared Bat *Plecotus auritus* have been recorded in recent years within 1km of the Deansgrange Stream (NBDC, 2022). Bat species are regarded as being of international ecological importance given the level of EU protections afforded to them under the Habitats Directive.

Preliminary Bat Roost and Habitat Suitability

A total of eight trees and one bridges within the site were found to have potential roost features (PRFs) with **low bat roost suitability**. These were mature Ash and Oak trees (

Figure 4-17) which had either mature / dense ivy cover and/or small, shallow trunk / branch cavities. These types of potential roost have minimal insulative qualities; and if utilised by local bats, roosting activity would only take place during the summer months. These trees are located within the mixed treeline and hedgerow habitat as well as scattered trees and parkland and within some sections of woodland along the Deansgrange Stream. The bridge with the recorded bat roost potential was a stone bridge with some low potential cracks that had no obvious signs of habitation (staining). The locations of these features in relation to the proposed works are shown in Figure 4-18 and Figure 4-19. The trees upstream of Killiney Hill Road bridge were surveyed from ground level for potential bat roosting features. Although Ivy cover was considered dense in sections (with dense coverage on a mature Ash tree), the maturity/thickness of the ivy provide low roosting potential. Thick branching cover and residual leaf canopy during the survey prevented a clear view of the upper canopy.

A preliminary roost assessment of the pedestrian bridge crossing the Shanganagh River was conducted on the 14th of June 2023. A number of open crevices were recorded however none of these crevices offered roosting potential for bats or had indications of active bat usage.

Figure 4-17: Ash tree containing trunk cavities and mature ivy growth

Figure 4-18: Trees (and one bridge to the south) with bat roost potential downstream of works at Granville Rd.

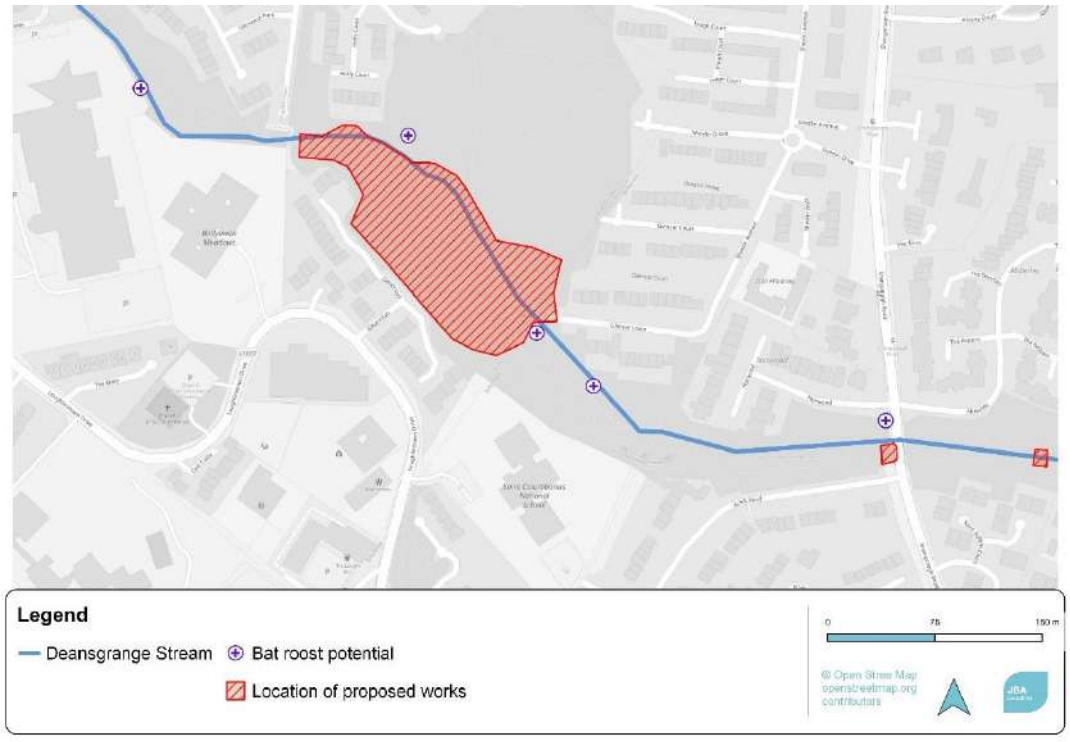

Figure 4-19: Location of trees with at roost potential downstream of Kilbogget Park.

Emergence and Activity Survey.

The presence of ivy covering a number of trees, (a large Ash in particular) in close proximity to proposed works (installation of a flood defence wall) resulted in the requirement for an emergence survey. Bat activity such as commuting, and foraging was also recorded during the emergence survey and a static bat detector was left for eight nights to monitor bat activity along this section

The survey of the treeline was conducted on the 11th of May 2023 between 20:45 and 22:45, with two surveyors positioned at vantage points looking into the treeline. One surveyor was focused on the large Ash for possible emergence while the surveyed above the treeline for any emerging bats. A static bat detector was installed in the centre of the treeline. Locations of surveyors with viewing angles and the location of statics are shown in Figure 4-20 below.

A total of three bat species were recorded during survey. These species included Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat. Common pipistrelle was most commonly recorded species with a total of 16 passes recorded between 21:23 and 22:06. The majority of these bats were actively foraging along the treeline. A pair of Common Pipistrelle were recorded foraging simultaneously along the treeline. A single pass of a Leisler's Bat and a Soprano Pipistrelle were recorded, likely using the treeline as a commuting feature. Bats were recorded foraging/commuting along a route which avoided the streetlight located on the Killiney Hill Road Bridge. This route is shown in Figure 4-20 below.

Figure 4-20: Location of surveyors, bat static and observed commuting route, 11th of May 2023.

The static bat detector recorded a total of 141 distinguishable calls over the course of eight nights with 13.05.2023 offering the highest number of recorded calls (27). Common pipistrelles were the most active with 121 of the 141 calls. Soprano pipistrelles, Leisler's Bats and Daubenton's Bats were recorded in lower numbers. The results of the static bat detector are shown in Table 4-8 below.

Table 4-8: Results from static detector surveys

Date	Species	Count
11th of May, 2023	Common pipistrelle	5
	Leisler's Bat	2
	Daubenton's Bat	1
12th of May, 2023	Common pipistrelle	4
	Soprano pipistrelle	2
13th of May, 2023	Common pipistrelle	22
	Soprano pipistrelle	4
	Daubenton's Bat	1
14th of May, 2023	Common pipistrelle	20
	Daubenton's Bat	2
15th of May, 2023	Common pipistrelle	23
	Daubenton's Bat	2
16th of May, 2023	Common pipistrelle	19
	Soprano pipistrelle	1
	Daubenton's Bat	3
17th of May, 2023	Common pipistrelle	12
	Soprano pipistrelle	2
18th of May, 2023	Soprano pipistrelle	16
Location of static detector (ITM):	725443, 723506	

The treeline at Killiney Hill Road Bridge is a foraging/commuting feature for local bats however surveys indicate the trees in this section are not active roosts.

The various linear features of the Deansgrange Stream, such as the treeline at Killiney Hill road bridge, other treelines in the area, hedgerows and the open grassland offer a variety of foraging and commuting habits for bats which are be abundant in the area. The habitats on site are valued as being of **high local importance** for bats

4.7.5 Breeding Birds and Riparian Birds

The various treelines, hedgerows, scrub and woodland habitats found along the Deansgrange Stream offer suitable habitat to nesting birds. Bird surveys conducted in Glenavon Park and north of the Kilbogget Culvert in March 2020 recorded Hooded Crow *Corvus cornix*, Mallard *Anas platyrhynchos*, Grey Wagtail, Wren *Troglodytes troglodytes*, Moorhen *Gallinula chloropus*, Woodpigeon *Columba palumbus* and Starling *Sturnus vulgaris.*

A survey of riparian birds was conducted on the 19th of May 2023. This was an instream survey within the schemes zone of works (Figure 4-22 and Figure 4-23). The survey recorded a variety of bird species, including Mallard, Moorhen, Pied Wagtail, Wren and Song thrush. Woodpigeon, Chaffinch and Starling were also recorded more than 20m from the stream. Only one nest was recorded, found under a pedestrian access bridge south of Abberley (Figure 4-21), This nest likely was unoccupied for the duration of the survey however it may have been constructed by a Grey Wagtail given its size, placement and structure off of the Shanganagh Road (Figure 4-22). Two Pied Wagtails an adult and fledgling, were recorded near the fish pass at Glenavon, as well as a number of Mallard, however no nest was recorded within the area. An artificial nest box, likely intended for Mallard was recorded near Glenavon however this was unoccupied (Figure 4-23). A single Moorhen was recorded 50m downstream of Granville Road, however after extensive searching no nest was recorded with the reeds and islands within 30m of the proposed works.

Figure 4-21: Potential Grey Wagtail nest found under the pedestrian access bridge south of Abberley

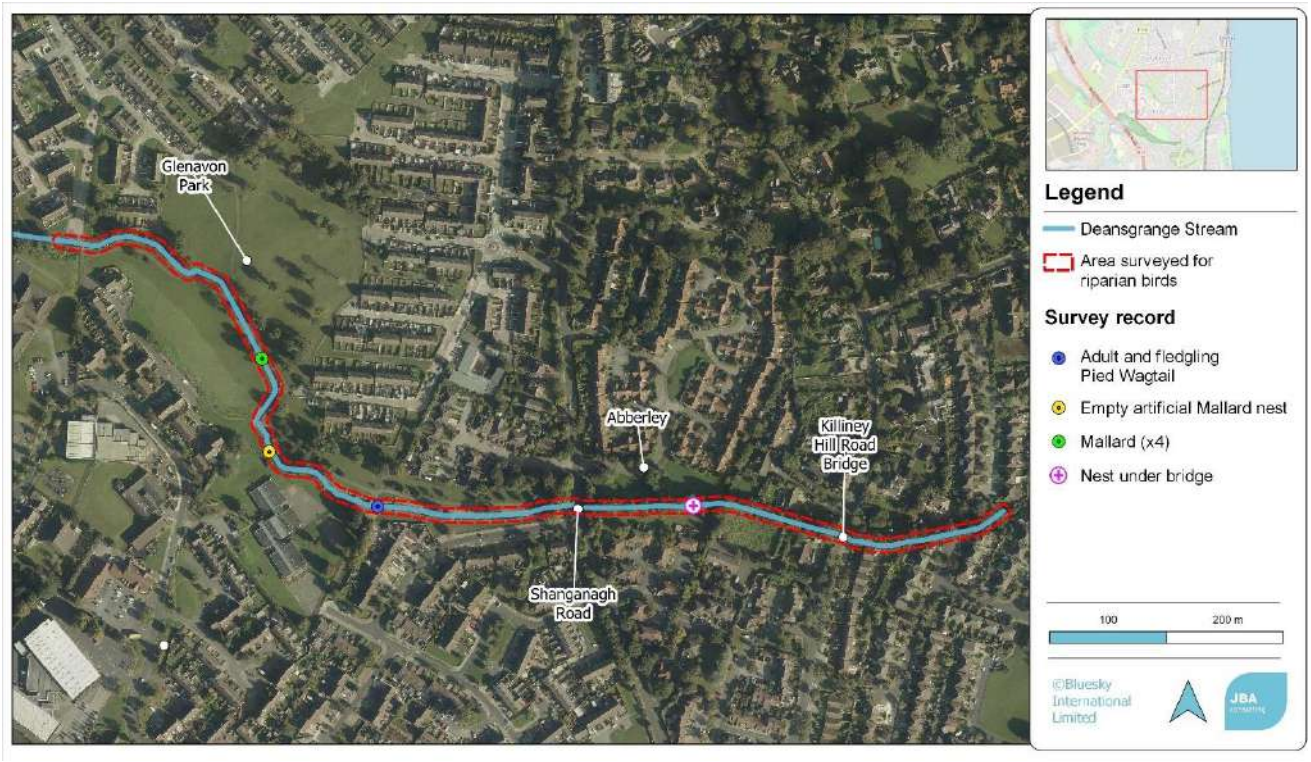

Figure 4-22: Riparian birds recorded between Glenavon Park and the Seafield culvert inlet (19th of May 2023)

Figure 4-23: Riparian birds recorded around Granville Road on the 19th of May 2023

The bridge over the Shanganagh River located along the embankment pathway at Killiney Beach was assessed for nesting/roosting birds on the 14th of June 2023. No birds were recorded nesting on the bridge however a number of Feral Pigeons *Columba livia f. domestica* were recorded roosting on small ledges under the bridge. It is likely

Mallard and Starling are both Amber listed on the Birds of Conservation Concern Ireland 2020-2026 (BoCCI) while Grey Wagtail are BoCCI red listed. A number of further red listed and amber listed species have been recorded on NBDC within 1km of the Deansgrange Stream

While BoCCI listed species are not given a specific protection they are, along with the majority of bird species, protected under the Wildlife Acts (1976 – 2012) where it is an offence to hunt, interfere with or destroy their breeding or resting places unless authority is obtained via statutory licence provision. The hedgerows, treelines, woodlands and scrub of the proposed site offer suitable nesting habitat for breeding birds.

Given the nesting and foraging suitability of the proposed site for breeding birds, the proposed development site has been valued by this study as being of **high local ecological importance** for breeding birds of conservation concern.

The habitat for riparian birds of conservation concern such as Grey Wagtail (Red listed) and Mallard (Amber listed) is considered being of **county wide ecological importance**.

4.7.6 Wintering Birds

Wintering birds were recorded during the bird surveys conducted in March 2020 upstream of Kilbogget park and in Glenavon Park. Only 14 Herring Gull *Larus argentatus* and 4 Common Gull *Larus canus* were recorded. Bird species that have been previously recorded in Kilbogget playing field, listed on NBDC records.

- Curlew *Numenius arquata*
- Redshank *Tringa totanus*
- Light-bellied Brent Goose *Branta bernicla hrota*
- Black and/or Bar-tailed Godwit *Limosa* spp.
- Mute Swan *Cygnus olor*
- Dunlin *Calidris alpina*

- Shelduck *Tadorna tadorna*
- Oystercatcher *Haematopus ostralegus*
- Pintail *Anas acuta*
- Red-breasted Merganser *Mergus serrator*
- Coot *Fulica atra*
- Herring Gull *Larus argentatus*
- Black-headed Gull *Chroicocephalus ridibundus*
- Lesser Black-backed Gull *Larus fuscus*

A survey for DLRCC in Kilbogget Park 2019-2020 recorded the following bird species:

- Light-bellied Brent Goose *Branta bernicla hrota*
- Oystercatcher *Haematopus ostralegus*
- Black-tailed Godwit *Limosa limosa*.
- Curlew *Numenius arquata*
- Black-headed Gull *Chroicocephalus ridibundus*
- Common Gull *Larus canus*
- Herring Gull *Larus argentatus*
- Great Black-backed Gull *Larus marinus*

Wintering bird species are assessed within the AA screening and are not considered further in this report.

4.7.7 Amphibians - Common Frog and Smooth Newt

While no signs of Common Frog and Smooth Newt habitation was recorded by the JBA Ecologists during the ecological walkover surveys of the proposed site, both species have been recorded within 1km of the site in recent years (NBDC, 2022). Given these recent records and the presence of multiple artificial ponds in and around the site, both amphibian species can be assumed to be utilising the site on an occasional basis under the precautionary principle.

Common Frog is afforded protection under the Wildlife Act 1976 (and subsequent amendments), as well as the Annex V of the EU Habitats Directive. Smooth Newt is protected under the Wildlife Act 1976 (and subsequent amendments). This site is **considered to be of high local ecological importance** for the local amphibian populations.

4.7.8 Fish - European Eel

Electrofishing surveys have not been conducted on the Deansgrange Stream, however direct communication with fisheries protection section of Inland Fisheries Ireland (IFI) in 2022 indicate that Brown Trout *Salmo Trutta* and European Eel *Anguilla anguilla* are known to be present in the stream. As the stream can support both Eel and Brown Trout populations, under the precautionary principle, Lamprey *Lampetra* spp., Stone Loach *Barbatula barbatula* and Minnow *Phoxinus phoxinus* should also be considered in this assessment.

Small streams such as the Deansgrange Stream are important habitat for native fish species, and spawning salmonids such as Brown Trout. The stream is considered to be of **county level importance** for these species.

4.8 Invasive Non-native Species

A total of eight invasive non-native species were recorded within Clonkeen Park, namely: Three-cornered garlic, Sycamore, Canadian Waterweed *Elodea canadensis*, Winter Heliotrope, Cherry Laurel, Butterfly-bush, Himalayan Knotweed, Japanese Knotweed and Traveller's Joy. This included five different invasive species listed on the Third Schedule of the European Communities Birds and Natural Habitats Regulations (S.I. 477 of 2011). An INNS Management Plan was drafted and carried out to manage these species along the stream. Japanese Knotweed was originally recorded in five locations

(Figure 4-17 and Figure 4-18), all of which have been treated. Only stands 002, 003, and 004 have remaining Japanese Knotweed stands with 10%, 15%, and 5% of biomass remaining respectively, as of the last INNS Management Report (Envirco, 2022).

Figure 4-24: INNS being treated on site in Glenavon Park (Extracted from Envirico 2022 report)

Figure 4-25: INNS being treated on site near Seafield Culvert (Extracted from Envirico 2022 report)

A stand of Japanese Knotweed was also recorded near the pedestrian access bridge on the 19th of May, as shown in Figure 4-26 and Figure 4-27. This stand of Japanese Knotweed did not seem to be actively managed by the aforementioned INNS management plan.

Giant Hogweed on the right-hand bank of the Shanganagh River, 20m upstream of the embankment pathway bridge (Figure 4-28)

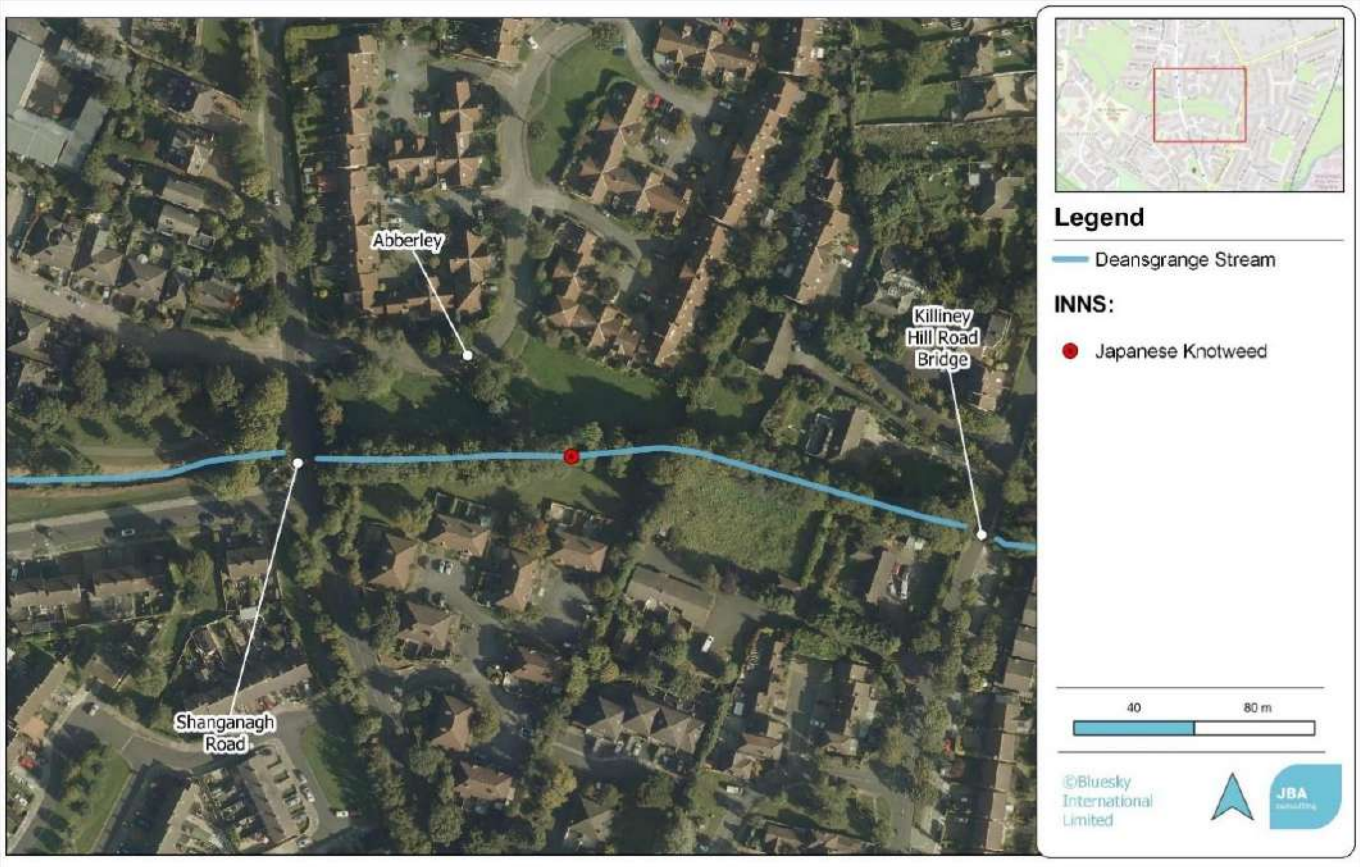

Figure 4-26: Location of Japanese Knotweed recorded on the 19th of May 2023

Figure 4-27: Japanese Knotweed recorded on the 19th of May 2023

Figure 4-28: Location of Giant Hogweed recorded on the 14th of June 2023

4.9 Screening of Designated Sites & Ecological Features

The screening of designated sites and ecological features identified during the desktop study and ecological survey are given in Table 4-9. Sites and features screened out are not considered further in this assessment. Ecological features carried forward are assessed for potential impact during construction and operation in the following sections.

Table 4-9: Summary of ecological features and the screening assessment.

Designated site / Ecological feature	Value	Screening
South Dublin Bay and River Tolka Estuary SPA	International	Out - AA Screening Report
South Dublin Bay SAC	International	Out - AA Screening Report
Dalkey Islands SPA	International	Out - AA Screening Report
Rockabill to Dalkey Island SAC	International	Out - AA Screening Report
Ballyman Glen SAC	International	Out - AA Screening Report
Dalkey coastal Zone and Killiney Hill	National	**Screened In**
Loughlinstown Wood	National	Out - no hydrological connection/ distance from site
South Dublin Bay	National	Out - no hydrological connection/ distance from site
Dingle Glen	National	Out - no hydrological connection/ distance from site
Booterstown Marsh	National	Out - no hydrological connection/ distance from site
Fitzsimons wood	National	Out - no hydrological connection/ distance from site
Ballyman Glen	National	Out - no hydrological connection/ distance from site
Buildings and artificial surfaces (BL3)	Less than local	Out - Less than local importance
Shingle and gravel banks (CB1)	International	**Screened In**
Amenity grassland (improved) (GA2)	Less than local	Out - Less than local importance
Dry meadows and grassy verges (GS2)	Higher local	**Screened In**
Other artificial lakes and ponds (FL8)	Higher local	Out - no hydrological connection/ distance from works
Depositing/lowland rivers (FW2)	County	**Screened In**
Reed and Large Sedge Swamp	County	**Screened In**
Reed and large sedge swamps/ Tall herb swamps (FS1/FS2)	County	**Screened In**
Shingle and gravel shores (LS1)	International	**Screened In**
(Mixed) broadleaved woodland (WD1)	County	**Screened In**
Scattered trees and parkland (WD5)	Higher local	**Screened In**
Riparian Woodland (WN5)	County	**Screened In**
Hedgerow (WL1)	Higher local	**Screened In**
Treelines (WL2)	Higher local	**Screened In**
Scrub (WS1)	Higher local	**Screened In**
Badger	County	**Screened In**
Red Squirrel	County	**Screened In**
Pygmy Shrew	Higher local	**Screened In**
European Hedgehog	Higher local	**Screened In**

Designated site / Ecological feature	Value	Screening
Otter	County	**Screened In**
Marine Mammals: Common Porpoise, Bottlenose Dolphin and Common Dolphin	International	Screened Out - AA Screening Report
Bats	Higher local	**Screened In**
Breeding Birds	Higher local	**Screened In**
Riparian Birds	County Level	**Screened In**
Wintering Birds	Higher local	Screened Out - AA Screening Report
Amphibians	Higher local	**Screened In**
Fish	County	**Screened In**
Invasive Non-Native Species	Third Schedule/ High Impact	**Screened In**

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5 Other Relevant Plans and Projects

5.1 Cumulative Effects

As part of the Ecological Impact Assessment, in addition to the proposed works, other relevant projects and plans in the region that may induce cumulative impacts must also be considered at this stage.

The following projects or plans were identified as potential sources of cumulative impacts:

- Dún Laoghaire Rathdown County Development Plan 2022-2028
- Greater Dublin Drainage Strategy
- Third Cycle River Basin Management Plan for Ireland 2022-2027
- Planning Applications (retrieved from Data.gov.ie - Planning Application Sites, September 2022)

5.2 Plans

5.2.1 Dún Laoghaire Rathdown County Development Plan 2022-2028

The County Development Plan (DLRCC., 2022) has a vision and policy statement that aims to continue to facilitate appropriate levels of sustainable development predicated on the delivery of high quality community, employment and recreational environments - allied to the promotion of sustainable transportation and travel patterns - all the while protecting Dún Laoghaire–Rathdown's unique landscape, natural heritage and physical fabric, to ensure the needs of those living and working in the County can thrive in a socially, economically, environmentally sustainable and equitable manner.

5.2.2 River Basin Management Plan for Ireland 2018-2021 / 2022-2027

The 2nd cycle River Basin Management Plan (RBMP) for Ireland 2018-2021 sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2021 (DoHPLG, 2018a). Changes from previous River Basin Management Plans is that all River Basin Districts are merged as one national River Basin District. The Plan provides a more coordinated framework for improving the quality of our waters — to protect public health, the environment, water amenities and to sustain water-intensive industries, including agri-food and tourism, particularly in rural Ireland.

The first cycle of River Basin Management Plans included the Eastern River Basin District - River Basin Management Plan 2009 – 2015 (WFD, 2010). The plans summarised the waterbodies that may not meet the environmental objectives of the WFD by 2015 and identified which pressures are contributing to the environmental objectives not being achieved. The plans described the classification results and identified measures that can be introduced in order to safeguard waters and meet the environmental objectives of the WFD;

- Prevent deterioration of water body status.
- Restore good status to water bodies.
- Achieve protected areas objectives.
- Reduce chemical pollution of water bodies

The River Basin Management Plan for Ireland (2018-2021) outlines the new approach that Ireland will take to protect our waters over the period to 2021. It builds on lessons learned from the first planning cycle in a number of areas:

- stronger and more effective delivery structures have been put in place to build the foundations and momentum for long-term improvements to water quality
- a new governance structure, which brings the policy, technical and implementation actors together with public and representative organisations. This will ensure the effective and coordinated delivery of measures.

Ireland's third River Basin Management Plan 2022-2027 (EPA 2021) was out for public consultation until March 31st 2022. The 3rd cycle draft Catchment Reports were published in August 2021. The draft Catchment Reports provides a summary of the water quality assessment outcomes for respective

catchments, including status and risk categories, significant threats and pressures, details on protected areas and a comparison between cycle 2 and cycle 3.

The third cycle draft Catchment Report for Liffey and Dublin Bay Catchment (EPA, 2021) identified that between Cycles 2 and 3 there has been an overall slight improvement in the catchment's status. The overall change in quality between Cycles 2 and 3 include 8 waterbodies achieving a High Status, which is an increase three, 46 which are achieving a Good Status which remains unchanged between Cycles, 18 achieving a Moderate Status which is a decrease by four waterbodies, 9 achieving a Poor Status which remains unchanged between Cycles, and 2 achieving a Bad Status which is an increase of one. agriculture, urban run-off, forestry, urban wastewater, domestic waste water, hydromorphology, Industry and mines and quarries

5.3 Other Projects

5.3.1 Loughlinstown Linear Park Footpath Resurfacing

Loughlinstown Park is located along the Deansgrange Stream, downstream of Clonkeen Park. The project is currently in construction and involves widening an existing path which runs along an existing stream (Deansgrange Stream) within Loughlinstown Linear Park. 2 x 100mm ducts will be laid on the side furthest away from the stream along the entire run of the path, with a 500mm excavated trench to depth of 400mm.

5.3.2 Grass Pitch Refurbishment: Killbogget Park Soccer and GAA Pitch and Killbogget Park Athletics

The proposed refurbishment of the GAA and Soccer pitch in Kilbogget Park, and Kilbogget Park Athletics, Dún Laoghaire, Co. Dublin, involves the breaking of existing ground, adding 150mm of topsoil, re-seeding and seaweed and other natural and organic fertilisers.

5.3.3 Granted Projects

There are several other recent developments or planning applications in the vicinity of the proposed project. Larger development planning applications in the near vicinity from the last three years that have been granted permission are listed in Table 5-1 below. Applications for home extensions, internal alterations and retention are not considered,

Table 5-1: Projects granted planning permission since September 2019 in vicinity of proposed site.

Planning Reference	Address	Application Status	Decision date	Summary of development
D22A/0451 / ABP Ref. 314620	Cromlech Cottage, Killiney Hill Road, Killiney, Co. Dublin	Refuse permission, appealed to An Bord Pleanála	18/109/2022	The development will consist of: the demolition of existing structures on site, including a habitable dwelling; The construction of 3-storey terrace of units consisting of 7 No. 3-bed houses with car garage, bike storage at the ground floor and habitable spaces to the first and second floor with access to the development from Killiney Hill Road; All with associated site works, surface carparking, bin storage, signage, open spaces, landscaping, and boundary treatments.
DZ20A/0073	At a site of c. 5.295 hectares, Beech Park, Bray Road, Cabinteely, Dublin 18, Loughlinstown, Co. Dublin	GRANT PERMISSION	30/06/2020	Permission for development to amend part of a permitted residential scheme (the parent submission Dún Laoghaire Rathdown Count Council Reg. Ref. D15A/0385(An Bord Pleanála Ref. ABP.-300194-17)). The site includes some 0.77 hectares forming part of the Cherrywood Strategic Development Zone Planning Scheme. (For identification purposes, the Application site comprised the lands of 10 No. houses (now demolished under Permission Reg. Ref. D15A/0385) comprising: Foinavan, No. 8 Beech park, Bray Road, Dublin 18, D18 A5N5; Woodbrook No. 7 Beech Park, Bray Road, Dublin 18 D18 FA55; Lynwood, No. 6 Beech Park, Bray Road, Dublin 18, D18 A2R7; Corrente, No. 5 Beech Park, Bray Road, Dublin 18, D18 W7K7, Dun Baoi, No. 4 Beech Park, Bray Road, Dublin 18, D18 TW75, Teely Lodge, Bray Road, Dublin 18, D18 E0K1; The Galliard, Bray Road, Dublin 18, D18 H9E2; Capard, Bray Road, Dublin 18, D18 A2Y6; Greenhills, Bray Road Dublin 18, D15 R9C0; El Dorado, Bray Road, Dublin 18, D18 T9C9; and Silver Slope, Bray Road, Dublin 18, D18 Y6H7 and the road area and associated open spaces at Beech Park, Bray Road, Cabinteely, Dublin 18/Loughlinstown County Dublin and its connection with the N11). The site is principally bounded by centenary Service Station to the North; the N11 to the east; Nos. 2-4 Sunnyhill Park, Loughlinstown to the south; and partly by the Cabinteely stream and open space to the west. (The property identified as Wood Haven (Beech Park, Cabinteely, Dublin 18, D18 A6R9) located between Silver Slope and El Dorado, does not form part of this development). The proposed development specifically relates to the permitted Apartment Blocks A, B and C located to the east of the site. (No alteration to the balance of the development is sought by this Application.)The proposed development will consist of the reconfiguration of Apartment Blocks A, B and C, comprising; amendments to the internal layout of the 65 No. permitted apartments including alteration to the permitted one-bedroom apartment at undercroft level, the provision of

Planning Reference	Address	Application Status	Decision date	Summary of development
				associated alterations to the facade designs and treatments, circulation areas and lift cores; amendments to the permitted stairs providing access to undercroft level on the eastern side of the permitted blocks; provision of 3 No. additional vents at ground floor level to the eastern side of the permitted blocks providing ventilation to undercroft area; amendments to the permitted landscape areas including the provision of post boxes; and all other associated site excavation, and infrastructural and site development works above and below ground. (Due to the reconfiguration of part of the permitted building, the proposed development will result in the provision of 55 No. two-bedroom apartments and 10 No. one-bedroom apartments. (54 No. two-bedroom apartments and 9 No. one-bed apartments are permitted under Application Reg. Ref. D15A/0385 (An Bord Pleanála Ref. ABP-300194-17.) However, the total number of residential units permitted on site will not change.)
DZ20A/0056	Beech Park (also known as Beechpark), Bray Road, Cabinteely, Dublin 18/Loughlinstown, County Dublin	GRANT PERMISSION	18/03/2020	Permission for development to amend part of a permitted residential scheme (the parent permission: Dun Laoghaire Rathdown County Council Reg. Ref. D15A/0385 (An Bord Pleanala Ref. ABP-300194-17) at a site of c. 5.295 hectares. The site includes some 0.77 hectares forming part of the Cherrywood Strategic Development Zone Planning Scheme. (For identification purposes, the Application site comprises the lands of 10 No. houses (now demolished under Permission Reg. Ref. D15A/0385) comprising: Foinavan, No. 8 Beech Park, Bray Road, Dublin 18, D18 A5N5; Woodbrook, No. 7 Beech Park, Bray Road, Dublin 18, D18 FA55; Lynwood, No. 6 Beech Park, Bray Road, Dublin 18, D18 A2R7; Corrente, No. 5 Beech Park, Bray Road, Dublin 18, D18 W7K7, Dun Baoi, No. 4 Beech Park, Bray Road, Dublin 18, D18 TW75; Teely Lodge, Bray Road, Dublin 18, D18 E0K1; The Galliard, Bray Road, Dublin 18, D18 H9E2; Capard, Bray Road, Dublin 18, D18 A2Y6; Greenhills Bray Road, Dublin 18, D18 R9C0; El Dorado, Bray Road, Dublin 18, D18 T9C9; and Silver Slope, Bray Road, Dublin 18, D18 Y6H7 and the road area and associated open spaces at Beech park, Bray Road, Cabinteely, Dublin 18/Loughlinstown, County Dublin and its connection with the N11.) The site is principally bounded by Centenary Service Station to the north; the N11 to the east; Nos. 2-4 Sunnyhill Park, Loughlinstown to the south; and partly by the Cabinteely Stream and open space to the west. (The property identified as Wood Haven (Beech Park, Cabinteely, Dublin 18, D18 A6R9) located between Silver Slope and El Dorado, does not form part of this development). The proposed development specifically relates to the permitted Apartment Blocks D, E and F located to the south east of the site. (No alteration to the

Planning Reference	Address	Application Status	Decision date	Summary of development
				balance of the development is sought by this Application.) The proposed development will consist of the reconfiguration of Apartment Blocks D, E and F, comprising amendments to the internal layout of the 78 No. permitted apartments; the provision of associated alterations to the facade designs and treatments, circulation areas and lift cores, including amendments to the permitted roof and solar panels and associated landscaped areas (including the provision of a new external stairs and amendment to the permitted footpath); the provision of additional vents at undercrof level; the thickening of the floor slabs in Blocks D and E resulting in an additional 150mm height to that part of the building; and all other associated site excavation, and infrastructural and site development works above and below ground. (Due to the re-configuration of part of the permitted building, the proposed development will result in the provision of 69 No. two-bedroom apartments and 9 No. one-bedroom apartments. (66 No. two-bedroom apartments and 12 No. one-bed apartments are permitted under Application Reg. Ref. D15A/0385 (An Bord Pleanala Ref. ABP300194-17). However, the total number of residential units permitted on site will not change.)
DZ19A/0893	Cromlech Lodge, 17 Shanganagh Road, Killiney, Co Dublin	GRANT PERMISSION	26/02/2020	Permission for development. The development will consist of the refurbishment of a single storey 3-bedroom bungalow, 3.0m² extension to the existing garage, remodelling of the roof including 59.0m² extension at first floor level consisting of 2 bedrooms with ensuites, dressing room and an artist studio. The development will also comprise of the works to the existing 0.95m high stone boundary wall and increasing its height to 2.3m along Shanganagh Road and the construction of 2.3m block wall to the western site boundary and all ancillary site and services works.
DZ19A/0797	Lands at Loughlinstown Drive (0.5685ha), Loughlinstown, Co. Dublin comprising Loughlinstown Industrial Estate and part of HSE Health Centre	GRANT PERMISSION	07/12/2020	Permission for development. The development will consist of the demolition of all existing buildings (1985sq.m) on site and the construction of a 4 storey Primary Care Centre and General Practitioner (GP) Surgery with a gross floor area of 4,267sq.m. The accommodation will consist of treatment rooms, consultation rooms, meeting rooms, staff facilities, ancillary offices and ancillary accommodation over 4 floors, with a maximum height of 16.955m. The building also includes an own door pharmacy (101sq.m) at ground floor. Permission is also sought for an ESB substation and switch room (35sq.m), bin store (19sq.m), a vehicular drop off area the main building entrance, 61 no. surface carparking spaces, 4 no. Motorcycle parking spaces, landscaping, lighting, external signage and all associated site and development works. Vehicular access/egress to the proposed development is via two points off Loughlinstown drive (one existing access to be retained and one proposed access point)..

Planning Reference	Address	Application Status	Decision date	Summary of development
DZ19A/0768	Beech Park, Bray Road, Cabinteely, Dublin 18, Loughlinstown, Co. Dublin	GRANT PERMISSION	29/11/2019	Permission for development to amend part of a permitted residential scheme (the parent permission: Dún Laoghaire-Rathdown County Council Reg. Ref. D15A/0385 (An Bord Pleanála Ref. ABP-300194-17)) at a site of c. 5.295 hectares. The site includes some 0.77 hectares forming part of the Cherrywood Strategic Development Zone Planning Scheme. (For identification purposes, the Application site comprised the lands of 10 No. houses (now demolished under Permission Reg. Ref. D15A/0385) comprising: Foinavan, No. 8 Beech Park, Bray Road, Dublin 18, D18 A5N5; Woodbrook, No. 7 Beech Park, Bray Road, Dublin 18, D18 FA55; Lynwood, No. 6 Beech Park, Bray Road, Dublin 18, D18 A2R7; Corrente, No. 5 Beech Park, Bray Road, Dublin 18, D18 W7K7; Dun Baoi, No. 4 Beech Park, Bray Road, Dublin 18, D18 TW75; Teely Lodge, Bray Road, Dublin 18, D18 E0K1; The Galliard, Bray Road, Dublin 18, D18 H9E2; Capard, Bray Road, Dublin 18, D18 A2Y6; Greenhills Bray Road, Dublin 18, D18 R9C0; El Dorado, Bray Road, Dublin 18, D18 T9C9; and Silver Slope, Bray Road, Dublin 18, D18 Y6H7 and the road area and associated open spaces at Beech Park, Bray Road, Cabinteely, Dublin 18/Loughlinstown, County Dublin, and its connection with the N11.) The site is principally bounded by Centenary Service Station to the north; the N11 to the east; Nos. 2-4 Sunnyhill Park, Loughlinstown to the south; and partly by the Cabinteely Stream and open space to the west. (The property identified as Wood Haven (Beech Park, Cabinteely, Dublin 18, D18 A6R9) located between Silver Slope and El Dorado, does not form part of this development.) The proposed development specifically relates to the permitted Apartment Blocks D, E and F located to the south east of the site. (No alteration to the balance of the development is sought by this Application.) The proposed development will consist of the reconfiguration of Apartment Blocks D, E and F, comprising: amendments to the internal layout of the 78 No. permitted apartments; the provision of (minor) associated alterations to the façade designs and treatments, circulation areas and lift cores, the parking layout at undercroft level of Blocks D, E and F and associated landscaped areas, including amendments to the permitted roof and solar panels; the provision of a Residents' Fitness Centre at the undercroft level of Block F (c. 80 sq m); and all other associated site excavation, and infrastructural and site development works above and below ground. The proposed development comprises a reduction in the permitted floor area of Block D (c. 33.5 sq m at Undercroft Car Park Level and c. 53.5 sq m at each level from permitted Ground to permitted Fourth Floor levels (resulting in the removal of some 301 sq m). (Due to the reconfiguration of part of the

Planning Reference	Address	Application Status	Decision date	Summary of development
				permitted building, the proposed development will result in the provision of 63 No. two-bedroom apartments and 15 No. one-bedroom apartments. (66 No. two-bedroom apartments and 12 No. one-bed apartments are permitted under Application Reg. Ref. D15A/0385 (An Bord Pleanála Ref. ABP-300194-17.) However, the total number of residential units permitted on site will not change.)
D15A/0028/E	Beech Park (also known as Beechpark), Bray Road, Cabinteely, Dublin 18/Loughlinstown, County Dublin	Grant extension of duration for permission	09/12/2019	Permission for a new single storey over basement dwelling with new boundary treatment and garden areas to front and rear with new vehicular and pedestrian access off Shanganagh Vale on subdivided site including partial demolition of existing garden wall and installation of a new rainwater harvesting tank.

5.4 Summary of Cumulative Impacts

The above planning applications are assessed in-combination with the proposed works as they may have a cumulative impact on the present aquatic and terrestrial features and projects near the proposed project are considered in combination with the currently proposed project in this EcIA

6 Impact Assessment

6.1 Introduction

The impacts on the valued ecological features are assessed here. The initial assessment considers the potential impact pathways and whether these apply to the ecological features. The impact assessment considers the project and the anticipated effects in the absence of any mitigation.

The potential impacts from the construction works and the site's operation following the works are assessed under the following:

- Disturbance to habitats and species
- Temporary and permanent habitat loss
- Impacts on surface water and groundwater quality

The following sections describe the nature of immediate / short-term impacts, as well as any medium- or long-term impacts, predicted for designated protected sites, habitats and species in the absence of implemented mitigation measures during the maintenance works.

6.2 Do Nothing Scenario

If the proposed works were not to go ahead and the present land management continues as is, the ecological value of the site would remain unchanged.

6.3 Construction Phase

6.3.1 Designated Sites - Dalkey coastal Zone and Killiney Hill pNHA

Construction activity is not expected to take place within the zone of the pNHA. Construction will be limited to excavation and placement of culvert piping along a section of amenity grassland on the opposite side of the existing historic railway embankment which separates the beach and pNHA from the proposed work.

The only potential impact on the pNHA is through potential hydrocarbon and/or silt pollution when the proposed works reconnects with the outlet, or if there is a surface water pollutant event associated with the wall construction works next to Killiney Hill Road Bridge or the landscaping at Glenavon Park.

Construction activities during the development of the proposed FRS measures may lead to the introduction of pollutants such as hydrocarbons and sediment into surface water through accidental spillage or incorrect containment measures. In the absence of appropriate mitigation, the Deansgrange Stream has the potential to transport these pollutants downstream to the shingle shore of the Dalkey coastal Zone and Killiney Hill pNHA. This is considered a moderate temporary impact.

The proposed site has a south-west prevailing wind year-round (Windfinder, 2023), therefore, any dust generated on-site will most likely be transported towards the shore. Levels of dust are expected to be negligible even in the worst-case scenario, having a negligible temporary impact on the Dalkey Coastal Zone and Killiney Hill pNHA.

Therefore, in the absence of mitigation, during the construction phase, it is anticipated that there will be overall **short term (effects lasting one to seven years) medium impact of moderate significance** for these designated sites.

6.3.2 Habitats

6.3.2.1 Shingle and gravel banks, shingle gravel shores, dry meadows and grassy verges

Each of these habitats are downstream of the proposed works beyond the outfall of the proposed Seafield overflow culvert and make up the graded habitats which form a transition from the scrub habitat down to the waters' edge. None of these habitats will be directly affected by the proposed works as the proposed access route and construction works are away from these habitats.

In the absence of proper containment measures and mitigation to prevent silt, cement and hydrocarbons entering the stream, there may be an accumulation of these pollutants along the shore where the stream enters the bay. The impact this would have on these habitats is considered to be minor and temporary.

In the absence of appropriate mitigation measures, impacts via air pollution from dust generated on site is expected to be temporary and minor in nature.

Therefore, in the absence of mitigation, during the construction phase, it is anticipated that there will be an overall **short term (effects lasting one to seven years) medium impact of moderate significance** for the shingle and gravel banks habitat and shingle and gravel shores habitat considering their value as potential Annex I habitats. In the absence of mitigation, during the construction phase, it is anticipated that there will be an overall temporary **negligible impact of non-significant level** expected for the dry meadows and grassy verge habitat .

6.3.2.2 Reed and large sedge swamps

This habitat is located at the outfall of both the Deansgrange stream and Shanganagh River. IN the absence of appropriate mitigation there is potential for a release of pollutants (cement, sedimentation, hydrocarbons etc.) during the construcion phase which may be highly toxic to the species that make up this habitat. Construction work may also remove this habitat while gaining access to the site.Therefore in the absence of a appropriate mitigation measures there may be **high medium-term impacts on this habitat which is considered significant** given the county wide importance of this habitat.

6.3.2.3 Reed and large sedge swamps/ Tall herb swamps

The majority of this habitat straddles the Deansgrange Stream along sections of the parkland north of Kilbogget Playing fields and immediately south of Granville Road. The main impact concerns would be that of an accidental introduction of pollutants (hydrocarbon leakages from site machinery); cement leachate; and excess sediment from the excavations associated with the installation of the improved culvert at Granville Road. In the absence of appropriate mitigation measures, the accidental release of pollutants in this area may have a **high medium-term impact on this habitat which is considered to be significant.**

In the absence of appropriate mitigation measures air pollution in the form of dust generated from the proposed works may also have a minor-negligible temporary impact on this habitat. This level of impact is **not considered to be significant.**

6.3.2.4 Depositing/lowland rivers.

This habitat, which makes up the main section of the Deansgrange Stream, is the receiving waterbody for any surface water runoff from the proposed works at Glenavon Park, Granville Road, Killiney Hill Road Bridge and immediately downstream of Seafield Culvert outlet where the stream enters the bay. Works to facilitate the proposed access bailey bridge will also take place above this habitat which makes up the Shanganagh River.

The main impact concerns would be that of an accidental introduction of pollutants (hydrocarbon leakages from site machinery); cement leachate; and excess sediment from the excavations and soil works. Instream works also have the potential to significantly impact the quality of this habitat through silt disturbance, and removal of gravels and instream vegetation. During construction of the proposed embankments at Glenavon Park and the construction of the improved culvert at Granville Road, water from the river will be diverted into a temporary secondary stream. This will reduce the functional connectivity of the habitat for a short duration of the proposed works. Impacts from pollutants and inappropriately managed instream works, in the absence of mitigation measures, are likely to be **high and lasting in the medium term, which is considered a significant impact.**

Works proposed upstream of Killiney Hill Road Bridge may result in the removal of the treeline along this section. The removal of these trees ay results in the destabilisation of the bank along this section, as the roots of these trees are a structural component of the bank. If the bank is destabilised, increased sediment load and deposition is expected within the stream, which may result in a significant pollution event. This impact, in the absence of appropriate mitigation measures will result a **high impact lasting in the long term which is conisdered a significant impact**

It is likely that the groundwater flow in Glenavon park is directly associated with this habitat, with water draining through the subsoil towards the stream. Construction works have the potential to disrupt this flow reducing water levels or accidentally introduce pollutants in the form of cement and/or hydrocarbons from machinery. The subsoil will provide a degree of containment and filtering of any pollutants before reaching the stream, however, impacts via groundwater are considered to be **moderate medium-term impacts with moderate significance.**

6.3.2.5 (Mixed) broadleaved woodland

The closest this habitat comes to any of the proposed works is at Granville Road where its northern edge is approximately 25m from the proposed works, where a new culvert is being constructed under Granville Road. This habitat is not hydrologically connected to any of the proposed works and is away from any proposed access routes for heavy machinery. In the absence of appropriate mitigation measures minor impacts are expected from air pollution as dust is generated on site. This impact will only affect a minor proportion of the woodland on site and will be temporary in nature.

Therefore, in the absence of mitigation, during the construction phase, it is anticipated that there will be an overall **temporary minor impact of slight significance** for this habitat.

6.3.2.6 Scattered trees and parkland

This habitat makes up the majority of Glenavon park. Four trees of varying sizes and maturity may be impacted by the proposed works. The proposed construction works will remove amenity grassland between the trees which is considered to be of low value. There is a low possibility that the proposed works could have an impact on the groundwater within the vicinity via a pollution event (accidental release of hydrocarbons etc.) however it is unlikely that an impact of this nature will significantly damage the trees in the locality.

A small section of immature sycamore trees may require removal to facilitate access to a site compound in Seafield Ct. These trees are of low quality, and do not offer bat roosting potential or habitat fro breeding birds.

Therefore, in the absence of mitigation, during the construction phase, it is anticipated that there will be an overall **minor long-term impact of slight significance.**

6.3.2.7 Riparian Woodland

The riparian woodland is upstream of the proposed access works on the embankment bridge over the Shanganagh River. The only potential impact on this habitat is through the spread of dust which is expected to be minimal at this location

Therefore, in the absence of mitigation, during the construction phase, it is anticipated that there will be an overall **negligible impact to this habitat.**

6.3.2.8 Hedgerow

A small section (Approx 5m) of low-quality ornamental hedgerow perpendicular to the proposed flood relief walls upstream of Killiney Hill Road Bridge will be removed as a result of the construction works. This impact is considered to be of **negligible significance** given the relatively limited extent of removal.

6.3.2.9 Treelines.

The majority of the proposed works will avoid removal and/or damage to individual trees and treelines across the scheme. The exception to this is at Killiney Hill Road Bridge, where a flood wall is proposed in parallel with the stream. The impact of this wall on the treeline along the river is assessed in an Arboricultural Impact Assessment (Appendix C). Of the 18 trees surveyed along this section of treeline, 15 were considered high quality, one considered good quality, with only two considered poor or low quality. This treeline makes up an important part of the wildlife corridor which runs along the Deansgrange Stream.

The proposed wall to be constructed is within the Root Protection Area (RPA) of the majority of the trees within the treeline. In the absence of appropriate mitigation measures, creation of strip foundations for this wall may severely damage the roots of these trees resulting in their removal. The removal of these trees has the potential to destabilise this bank and contribute to increased sediment load to the stream as discussed above.

This will have a high permanent term impact on this treeline, resulting in a **moderate long-term impact of slight significance** to this habitat across the proposed scheme.

6.3.2.10 Scrub

Sections of this habitat near the proposed Seafield Culvert Overflow will be directly removed as a result of the proposed FRS construction works. This is to facilitate access to the zone of works. The proportion of this habitat to be removed makes up approximately 15% of the total area of this habitat on site. Once construction works are complete, scrub will likely recolonise the disturbed land in time making this impact temporary in nature.

In the absence of mitigation measures, impacts via air pollution from dust generated on site may have a slight temporary impact on the sections of scrub that are not directly removed by the proposed works.

Therefore, in the absence of mitigation, during the construction phase, it is anticipated that there will be an overall **temporary minor impact of slight significance** for this habitat.

6.3.3 Species

6.3.3.1 Badger

Although signs of Badger were not recorded during any of the ecological walkover of the site, they may potentially use the various parklands and the treeline upstream of Killiney Hill Road Bridge to commute between foraging areas. The removal of trees, as discussed above, would reduce connectivity for this species while commuting. Camera trap surveys indicate that this section of Deansgrange wildlife corridor is not heavily frequented by Badger, however its removal will reduce a potential route if Badger populations increase in the area. The removal of scrub in the vicinity of the Seafield overflow culvert may also impact commuting Badger which may potentially use the area,. However this removal will be temporary and limited in nature, and is unlikely to impact on commuting badger populations, given the abundance of alternative routes in the area. Additionally, there is the potential for direct loss of life of individuals in the case of accidents within the construction site (e.g., accidental trappings), after failure to exclude entry; this is the case across the catchment. In the absence of appropriate mitigation measures, the proposed works will have a **minor impact of slight significance** to local Badger populations through the removal of trees and vegetation upstream of Killiney Hill Road Bridge, and through accidental entrapment.

The works in Glenavon park may remove a small area of potential foraging habitat for Badger, however given the abundance of alternative foraging habitat that is similar in nature within the locality, this removal is considered to be a **negligible impact with no significance**.

In the absence of appropriate mitigation measures, the proposed works will have a minor temporary impact on local terrestrial mammals including Badger through noise and light pollution for the duration of construction works. **This impact considered to be of temporary slight significance** for Badger.

6.3.3.2 Red Squirrel

Red Squirrel may use treelines along the lower reaches of the Deansgrange Stream for commuting and foraging. The removal of the treeline upstream of the Killiney Hill Road Bridge may reduce habitat connectivity and foraging potential for this species in the area. In the absence of appropriate mitigation measures this would have a **minor impact of slight significance** for this species.

In the absence of appropriate mitigation measures, the proposed works will have a minor temporary impact on local terrestrial mammals including Red Squirrel through noise pollution throughout the duration of construction works. **This impact considered to be of slight significance** for Red Squirrel.

6.3.3.3 Pygmy Shrew and European Hedgehog

Pygmy Shrew may be present in the scrub habitat in the vicinity of the proposed Seafield overflow culvert given its close proximity to the known population at Killiney Hill Park. Hedgehog is also likely to be present in this habitat. Hedgehog are also likely to use the treeline upstream of Killiney Hill Road Bridge as cover when commuting from foraging sites. In the absence of appropriate mitigation measures removal of vegetation will reduce available refuge habitat for these species (hibernation and summer day-time nesting). Additionally, there is the potential for direct loss of life of individuals in the case of accidents within the construction site (e.g., accidental trappings), after failure to exclude entry.

In the absence of appropriate mitigation measures, the proposed construction works will have a **minor temporary impact on small mammals which is not considered significant**.

6.3.3.4 Otter

Otter are known to forage along the Deansgrange Stream, and likely prey on fish and amphibians along this wildlife corridor, using riparian vegetation as cover during the day.

As stated above the main impact concerns would be that of an accidental introduction of pollutants (hydrocarbon leakages from site machinery); cement leachate; and excess sediment from the excavations and soil works into the Deansgrange Stream which would impact on the availability of prey via the inevitable death of fish and amphibians that would result, and through the degradation of appropriate habitat for these species. In the absence of appropriate mitigation measures, this would have a **moderate medium-term impact of slight significance** on this species.

During construction of the proposed embankments at Glenavon Park and the construction of the improved culvert at Granville Road, water from the river will be diverted via a pumping mechanism. This will temporarily remove the functional connectivity of the habitat for the duration of the proposed works, having a negligible impact on commuting ability of Otter.

Removal of vegetation and the cover it provides to facilitate the construction of a flood relief wall upstream of Killiney Hill Road Bridge will have a **minor impact of slight significance** on the foraging and commuting activity of Otter.

In the absence of appropriate mitigation measures, inappropriate site compound management and placement of construction materials may result in accidental entrapment of Otter. Insensitive construction methodology may result in disturbance to Otter via noise pollution an/or inappropriate use of lighting at night, in close proximity to the stream. These are considered **temporary moderate impacts of moderate significance for Otter,** in the absence of appropriate mitigation measures.

6.3.3.5 Bats

None of the individual trees or bridges that were described as having bat roost potential will be impacted by the proposed works. The trees upstream of Killiney Hill Road Bridge were surveyed for emergence, and no bats were recorded using the low potential roosting features (ivy cover) as bat roosts. Using the precautionary principle it must be assumed that these roosting features may offer low quality summertime opportunistic day roosts for resting bats. In the absence of appropriate mitigation measures during construction works, the removal of these trees will result in a **moderate residual impact of slight significance for bats.**

In the absence of appropriate mitigation measures there will be a negligible reduction in available foraging habitat, and the commuting features will remain intact.

6.3.3.6 Breeding Birds

Breeding bird species that utilise the scrub habitats and treelines on site for foraging purposes may be visually and/or audibly disturbed by construction activities, causing these breeding bird species to vacate the site during active construction periods. Furthermore, local breeding bird populations will experience a temporary loss of potential nesting sites as result of the loss of the existing treeline habitat upstream of Killiney Hill Road Bridge. If construction works take place during the bird nesting season, birds may be physically impacted by the proposed works.

Therefore, in the absence of mitigation, during the construction phase, **a minor temporary impact of slight significance is anticipated for the local breeding bird populations.**

6.3.3.7 Riparian Birds

Riparian birds such as Mallard, Moorehen and Coots *Fulica atra* use marginal river habitat such as reed beds and scrub overgrowth to nest. Dipper, Grey wagtail and Kingfisher create nest on or within structures. Kingfisher burrow in banks, Grey wagtail use rock nulls or covered banksides while Dipper create a nest on overhanging tree branches or under bridges. Given the extensive works along the banksides and improvements to screens next to various bridges there is potential for significant **temporary impact of moderate significance anticipated for the local riparian bird populations.**

6.3.3.8 Amphibians

In the absence of mitigation, amphibians are likely to be impacted by any degradation of the reed and large sedge swamps/ tall herb swamps on site as discussed above. This degradation will have a **moderate temporary impact of slight significance for this species**.

6.3.3.9 Fish

Fish are dependent on the depositing/lowland river habitat on site. The main impact concerns would be that of an accidental introduction of pollutants (hydrocarbon leakages from site machinery); cement leachate; and excess sediment from the excavations and soil works. Instream works also has the potential to significantly impact the quality of this habitat through silt disturbance, and removal of gravels and instream vegetation. During construction of the proposed embankments at Glenavon Park and the construction of the improved culvert at Granville Road, water from the river will be diverted via a pumping mechanism. This will remove the functional connectivity of the habitat for the duration of the proposed works. Impacts from pollutants and inappropriately managed instream works, in the absence of mitigation measures, are likely to be **high and lasting in the medium term, which is considered a moderately significant impact for fish species** such as Brown Trout and European Eel.

6.3.3.10 Invasive non-native species

INNS are present in close vicinity of the proposed works. In the absence of appropriate mitigation measures construction works may result in the accidental spread of these species

6.4 Operation Phase

The operational phase will only impact on the following habitats and species directly associated with the Deansgrange Stream and the proposed FRS Scheme which include:

- Depositing/lowland rivers
- Fish
- Otter
- Terrestrial mammals

The other habitats and species within the site area will not be impacted during the operational phase of the proposed scheme.

6.4.1 Depositing/lowland river and fish

The proposed FRS measures will have varying levels of impact on the hydromorphology of the depositing lowland river habitat and in turn the fish species that are dependent on this habitat. These measures include the proposed culvert upgrade at Granville Road and the placement of an instream flow control device in the form of culvert running through an embankment in Glenavon Park, as well as the replacement of debris/trash screens along the Deansgrange Stream.

The residual impact of upgrading the culvert at Granville Road will not significantly impact the existing hydromorphology of the river in this section or the capabilities for fish to pass through this section unless best practice guidance is not followed due to the presence of an existing culvert. If considerations to fish passage are not made in the design of this culvert a minor residual impact on fish species may be expected. Concerning the depositing lowland river habitat, if increased flow rates are a result of the improved culvert, some consideration for increased scour risk should be given.

A flood storage system within the existing greenspace adjoining Deansgrange Stream in Glenavon Park is proposed as part of this FRS. A key engineering feature of this flood storage system is an embankment which will run along the southern boundary of the storage system adjoining with the stream where a new bridge will be constructed with an associated flow control structure. This structure will include a culvert with the main channel flow running through a new bespoke headwall with rip rap or similar at either face. Directly above the main channel flow, the flow control weir and spillway will be installed to limit the top water level during a storm event. The wing walls for the new pipe within the stream channel and spillway will also act as retaining walls for the flood defence embankments.

Placing infrastructure into a water course is counter to the objectives of the WFD which seeks to improve the Ecological status of water courses; hydromorphology being one of the underpinning elements on which the biological elements rely.The insertion of a flow control device in the riverbed may result in an increase in deposition above the bridge due to decreased flow velocity. Changes to rates of velocity are yet to be confirmed but if these rates are altered substantially, they may affect instream habitat quality, causing excessive deposition, and a change to oxygenation status and habitat quality for instream fauna.

This structure and associated culvert carrying the main channel flow will disrupt the habitat connectivity of the depositing/lowland river habitat which will have an impact on local fish populations. The flow

-	Passability Score			
Species	**1.0**	**0.6**	**0.3**	**0**
Adult Salmonid	≤10m	11m - 30m	31m - 99m	≥100m
Cyprinids	≤1m	2m - 6m	7m - 19m	≥20m
Juvenile Salmon	≤3m	4m - 9m	10m - 49m	≥50m
Adult Lamprey	≤3m	4m - 9m	10m - 49m	≥50m
Juvenile Eel	≤3m	4m - 6m	7m - 29m	≥30m
1.0 = Not an obstacle to passage				
0.6 = Partial low impact obstacle, significant impediment but most of the populations (e.g. greater than two thirds of the population will pass eventually)				
0.3 = Partial high impact obstacle, significant impediment but some of the population (eg. Less than one third of the population will pass eventually)				
0 = Impassable, complete obstacle to fish movement				

control structure will have a total effective length of 20m, with the culvert making up 4m of this effective length. Water will pool upstream of the culvert, creating a functionally passable depth for fish over the 8m of rip rap present instream before entering the culvert. The water depth through the structure and over the downstream rip rap has not been modelled, however the culvert will be placed at bed level and water depths within the culvert are expected to be approximately equivalent to standard streams depths. If the water depth over the rip rap downstream of the culvert is reduced due to a gradient, this section will contribute to the effective length of the obstacle. The combined length of the culvert and downstream rip rap section is approximately 12m. The proposed culvert and associated rip rap will be a low impact partial barrier for adult salmonid passage, and a high impact partial barrier for juvenile salmonids,

cyprinids, adult lamprey and juvenile eel as derived from the effective length passability scores set out in the SNIFFER Manual: WFD111 (2a) Coarse resolution rapid-assessment methodology to assess obstacles to fish migration (2010). This is summarised in Table 6-1below.

Table 6-1: Summary of the effective length passability score of an obstacle (e.g. culvert) for different fish species

The creation of a flood storage system in Glenavon Park may alter ground water flow regimes within the vicinity of Glenavon Park. In the absence of appropriate mitigation measures, the design of this flood storage area may contribute to lower flow water levels within the river during drought conditions.

A number of upgrades to trash/debris screens are recommended as part of the FRS. Inappropriate design of these screens can result in restrictions to fish passage.

In the absence of appropriate mitigation measures the accumulative impacts of the proposed schemes design will have a **moderate residual impact on the depositing/lowland river habitat within the scheme, which is of moderate significance.** Consequently, residual impacts on habitat connectivity and changes to the streams hydromorphology will have a **moderate residual impact of slight significance on fish species.**

6.4.2 Otter

Otter frequent the Deansgrange Stream while commuting and foraging. In the absence of appropriate mitigation measures, inappropriate design of the trash/debris screens along the Deansgrange Stream may result in disrupted access to commuting routes along this important wildlife corridor. This would result in a **minor residual impact of slight significance for this species.**

The construction of flood relief walls upstream of Killiney Hill Road Bridge may result in a small degree of habitat disconnect for Otter, however these walls will also provide a degree of shielding from human disturbance along this section of the stream once constructed. The impact of this wall on habitat connectivity for Otter is considered negligible, however the previously discussed impact of Otter as a

result of the vegetation and tree removal associated with the construction of these walls remains present in the absence of appropriate mitigation measures.

6.4.3 Terrestrial Mammals (Badger; Pygmy Shrew; Red Squirrel and European Hedgehog)

Most of the proposed infrastructure associated with the FRS will not impact on these species. The newly constructed swales and earthen banks in Glenavon park may provide additional habitat for these species and, in the absence of appropriate mitigation measures will have a negligible positive impact.

The proposed flood relief walls upstream of Killiney Hill Road Bridge may restrict access to the greenfield site in this area from the wildlife corridor along Deansgrange Stream. This site is still accessible from the western boundary of the greenfield site. This impact is considered negligible. The residual impact of removing vegetation and trees associated with the construction of these walls remains present in the absence of appropriate mitigation measures.

6.5 Summary

The following potential significant impacts have been identified below, while the necessary mitigation is discussed in the next chapter:

Construction Phase:

- Pollution of those aquatic habitats associated with the Deansgrange Stream including reed and large sedge swamps/ tall herb swamps and depositing/lowland rivers as well as the protected species they host (ie. Otter, fish, amphibians, waterfowl etc.).
- Degradation of treeline habitats through root severance, resulting in tree death and removal, reducing nesting and foraging opportunities for local breeding bird species, removal of potential bat roosts and degradation of the wildlife corridor used by protected mammals in the area.
- General disturbance of commuting, foraging and roosting /nesting / denning habitat for ground-dwelling mammals; bat species; breeding and wintering birds; and amphibians, as well as potentially accidental fatal entrapment for these faunal groups.

Operational Phase

- Alteration to the hydromorphology of the stream, permanently impacting on the depositing/lowland river habitat and fish species within the stream.

The mitigation is based on existing guidance documentation and where necessary additional mitigation is proposed to reduce the impacts identified above.

7 Mitigation

The following mitigation is recommended to ensure that the proposed works do not adversely impact on the ecological receptors outlined in Section 5.

Mitigation measures for anticipated impacts on designated sites and ecological features are outlined below.

7.1 Mitigation for Project Construction Phase

The activities of the project for the construction phase shall remain within the areas described in the buildability report accompanying this report. Site compound areas are also described in this report and are often situated in nearby amenity greenspaces. Within the area of works, the mitigation measures outlined below shall be implemented.

A Construction and Environment Management Plan (CEMP) will be submitted to Dun Laoghaire Rathdown County Council for agreement prior to site works commencing. This CEMP will incorporate the mitigation measures listed here and within the preliminary CEMP accompanying this EcIA .

- The CEMP will also strictly adhere to best practice environmental guidance including but not limited to the following:
- CIRIA Guidance C532 Control of water pollution from construction sites. Guidance for consultants and contractors. (CIRIA, 2019 - www.ciria.org);
- CIRIA Guidance C741: Environmental good practice on site guide (Charles & Edwards, 2015; CIRIA, 2019 - www.ciria.org);
- CIRIA Guidance C750D: Groundwater control: design and practice (Preene et al., 2016; CIRIA, 2019 - www.ciria.org);
- Inland Fisheries Ireland (2016) Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters;
- Inland Fisheries Ireland (2020) A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning

Construction method statements will be submitted to Dun Laoghaire Rathdown County Council for agreement prior to site works commencing.

7.1.1 Construction Environmental Management Plan (CEMP)

A preliminary CEMP has been developed alongside this EcIA to manage construction works in such a way so that any impacts related to construction are appropriately mitigated.

This preliminary CEMP includes all of the mitigation and enhancement measures set out in the EcIA, Landscape Rationale and Arboricultural Assessment, however it is the responsibility of the appointed contractor to develop a final CEMP which incorporates all of these measures in association with the final Construction Methodology Report for the proposed Scheme. There are a number of requirements for this final CEMP to ensure compliance with this EcIA and the preliminary CEMP

The Final CEMP will include input from a suitably qualified ecologist for biodiversity elements and will include the following:

- The CEMP will be developed in full consultation with and approval of Inland Fisheries Ireland and the DLRCC Biodiversity Officer. This should be from the onset of design.
- Monitoring schedule and reporting will be provided for agreement with DLR's Biodiversity Officer
- A detailed programme for monitoring mitigation and enhancement measures, for agreement with the Planning Authority
- The CEMP will include all provisions made within DLRCCs Invasive Species Management Plan for the Deansgrange subcatchment

  A suitably qualified project ecologist (PE)/ ecological clerk of works (ECoW) will be retained to ensure that the necessary measures of the CEMP and EcIA are implemented. The necessary responsibilities of the ECoW is set out below.

7.1.2 Ecological Clerk of Works (ECoW)

An ECoW will be appointed by the contractor to ensure compliance with measures set out in the EcIA and the CEMP. This ECoW will have the following roles:

- Act as the contact for the Planning Authority and agree the frequency and number of site inspections and monitoring programme for the implementation of the biodiversity related mitigation of the EcIA and CEMP.
- Act as the primary on-site ecological contact for the main contractor and site manager regarding implementation of the Biodiversity related mitigation of the EcIA and CEMP.
- Ensure compliance with all Biodiversity related mitigation of the EcIA and CEMP;
- Request relevant records and documentation from the Site Manager where necessary
- Attend routine meetings with the site manager;
- Keep detailed records of any ecological incidents and the remedies required and implemented. Report these to the main contractor and Planning Authority;
- The ECoW shall produce the staged monitoring reports in agreement with the Planning Authority on the implementation of Biodiversity related mitigation of the EcIA and CEMP. The ECoW shall submit these directly to the Planning Authority and to the principle contractor
- The ECoW shall also act as overall technical advisor to the principle contractor and site manager regarding the implementation of all Biodiversity related mitigation of the EcIA, and CEMP, and also the objectives of any relevant INNS management plan.

7.1.3 Compound

- The compound will be sited at least >50m away from the Deansgrange Stream within and bordering the site, in order to minimise any potential impacts.
- Only plant and materials necessary for the construction of the works will be permitted to be stored at the compound location.
- Site Security to restrict unauthorized entry;
- Bunded storage of fuels and refuelling area. Bunds shall be 110% capacity of the largest vessel contained within the bunded area.
- A separate container will be located in the Contractors compound to store absorbents used to contain spillages of hazardous materials. The container will be clearly labelled, and the contents of the container will be disposed of by a licenced waste contractor at a licenced site. Records will be maintained of material taken off site for disposal.
- A maintenance programme for the bunded areas will be managed by the site environmental manager. The removal of rainwater from the bunded areas will be their responsibility. Records will be maintained of materials taken off site for disposal.
- The site environmental manger will be responsible for maintaining all training records.
- Drainage collection system for washing area to prevent run-off into surface water system.
- All refuelling of vehicles will be carried out at the fuel stores within the main site compound and only ADR trained personnel will be permitted to operate fuel bowsers.
- Lighting should be restricted wherever possible to appropriately cowled security lighting, or preferably none at all.

7.1.4 Water Quality

Relevant legislation and best practice guidance that have been considered includes but not limited to the following:

- Water Framework Directive (2000/60/EC);
- European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009;
- Local Government (Water Pollution) Acts 1977-1990;
- CIRIA C532 *Control of water pollution from construction sites*. Guidance for consultants and contractors. (www.ciria.org);

- CIRIA Guidance C750D: *Groundwater control: design and practice* (Preene *et al.*, 2016) (www.ciria.org);
- Inland Fisheries Ireland (2016) *Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters;*
- Inland Fisheries Ireland *(2020) A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning*
- CIRIA C515 Groundwater control – design and practice, 2nd ed. (CIRIA, 2021 - www.ciria.org)
- CIRIA Guidance C741: *Environmental good practice on site guide* (Charles & Edwards, 2015; CIRIA, 2020 - www.ciria.org)

To prevent watercourse pollution:

- Adoption of a surface water plan including appropriate barrier controls to prevent any polluted surface water from the proposed works reaching the Deansgrange Stream.
- Minimise area of exposed ground by maintaining existing vegetation in vicinity of site compound.
- Oil booms and oil soakage pads should be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. These shall be disposed of correctly and records will be maintained by the environmental manager of the used booms and pads taken off site for disposal.
- Fail-safe site drainage and bunding through drip trays on plant and machinery will be provided to prevent discharge of chemical spillage from the sites to surface water.
- Any accidental discharge will be controlled by use of oil booms in the water prior to construction starting.
- Phased installation of silt fences (see Figure 7-1) along the lengths of the site boundary where excavation works are taking place away from the stream. Specific measures must be followed for instream works, described below. The measures must be taken prior to performing excavations on-site, in order to prevent any uncontrolled flow of surface water run-off (with high sediment loading) from the site into the stream. This must be completed prior to performing any movement of soil or excavations on-site, in order to prevent any uncontrolled flow of surface water run-off (with high sediment loading) from the site into the Deansgrange Stream.
- The precise locations of silt fences must be mapped after the detailed design stage of the scheme and published as an appendix in the schemes CEMP.
- Where silt fences cannot be erected due to the presence of hardstanding, geotextile sandbags (triple layered) must be installed . This must be completed prior to performing any movement of soil or excavations on-site, in order to prevent any uncontrolled flow of surface water run-off (with high sediment loading) from the site into the Deansgrange Stream.
- An Ecological Clerk of Works (ECoW) will inspect the structural integrity of the silt fences/ geotextile sandbags once installed; following this the ECoW will check these silt fences monthly until the end of the construction phase. The positioning and installation of silt fences will be done to ensure that the stream banks are not compromised or fragmented and will not result in causing the slumping of the stream banks

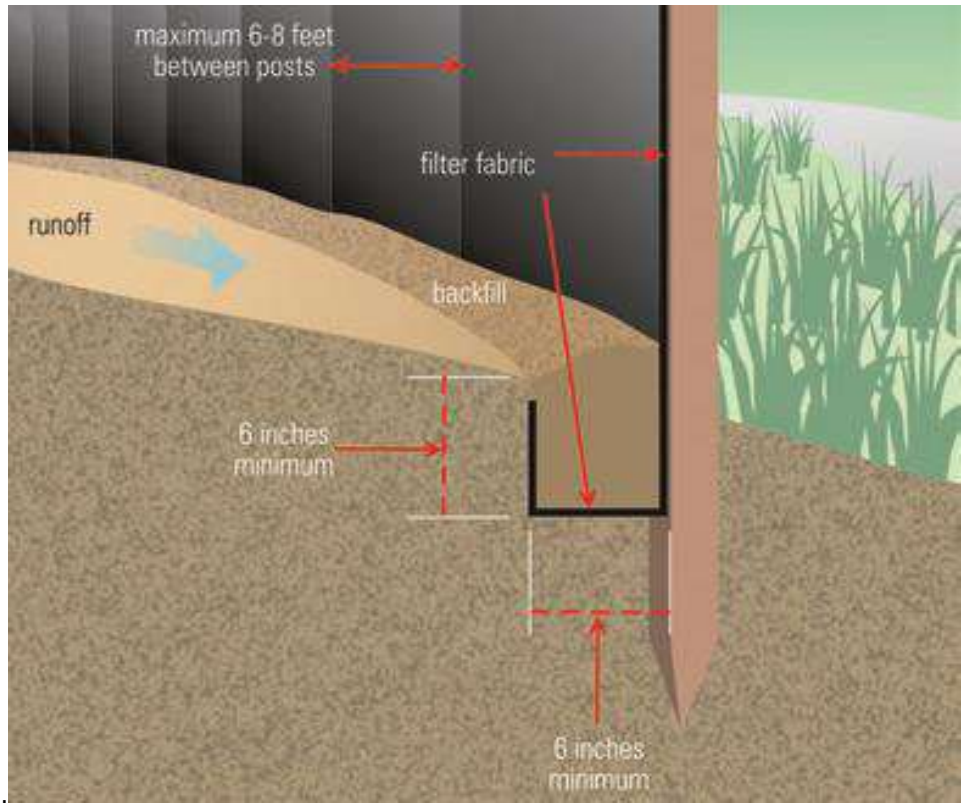


Table 7-1: Example of suitable silt fence mitigation ensuring maximum safeguarding efficiency

7.1.5 Instream Works

The following measures should be incorporated into a final CEMP for the project which is required in advance of works after detailed design of the proposed infrastructure is complete. This CEMP should inform the Construction Methodology document. All instream works should be approved by Inland Fisheries Ireland and overseen by an Ecological Clerks of Works for its duration. All instream works will follow guidance in:

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

In order to facilitate instream works, water must be diverted from the works area. This must be achieved through a stream diversion and not overtop pumping in order to retain habitat connectivity for the duration of works. Stream diversions are required at Granville Road and at Glenavon Park, details of which will be published during the detailed design phase. New connections with the Deansgrange Stream are required for the new Seafield culvert overflow, however this work will not require a stream diversion.

7.1.5.1 **Stream diversions**

These recommendations as well as any other recommendations that come as a result of consultation with IFI should be detailed in the CEMP and referred to in the Construction Methodology report prior to any works commencing. All stages of the stream diversion should be overseen by an ECoW who will monitor all stages of instream works, with regular reporting to the DLRCC Biodiversity Officer and Inland Fisheries Ireland.

Wherever possible, habitat connectivity should be retained during the proposed works. The use of a three side coffer dam to facilitate works should be considered as a favoured methodology in order to maintain flow within the natural course of the river. If instream works require dry celling of the stream width to create a dry bed for construction works, river connectivity should be maintained and water pumping avoided, the stream should be temporarily diverted into a temporary stream bed which maintains connectivity downstream. This temporary stream diversion should be constructed in advance of drying, the temporary riverbed should be made of compacted soil lined with Terram geotextile up to the banks. Appropriate gravels and boulders (in line with local bedrock type present in the stream)

should be placed overtop the Terram geotextile. Both ends of the temporary diversion should be disconnected from the stream with a geotextile Terram lined sheet piling in advance of connection. The temporary diversion should be opened in tandem with the closure of the works area, described below.

A full description of the diversion should be set out in the CEMP and a construction methodology submitted to IFI and DLRCC in advance of works.

7.1.5.2 Installation of Sheet Piling (temporary coffer dam); Cement Pours; and Silt Fence Functionality Checks

In order to ensure the safeguarding of the Deansgrange Stream as well as downstream habitats which support a variety of protected species; the presence of an Ecological Clerk of Works (ECoW) will be required during the installation of the sheet piling within the stream and the upstream and downstream boundaries of the zone of works. The precise location of these temporary dry cell areas (coffer dam) should be set out in the CEMP following detailed design.

Dewatering of the proposed coffer dam and/or dry cell area, will require installation of sheet pilings between the bank and the area of works. Water should be introduced back into the river only after suspended sediment has settled and/or filtered from the water. The methodology for this water reintroduction should follow best practice guidance as set out by the contractor and ECoW in the final CEMP, which should be approved by IFI and DLRCC. One approved method involves pumping water into a settling pond more than 30m from the pond before slowly spilling the water through silt bag traps into a discharge point located on the edge of the Deansgrange stream. The discharge point will consist of a circle of triple silt fences surrounding a circle of straw bales wrapped in Terram geotextile. All waters pumped from the dry cell area will first settle within the pond and then filter though the silt bag, straw bales and silt fences before diffusely discharging back into the river. The discharge points will be constructed prior to commencement of construction works and will be monitored on a daily basis when in use to ensure that the release of any polluting material is mitigated. These works will need to be scheduled for a dry weather period, as heavy rains during these works will compromise the absorption ability of the discharge point. Should any aquatic fauna enter the dewatering system or become trapped in the dry cell area, the ECoW will be there to secure them and ensure their safe return to the Deansgrange stream.

The ECoW will also be present during any phase of the project which involves the pouring of cement within 10m of the Deansgrange Stream, in order to safeguard the stream during the proposed works by identifying any arising ecological issues during these works. The ECoW at these times will also conduct a structural integrity check on the silt fence and geotextile sandbag buffers installed within the zone of works. The ECoW will recommend works cease if they are not satisfied the appropriate mitigation measures have been put in place.

All instream works should be conducted between July and September inclusive as per IFI recommendations.

7.1.6 Specific Mitigation for works upstream of Killiney Hill Road Bridge

For the construction of the flood relief wall upstream of Killiney Hill Road Bridge, works will be in close proximity to the tree line and the Deansgrange Stream. These works will require excavation of a series of slit trenches to allow for the foundation of these walls. This report looks at the worst-case scenario for the treeline on site, where provision of the trees is not successful. All efforts to retain these trees should be made in order to have smallest possible impact on this habitat. To achieve this, an arborist must be on site to supervise excavation and provide insight into the root protection and avoidance during construction. The following measures should be followed in advance of excavation and throughout the works:

- An Ecological Clerk of Works must supervise all removal of vegetation on site in advance of construction works. The ECoW should survey the bankside of the stream to determine if any new indications of protected mammals are present.
- A qualified arborist must be on site to supervise all stages of excavation inside the Root Protection Area of the treeline. The arborist will have authority to stop works at any point and should provide insight into root structure and placement of piles to avoid roots in the area. If required, the arborist will recommend crowning and best removal of tree limbs to avoid tree loss.

- If tree loss is unavoidable works must be stopped, a full assessment of trees to be removed will be required as well as an assessment on the bank stability, looking specifically at the link between the tree roots and how they support the bank.
- If the trees can be removed without disrupting bank stability, ivy must be removed in advance of tree cutting in order to uncover any potential roosting features obscured by Ivy. This work should be conducted collaboratively between a tree surgeon and ECoW on site.
- If Ivy removal uncovers a potential roost, an inspection of the roost and assessment of impact will be required. If a roost is present a derogation licence is required in advance of tree removal.
- In the absence of potential roost features, the tree can be removed. Removal should take place outside of the breeding bird season (1st of March to 31st of August inclusive).
- A silt trap (as described above) should be placed along the bank of the stream to prevent any sediment resulting from excavations entering the stream. A geotextile sealed lining should be placed within trenches and piled excavations before any concrete is poured for foundations.

7.1.7 Concrete Management Procedures

Concrete will be used for formation of a number of construction elements (e.g., foundations for infrastructure and piling). The following measures will be implemented to prevent liquid concrete/cement entering the surface water systems, i.e., Deansgrange Stream.

- Concrete delivery, concrete pours and related construction methodologies will be part of the procedure agreed with the contractor to mitigate any possibility of spillage or contamination of the local environment. Particular attention will be paid during the pouring process in order to avoid leakages or spills of concrete.
- Washout of concrete plant will occur off site at a designated impermeable area with waste control facilities.
- Raw, uncured or waste concrete will be stored appropriately prior to disposal by licenced contractor.
- The contractor's construction methodology will require the use of precast elements where practical; the use of secondary protection shuttering for concrete pours; all pours to be carried out in dry weather conditions; and that all trucks be cleaned prior to leaving respective depots and on-site compound.
- The contractor will be required to use experienced operators for the work; provide an appropriate level of continuous monitoring during any concrete pours by experienced management; and have method statements approved by DLRCC prior to commencing works. Works will be carried out using recommendations from current guidance and relevant codes of practise as outlined in EA (2011) - *Managing concrete wash waters on construction sites: good practice and temporary discharges to ground or to surface waters*.

7.1.8 Pollution Control and Spill Prevention

Spill kits containing absorbent pads, granules and booms will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and site foremen's vehicles will carry large spill kits at all times. Absorbent material will be used with pumps and generators at all times and used material disposed of in accordance with the Waste Management Plan. All used spill materials e.g., absorbent pads will be placed in a bunded container in the contractor's compound. The material will be disposed of by a licenced waste contractor at a licenced facility. Records will be maintained by the environmental site manager.

Regular inspections and maintenance of plant and machinery checking for leaks, damage or vandalism will be made on all plant and equipment.

In the event of a spill the Contractor will ensure that the following procedure are in place:

- Emergency response awareness training for all Project personnel on-site works.
- Appropriate and sufficient spill control materials will be installed at strategic locations within the site. Spills kits for immediate use will be kept in the cab of mobile equipment.
- Spill kits will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and site vehicles will

carry spill kits at all times. Spill kits must include suitable spill control materials to deal with the type of spillage that may occur and where it may occur. Typical contents of an on-site spill kit will include the following as a minimum:

- Absorbent granules;
- Absorbent mats/cushions;
- Absorbent booms
- Track-mats, geotextile material and drain covers.

- All potentially polluting substances such as oils and chemicals used during construction will be stored in containers clearly labelled and stored with suitable precautionary measures such as bunding within the site compound.
- All tank and drum storage areas on the site will, as a minimum, be bunded to a volume not less than the following:
  - 110% of the capacity of the largest tank or drum within the bunded area, or
  - 25% of the total volume of substances which could be stored within the bunded area.
- The site compound fuel storage areas and cleaning areas will be rendered impervious and will be constructed to ensure no discharges will cause pollution to surface or ground waters.
- Designated locations for refuelling are within Site Compound.
- Potentially contaminated run off from plant and machinery maintenance areas will be managed within the site compound surface water collection system.
- Damaged or leaking containers will be removed from use and replaced immediately

7.1.9 Dust and Noise Minimisation

The construction of the development will largely be limited to daylight hours where possible, ensuring minimum disturbance to commuting and foraging activities of local wildlife. The works will also be temporary. With regard to construction activities, reference will be made to BS 5228-1, which offers detailed guidance on the control of noise from demolition and construction activities. A variety of practicable noise control measures will be employed. These include:

- Erection of barriers at construction works boundary as necessary and around items such as generators or high duty compressors.
- Limiting the hours during which site activities likely to create high levels of noise are permitted. Construction activities will take place Monday to Friday, between 07:00 and 18:00, and on Saturdays, between 08:00 and 13:00.
- A site representative responsible for matters relating to noise will be appointed to liaise with DLRCC.
- The implementation of a quiet plan, where the least noisy tools will be selected wherever possible, and units be supplied with manufacturers' proprietary acoustic enclosures where available.
- The use of machinery for lifting bulky items, dropping, and loading of materials within work areas should be restricted to normal working hours.
- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should be switched off when not in use and not left idling.
- For compressors, generators, and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site, as necessary.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.
- Care will be taken when cleaning augers of piling rigs. Shaking and banging of the auger to loosen earth will be avoided.

- Use of pneumatic hand tools will be avoided at night-time and fixings should be manually tightened where possible.
- Works involving piling such as those in close proximity to Killiney Bay, should be achieved in consideration of noise reduction where the least noise producing option is the preferred option.

Additional guidance relevant to acceptable vibration and noise levels will be followed and is contained in the following documents:

- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.
- British Standard BS 5228-2: 2009: Code of Practice for Noise and Vibration Control on Construction and Open Sites: Vibration.
- NRA: 2014: Guidelines for the Treatment of Noise and Vibration in National Road Schemes.

To minimise the dispersion of airborne pollutants in the form of dust the following mitigation measures should be followed:

- Spraying of exposed earthwork activities and site haul roads during dry weather;
- Provision of wheel wash at exit points;
- Covering of stockpiles;
- Control of vehicle speeds and vehicle access; and sweeping of hard surfaced roads;
- Erection of a 2.4m high hoarding will be provided around work areas where allowable to minimize the dispersion of dust from working areas;
- Stockpiles will be located as far away as possible from sensitive receivers and covered/dampened during dry weather;
- Generators will be located as far away as practicable from sensitive receivers;
- On-site and delivery vehicles will be prevented from leaving engines idling, even over short periods. This is to prevent the harmful emissions from vehicle exhausts.

7.1.10 General Avoidance Measures

Although it has been identified that there will be no permanent impact through disturbance to wildlife during the work, it is advised that general avoidance measures be undertaken to protect wildlife while the works are being carried out.

General avoidance measures that should be incorporated by the contractors working on site include:

- Limit the hours of working to daylight (including twilight hours), to limit disturbance to nocturnal animals;
- Due to the potential presence of Badger, Hedgehog, Otter, bat species and Common Frog the use of lighting at night should be avoided. If the use of lighting is essential, then a directional cowl should be fitted to all lights to prevent light spill and to be directed away from all treelines / wooded areas;
- Contractors must ensure that no harm comes to wildlife by maintaining the site efficiently and clearing away materials which are not in use, such as wire or bags in which animals can become entangled; and
- Any pipes should be capped when not in use (especially at night) to prevent local fauna becoming trapped. Any excavations should be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank should be placed to allow animals to escape.

7.1.11 Mitigation for clearance of the vegetation

The clearance of scrub, hedge or tree vegetation is to be conducted outside of the breeding bird season (March – August inclusive). If this is not possible, a breeding bird survey by an appropriately qualified ecologist will be undertaken in advance of the works to ensure that there will be no impacts on nesting birds. If nests are found, they will be safeguarded, with an appropriate buffer, until the chicks have

successfully fledged. The removal of scrub in the vicinity of works proposed at the Seafield Culvert Overflow should be limited to the minimum removal required. Removal should be conducted in such a way that mature plants should be cut back but not entirely removed so that recolonisation of the scrub habitat after completion of works can be hastened.

7.1.12 Mitigation relating to works in close proximity to birds' nests.

A survey of the nest located at the pedestrian access bridge south of Abberley should be conducted in advance of all instream works relating to the installation of the new Trash Screen. Works should be restricted to the last few months of the IFI instream works season (August or September), preferably in September when there is a higher likelihood that birds have fledged the nest.

7.1.13 Invasive species management

DLRCC currently have a Invasive Species Management Plan for a number of species along the Deansgrange stream that were deemed problematic (ie. Japanese Knotweed). Works conducted on site should not interfere with the objectives of this plan, and should works come in close proximity of managed plots, the Ecologist in charge of DLRCC Invasive Species Management Plan should be consulted.

Winter Heliotrope grows in abundance along sections of the banks in Glenavon Park. Prior to clearance of vegetation and the commencement of works in the area, any Winter Heliotrope or other encountered INNS should be removed and appropriately disposed of to avoid further dispersal of the species. Winter Heliotrope should be physically removed with topsoil and vegetative roots intact and disposed of in a controlled manner following NRA guidance; The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2010). Soils containing the plant are classified as controlled waste and should be disposed of at licensed landfill. The optimal time for removal is in early spring when the surface vegetation is most visible. If reoccurrence occurs post work, follow-up treatment will be carried out with foliar spray, wiper applicator or spot treatment.

Biosecurity awareness training should be conducted on site as a tool-box talk for any staff working on site and if any INNS is uncovered during the construction, works are to cease in the vicinity and the presence should be reported to the Ecological Clerk of Works who will devise management plan for removal.

7.1.14 Site lighting (Nocturnal species)

7.1.14.1 Hours of illumination during construction:

Site lighting should be switched off during inactive construction site hours; this would benefit the bats foraging and/or commuting in the locality.

7.1.14.2 Light levels and type:

Construction works should be restricted to daylight hours. If construction works are required during night hours, resulting in the requirement for lighting, the appointed ECoW should be consulted in advance and relevant site-specific mitigation measures should be enacted. These measures iclude (but are not limited to) the following measures.

Construction site lighting that meets the lowest light levels permitted under health and safety would be preferable for bats in the vicinity. The specification and colour of light treatments, such as single bandwidth lights and no UV light are essential. LED luminaires are ideal and should be used where possible due to their sharp cut-off, lower intensity, and dimming capability. A warm white spectrum (2700K – 3000K) should be used in the lighting located along the boundaries of the site to reduce the blue light component

7.2 Mitigation for Operation Phase

7.2.1 FRS Structure Design

Culverts placed within the stream should be in line with recommendations set out in IFIs recommendations (IFI 2016).

- A gradient of 5% should never be exceeded, with 3% being the preferred upper limit
- Be positioned such that both the upstream and downstream invert shall be 500mm below the upstream and downstream riverbed invert levels respectively
- Piped culverts should be avoided wherever possible, with inverted U shape or box culverts over the existing stream bed being the preferred option. If a piped culvert is required at the detailed design stage, consultation should be made with IFI to avoid unnecessary impacts.
- Pools should be formed at each end of the culvert to provide transition from the shape of the opening to the shape of the river downstream. Pools should, ideally, be built in natural rock and be designed to provide take-off conditions for upstream migrants entering/ leaving the culvert.
- Maximum flow velocities of 1.5 – 2.0 for coarse fish, 2.0-2.4 for trout and 3.0-3.5 for salmon
- Power densities of up to 100-150Wm3 for trout and 150-200Wm3 for salmon.
- Head drops should be avoided during detailed design, but if absolutely required a maximum head drops of 0.1m can be permitted

Trash screens on site should be adequately spaced to approximately 230mm to allow for fish passage and safe passage of Otter. Mesh screens should be avoided.

7.2.2 Remedial / Supplementary Tree Planting Enhancement - Killiney Hill Road Bridge

If any trees require removal upstream of Killiney Hill Road Bridge, remedial planting should take place after the walls are constructed. These species should be native only. Some potential species to be planted and their benefits are listed below, large trees with particularly extensive root systems have been excluded from this list to avoid complications with the flood relief wall.

- **Alder** *Alnus glutinosa* - Supports diverse insect life, supplying local birds and bats with prey.
- **Silver Birch** *Betula* pendula - Supports numerous moth species supplying bats with prey. This species is also preferred by Greater Spotted Woodpecker for nest building. While not recorded in locality, this species range is expanding quickly in eastern Ireland. This has knock-on benefits for Red Squirrel and bats species which occupy abandoned nests.
- **Bird Cherry** *Prunus padus* - The flowers support numerous pollinator species, while the fruits are often consumed by small mammals and bird species.
- **Hazel Corylus** *avellana* - Provides food for the caterpillars of moths, suppling local birds and bats with prey. Additionally, hazelnuts are eaten by Wood Pigeon and small mammals.
- **Holly** *Ilex aquifolium* - Provides dense cover and good nesting opportunities for birds, while its deep, dry leaf litter may be used by Hedgehogs and small mammals for hibernation. Also supports pollinator species providing prey for bats and birds. Its berries are also an important food source for birds in the winter.
- **Rowan** *Sorbus aucuparia* - Supports diverse insect life, including pollinator species like bees and moths, supplying local birds and bats with prey. The berries also provide food for wintering Redwing, which have been recorded on the site.
- **Goat Willow** *Salix caprea* - Supports diverse insect life, suppling local birds and bats with prey. Generally preferred by a number of bird species for nesting.
- **Scots Pine** *Pinus* sylvestris - Preferred by Red Squirrel for building dreys. While not recorded in the locality the presence of mature Scots Pine will provide the means for Red Squirrel populations to re-establish themselves within the area.
- **Hawthorn** *Crataegus monogyna* - Supports a wide variety of invertebrate life, including pollinators. The haws it produces are eaten by small mammals and wintering birds such as Redwing.
- **Elder** *Sambucus nigra* - Provides food for the caterpillars of moths, suppling local birds and bats with prey. Additionally, the berries are eaten by a range of birds and small mammals.

7.2.3 Wetland habitat creation at Glenavon Park

The flood relief detention basins proposed for construction in Glenavon Park will be managed as wetland habitat. A Landscape Management Plan for the site which accompanies this report (Appendix C) will provide a multifunctional landscape that acts as a biodiversity hotspot along the green corridor of Deansgrange Stream, while also providing flood relief measures. This wetland habitat will be offline from the main Deansgrange channel, only connecting at a downstream storm water opening to the Deansgrange Stream.

The basins will be split into two sections, one upper and one lower. The upper section will have two ponds connected to a surface water inflow pipe running under the Deansgrange Stream from a nearby housing estate. The bottom section will include one large pond connected to the upper ponds via a interconnected pipe and swale mechanism. Water from the ponds will drain into th e Deansgrange Stream, upstream of the proposed flow control structure

These ponds will be planted with native wetlands species that can withstand seasonal changes in water level and will be bounded by a fence and native hedgerow to lessen disturbance in the area. This fence and hedgerow should have gaps of approx. 30cm x 40cm to allow for mammals to access the ponds. The site will be planted with wildflower meadows using green hay from nearby Fernhill and Shanganagh wildflower meadows. Additional trees will be planted on site which will exceed the number of trees that may require removal. These trees will be native and will be planted along a gradient habitat type, with those species tolerant to wet conditions planted closer to the ponds, and those that favour dry conditions planted away from areas that will be flooded.

This wetland will provide additional habitat to a range of species found along the Deansgrange Stream wildlife corridor such as mammals, amphibians, bats and breeding/wintering birds.

8 Residual Impact

Residual ecological impacts are those that remain once the development proposals have been implemented. The main aim of ecological mitigation, compensation and enhancement is to minimise or eliminate residual impacts.

8.1 Construction Phase

Preparatory and construction works may result in the removal of a treeline upstream of Killiney Hill Road Bridge, which will have a **moderate residual impact of slight significance on this habitat** once this area has been replanted as recommended in the mitigation measures. This will consequently have a **moderate residual impact of slight significance for bats.**

The proposed flood alleviation works will result in **a very temporary minor impact of slight significance for fish and the depositing/lowland river habitat** during the initial redirection of the stream to allow for proposed instream construction works.

Implementation of mitigation measures during the construction phase, along with good site management and construction practices will help to minimise any significant and/or permanent impact on the environment. This will be included in a Construction Environmental Management Plan (CEMP). Included in this will be best practice measures for visual and audible disturbance, as well as control of surface, groundwater and dust emissions, which will minimise any significant impact on the surface water and groundwater systems (including those within the dust settlement zone) and the species reliant on them.

8.2 Operational Phase

The proposed piped section of channel under the instream flood control device at Glenavon Park will have a **minor residual impact of slight significance** for local fish species within the stream, as it is an obstacle for fish passage. Placing infrastructure instream will also result in a negative impact to the hydromorphology of the stream, resulting in a **minor residual impact to the depositing/lowland river habitat**.

The creation of wetland habitat on site will have a positive residual impact on fauna on site, as well as providing diverse habitat along the route of the Deansgrange wildlife corridor.

9 Summary of Impact Assessment

9.1 EcIA Table

Table 9-1 presents a summary of the impacts envisaged when mitigation measures are included. Residual impacts are also described.

All other ecological impacts can be avoided, mitigated or compensated so there is no anticipated significant impact for the remaining species considered in the assessment

Table 9-1: Summary of Impacts; Mitigations; and Significance of Residual Impacts on ecological features

Ecological features	Impacts	Importance of features	Significance of impact without mitigation	Mitigation	Significance of residual impact
Dalkey coastal Zone and Killiney Hill	Accidental introduction of pollutants into the Deansgrange Stream and subsequently degrading the habitat in close proximity to the outfall of the Deansgrange stream	National	Temporary minor impact of moderate significance	Strict adherence to mitigation measures set out in Sections 7.1.1 – 7.1.8 pertaining to the protection of the watercourse and pollution prevention	Negligible significance
Shingle and gravel banks (CB1)		International	Temporary minor impact of moderate significance		Negligible significance
Dry meadows and grassy verges (GS2)		Higher local	Temporary negligible impact of negligible significance		Negligible significance
Reed and large sedge swamps/	Accidental introduction of pollutants into the Deansgrange Stream and subsequently degrading the downstream habitat	County	High medium impact considered significant		Negligible significance
Reed and large sedge swamps/ Tall herb swamps (FS1/FS2)					
Shingle and gravel shores (LS1)	Accidental introduction of pollutants into the Deansgrange Stream and subsequently degrading the habitat in close proximity to the outfall of the Deansgrange stream	International	Temporary minor impact of moderate significance		Negligible significance

Ecological features	Impacts	Importance of features	Significance of impact without mitigation	Mitigation	Significance of residual impact
Depositing/lowland rivers (FW2)	Accidental introduction of pollutants into the Deansgrange Stream during construction works, degrading the habitat. Bank destabilisation as a result of tree removal at Killiney Hill Road Bridge. Temporary changes to habitat connectivity during construction Residual impacts to stream hydromorphology and habitat connecitvity as result of permanent instream structures.	County	High medium-term impacts of moderate significance during the construction phase Moderate residual impacts of moderate significance in the operational phase.	Strict adherence to mitigation measures set out in Sections 7.1.1 – 7.1.8 pertaining to the protection of the watercourse, pollution prevention and carrying out instream works safely. Follow appropriate instream structure designs as set out in Section 7.2.1	Negligible significance from the construction phase however there is a residual impact of slight significance in the operation phase due to the presence of an instream structure.
(Mixed) broadleaved woodland (WD1)	Impacts from airborne pollutants produced during construction work at Granville Road	County	Temporary minor impact of slight significance	Strict adherence to mitigation measures set out in Section 7.1.7 pertaining to the control of dust generated on site.	Negligible significance
Scattered trees and parkland (WD5)	Impact on groundwater via accidental release of pollutants, subsequently damaging trees. Potential removal of four trees on site	High local	Minor long-term impact of slight significance	Strict adherence to mitigation measures set out in Sections 7.1.1 – 7.1.8 on site pertaining to pollution control measures, site compound selection. Adherence to the Landscape management plan for the site requiring the planting of additional native trees	Negligible significance

Ecological features	Impacts	Importance of features	Significance of impact without mitigation	Mitigation	Significance of residual impact
Riparian Woodland (WN5)	Negligible Impacts from airborne pollutants	County	Temporary negligible	Strict adherence to mitigation measures set out in Sections 7.1.1 – 7.1.8 on site pertaining to pollution control measures, site compound selection.	Negligible Significance
Hedgerow (WL1)	Small impact resulting from limited removal of hedgerow to facilitate construction of a flood relief wall upstream of Killiney Hill Road Bridge.	High local	Temporary negligible impact of negligible significance	Strict adherence to measures set out in Section 7.1.4 and 7.2.2 detailing vegetation removal and remedial planting in this area	Negligible significance
Treelines (WL2)	Flood relief wall to be constructed inside of the Root Protection Area of the treeline upstream of Killiney Hill Road Bridge resulting in potential loss of trees.	High Local	Moderate long term impact of sight significance	Strict adherence to measures set out in Section 7.1.4 and 7.2.2 detailing vegetation removal and remedial planting in this area	Potential moderate residual impact of slight significance.
Scrub (WS1)	Direct removal of habitat to facilitate construction of the Seafield Culvert Overflow	High Local	Minor medium-term impact of slight significance.	Strict adherence to measures set out in Section 7.1.10 regarding scrub clearance.	Medium term minor impact of slight significance however scrub species in the vicinity will recolonise in time resulting in a residual impact of negligible significance.

Ecological features	Impacts	Importance of features	Significance of impact without mitigation	Mitigation	Significance of residual impact
Badger	Small reduction in foraging habitat and commuting connectivity in area around the treeline upstream of Killiney Hill Road Bridge. Disturbance from light and noise during construction.	County	Minor Temporary significance	Strict adherence to measures set out in Section 7.1.4 and 7.2.2 detailing vegetation removal and remedial planting in this area Mitigation measures set out in Section 7.1.7 regarding noise minimisation and Section 7.1.11 regarding light pollution	Negligible significance
Red Squirrel	Reduction in foraging habitat and commuting connectivity in area around the treeline upstream of Killiney Hill Road Bridge, which is already limited in the area for Red Squirrel Disturbance from light and noise during construction.	County	Minor residual impact of slight significance	Strict adherence to measures set out in Section 7.1.4 and 7.2.2 detailing vegetation removal and remedial planting in this area Mitigation measures set out in Section 7.1.7 regarding noise minimisation and Section 7.1.11 regarding light pollution	Minor residual impact of slight significance
Pygmy Shrew	Small reduction in foraging habitat and commuting connectivity in area around the treeline upstream of Killiney Hill Road Bridge. Disturbance from light and noise during construction. .	Higher local	Negligible significance	Strict adherence to measures set out in Section 7.1.4 and 7.2.2 detailing vegetation removal and remedial planting in this area Mitigation measures set out in Section 7.1.7 regarding noise minimisation and	Negligible significance
European Hedgehog		Higher local	Negligible significance		Negligible significance

Ecological features	Impacts	Importance of features	Significance of impact without mitigation	Mitigation	Significance of residual impact
				Section 7.1.11 regarding light pollution	
Otter	Accidental introduction of pollutants into the Deansgrange Stream during construction works, potentially resulting in a death of prey species and degradation of foraging/commuting habitat. Small reduction in foraging habitat and commuting connectivity in area around the treeline upstream of Killiney Hill Road Bridge. Disturbance from light and noise during construction.	County	Temporary moderate impacts of moderate significance	Strict adherence to mitigation measures set out in Sections 7.1.1 – 7.1.8 pertaining to the protection of the watercourse, pollution prevention and carrying out instream works safely. Strict adherence to measures set out in Section 7.1.4 and 7.2.2 detailing vegetation removal and remedial planting upstream of Killiney Hill Road Bridge Mitigation measures set out in Section 7.1.7 regarding noise minimisation and Section 7.1.11 regarding light pollution	Negligible Significance
Bats	Reduction in foraging and commuting habitat associate with the removal of the treeline upstream of Killiney Hill Road Bridge Removal of a potential roost in the worst-case scenario. Disturbance from light and noise during construction.	Higher local		Strict adherence to measures set out in Section 7.1.4 and 7.2.2 detailing vegetation removal and remedial planting in this area Construction of wetland habitat within Glenavon Park offering increased habitat for these species Mitigation measures set out	Positive residual impact to foraging habitat availability. Moderate residual impact of slight significance for bats overall, due to removal of potential roosting features (in the worst-case scenario)

Ecological features	Impacts	Importance of features	Significance of impact without mitigation	Mitigation	Significance of residual impact
				in Section 7.1.7 regarding noise minimisation and Section 7.1.11 regarding light pollution	
Breeding Birds	Disturbance from light and noise during construction. Disturbance to nests and foraging habitat.	Higher local	Minor temporary impact of slight significance. Minor temporary impact of slight significance.	Strict adherence to measures set out in Section 7.1.10 regarding vegetation clearance Mitigation measures set out in Section 7.1.7 regarding noise minimisation and Section 7.1.11 regarding light pollution	Positive residual impact
Riparian Birds		County		Construction of wetland habitat within Glenavon Park offering increased habitat for this species	Positive residual impact
Amphibians	Accidental introduction of pollutants into the Deansgrange Stream and subsequently degrading the habitat downstream of Granville Road and potentially killing amphibians or reducing vigour.	Higher local	High medium-term impact of moderate significance	Strict adherence to mitigation measures set out in Sections 7.1.1 – 7.1.8 pertaining to the protection of the watercourse, pollution prevention and carrying out instream works safely. Construction of wetland habitat within Glenavon Park offering increased habitat for this species	Positive residual impact
Fish	Accidental introduction of pollutants into the Deansgrange Stream during	County	High medium-term impacts of moderate significance during the	Strict adherence to mitigation measures set out in Sections 7.1.1 – 7.1.8 pertaining to	Negligible significance from the construction phase however there

Ecological features	Impacts	Importance of features	Significance of impact without mitigation	Mitigation	Significance of residual impact
	construction works, bank destabilisation, potentially resulting in a fish kill. Temporary changes to habitat connectivity during construction Residual impacts to stream hydromorphology and habitat connecitvity as result of permanent instream structures.		construction phase Moderate residual impacts of moderate significance in the operational phase.	the protection of the watercourse, pollution prevention and carrying out instream works safely. Follow appropriate instream structure designs as set out in Section 7.2.1	is a residual impact of slight significance in the operation phase due to the presence of an instream structure restricting fish passage.
Invasive Non-Native Species (INNS)	Spread of INNS	Third Schedule/ High Impact	Must be avoided as required by law	Strict adherence to mitigation measures set out in section 7.1.11 pertaining to invasive species management and biosecurity measures	No spread of INNS

9.2 Cumulative Impacts

As there are no significant residual impacts on ecological features (following mitigation measures) from this development, there is therefore no potential for other plans or projects identified in Section 5 to act in combination with it. Therefore, significant cumulative impacts are not expected to occur on the ecological features within the proposed site.

10 Conclusion

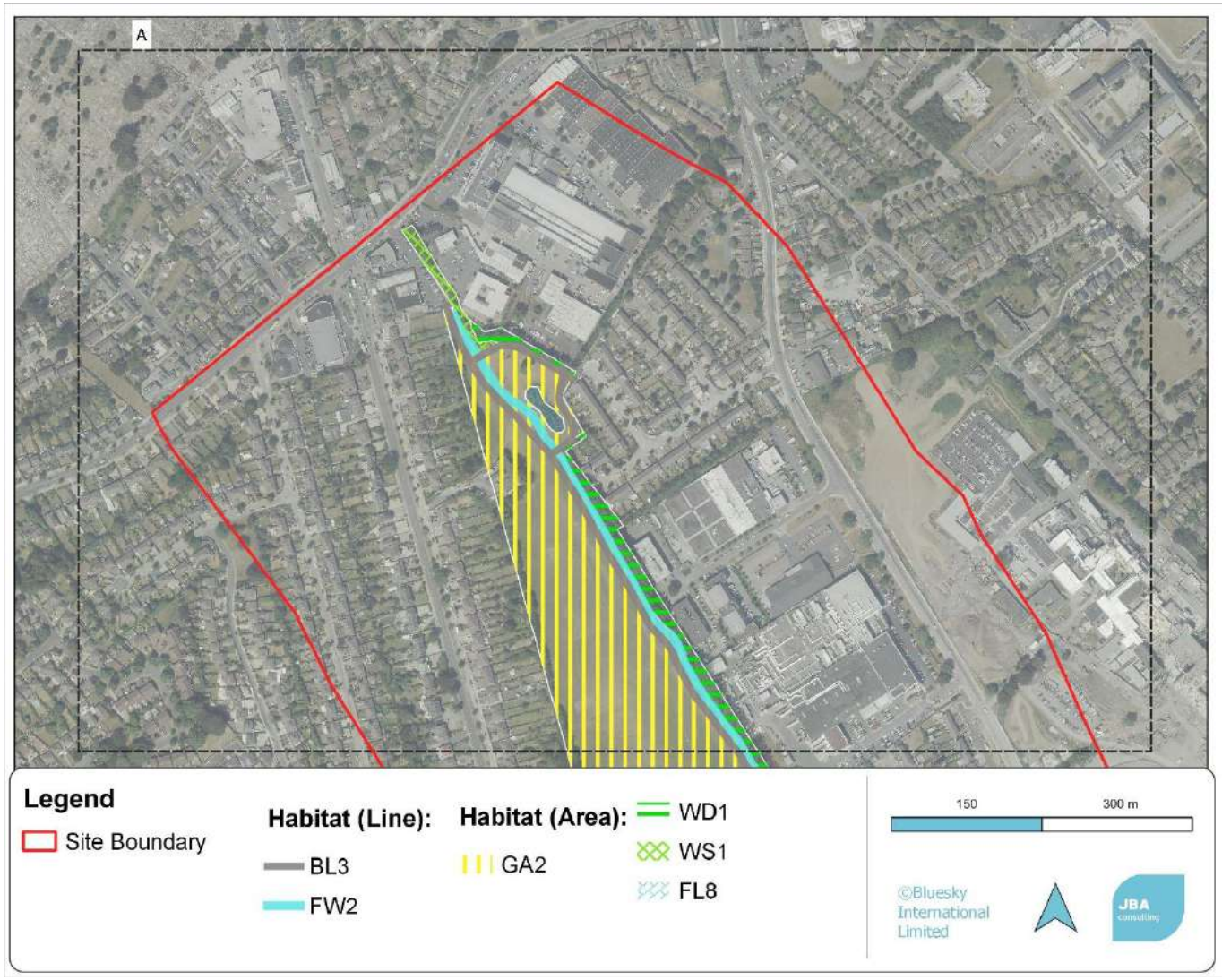
The construction of this scheme has been shown to potentially impact on a treeline on site and as such bats species and Red Squirrel that are dependent on this habitat, whose ecological importance ranges from high local to county level in the context of this site.

Once complete the Flood Relief Scheme will have a minor impact of slight significance on the fish population of Deansgrange Stream as well as the overall depositing/lowland river habitat due to the placement of instream infrastructure and the introduction of an obstacle to fish passage in the form of a flow control structure in Glenavon Park. The wetland habitat proposed as part of the scheme will have a net positive impact on the majority of faunal species within the wildlife corridor of the Deansgrange Stream. There are no cumulative impacts associated with the scheme as a result of impacts identified by other plans and projects within the vicinity of the site.

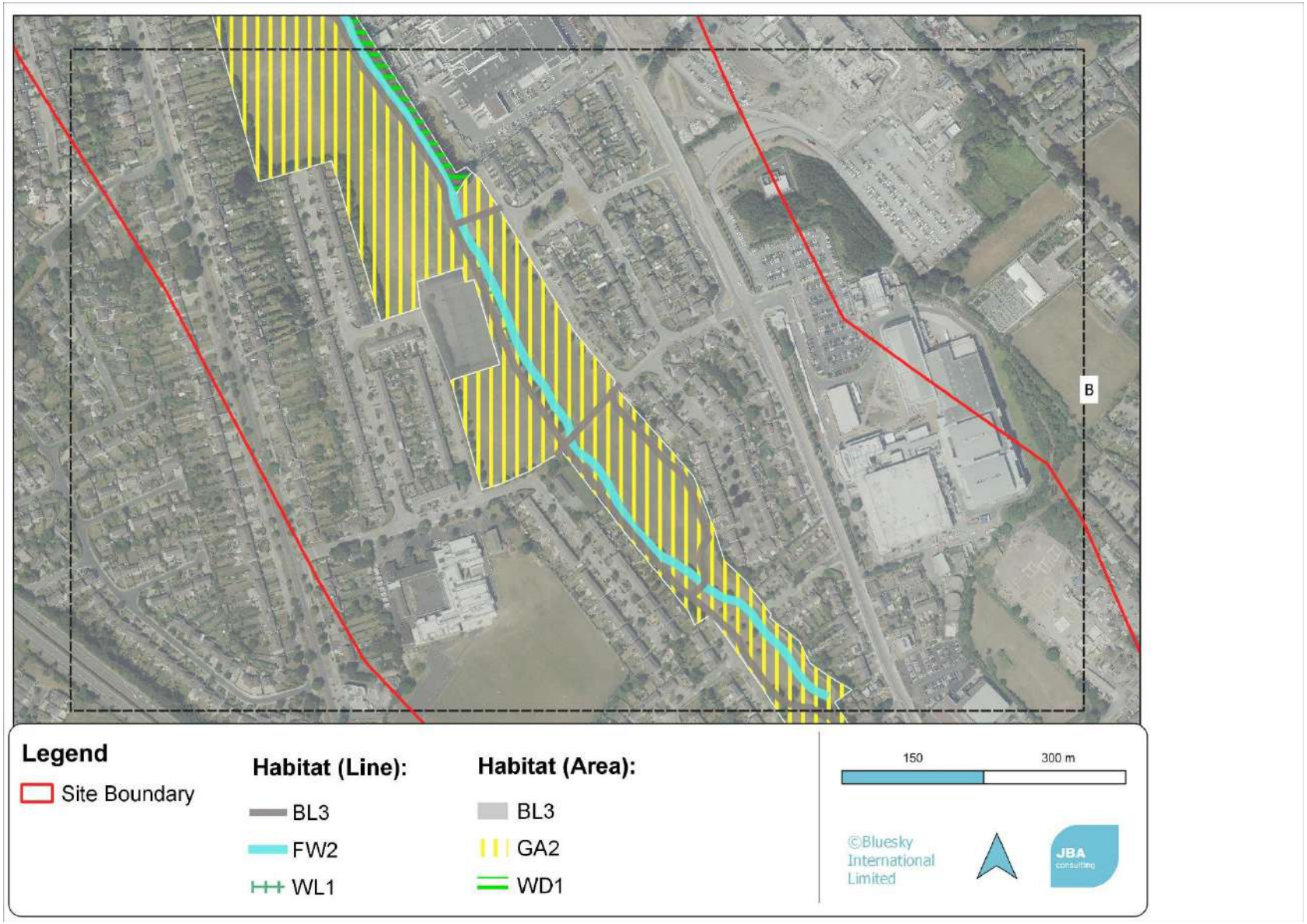
Appendices

A Habitat Maps

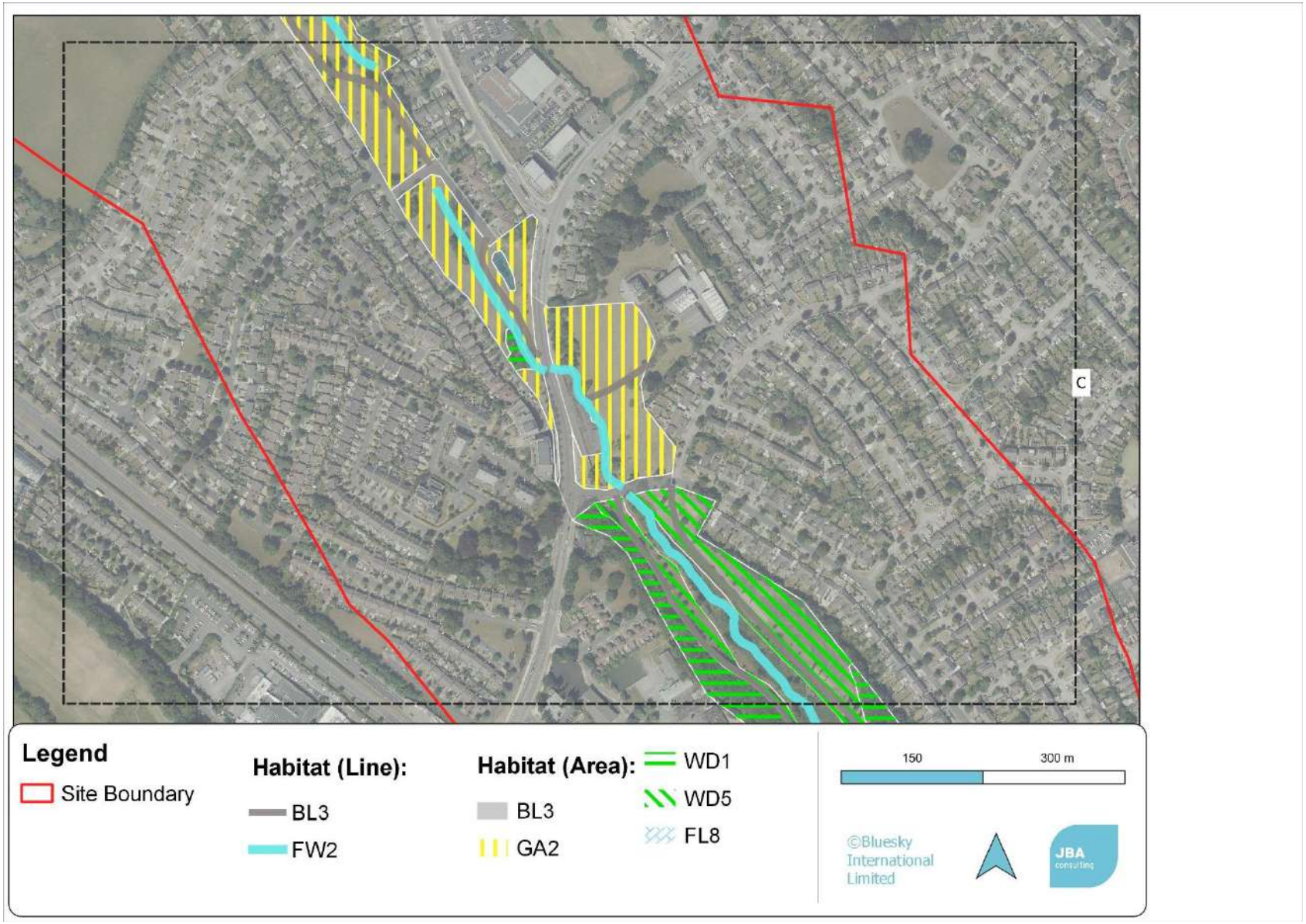
A.1 Habitat Map A



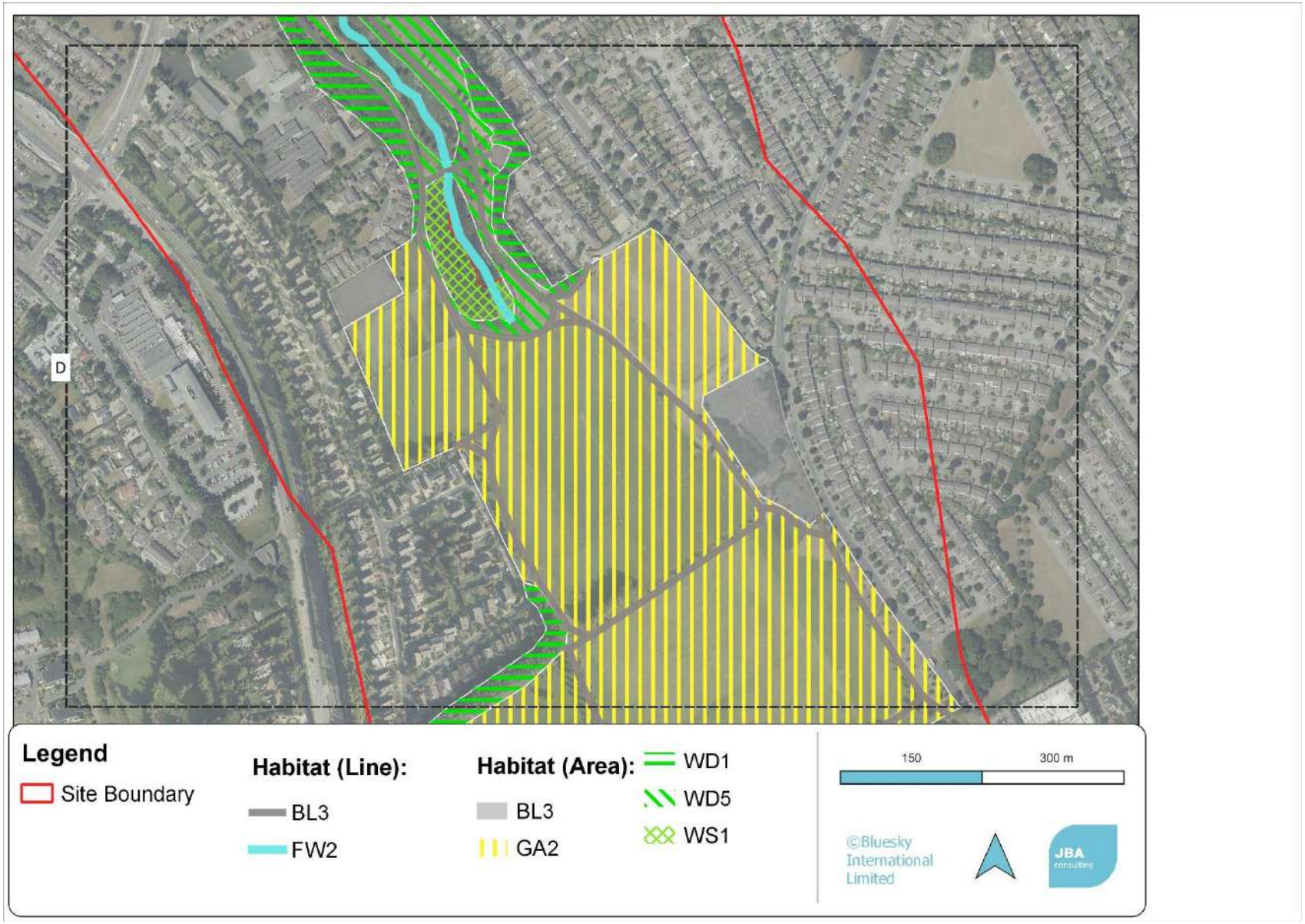
A.2 Habitat Map B



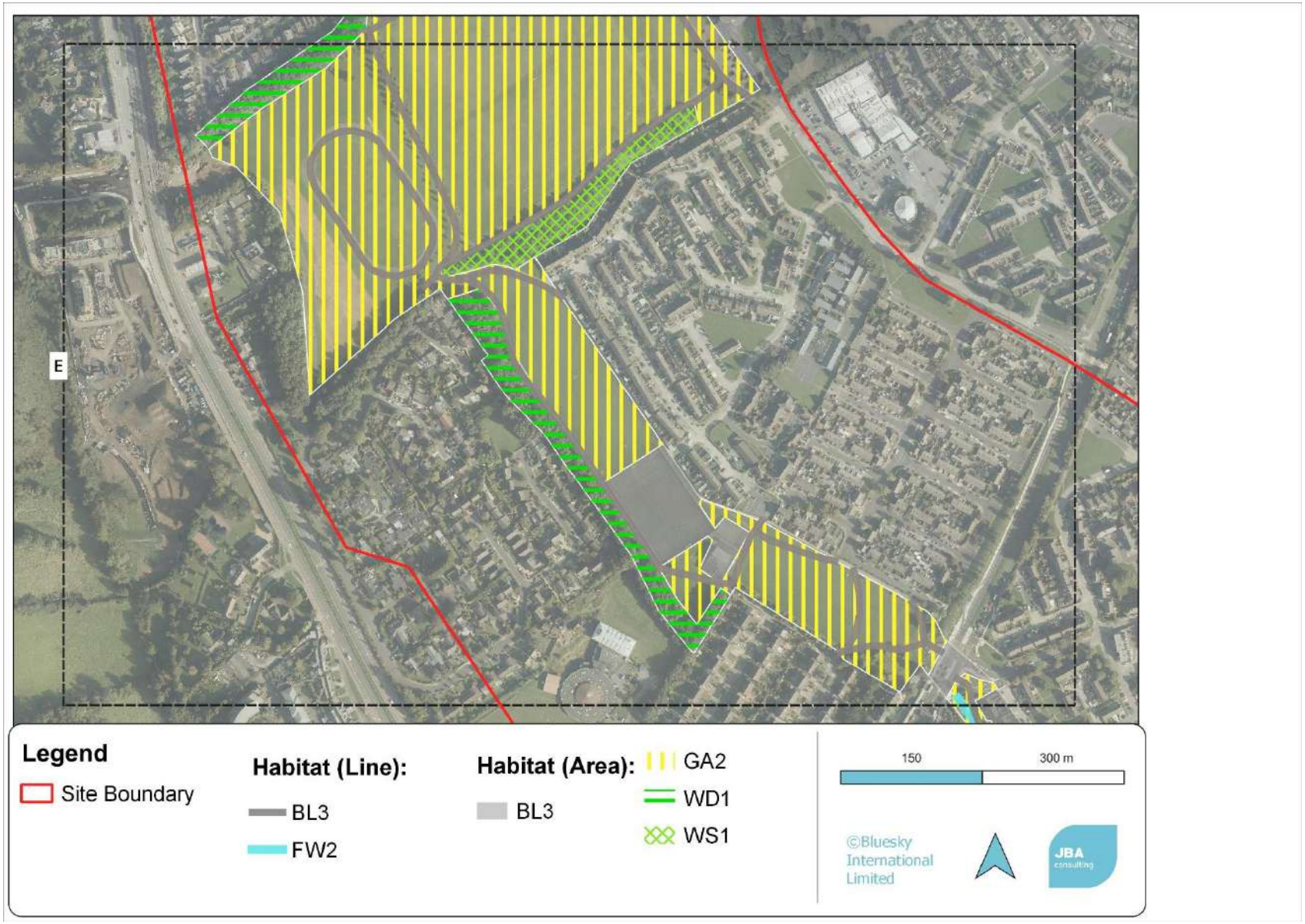
A.3 Habitat Map C



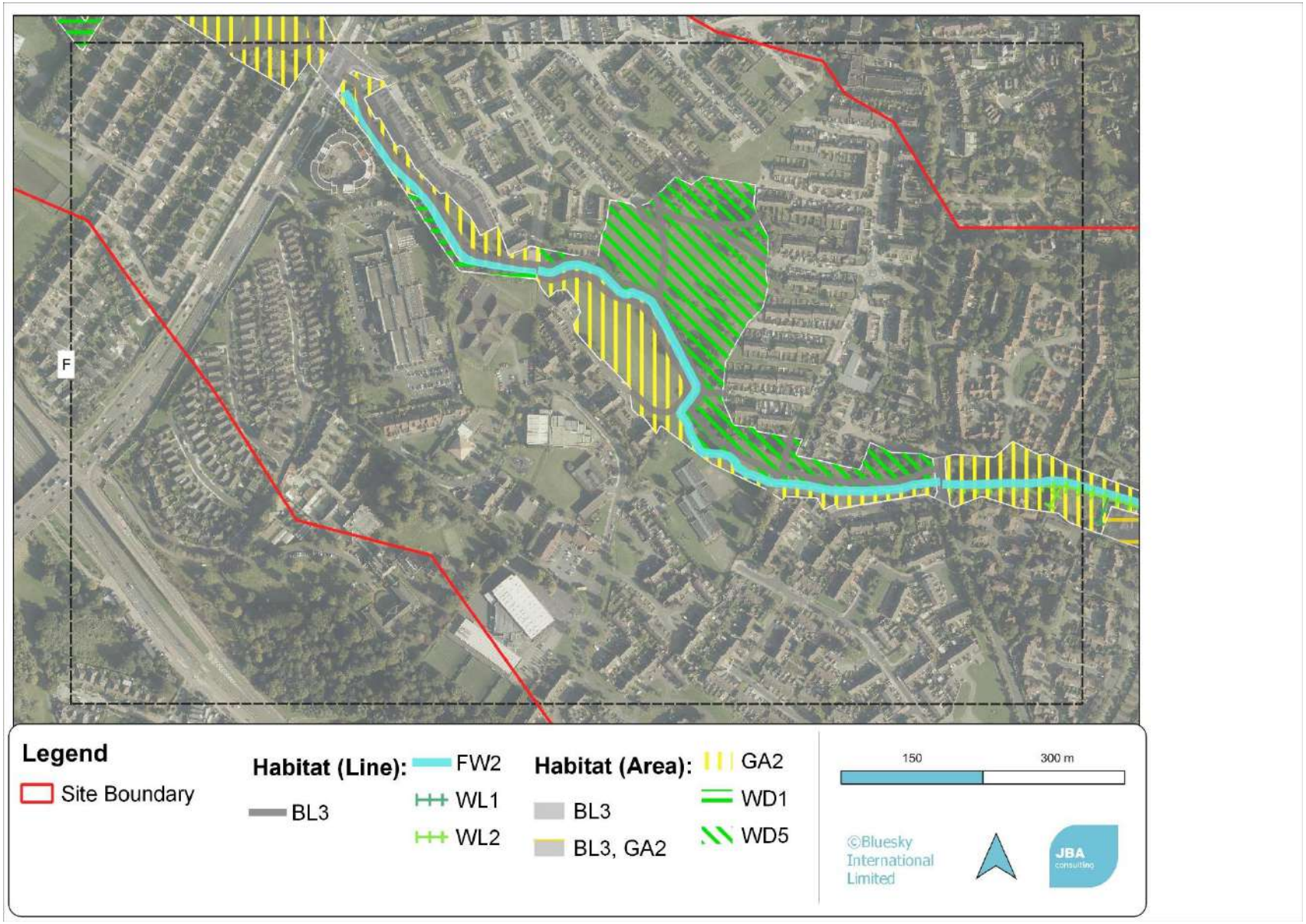
A.4 Habitat Map D



A.5 Habitat Map E



A.6 Habitat Map F



A.7 Habitat Map G

Appendices

B Arboricultural Assessment

Arboricultural Impact Assessment

Prepared for:

JBA Consulting

Proposed site:

Deansgrange Flood relief Scheme.

Prepared by:

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Arboricultural ASSOCIATION
Professional Member

Table of Contents

Executive Summary

1.0 This arboricultural report has been commissioned by JBA Consulting to provide information to assist with the planning process in relation to a proposed flood relief scheme at the above location. The adjoining properties are susceptible to flooding and therefore a flood defence scheme is required. The bank of the stream is lined with large mature trees of significant amenity and ecological value. Due to the size , location and prominence of these trees all efforts are required in order to ensure the flood defence scheme can be constructed whilst retaining the trees. The trees are rooted into the bank and therefore bind the bank together.

This report includes:

- an assessment of the trees, their quality and value in accordance with BS 5837:2012 - Trees in relation to design, demolition and construction;
- the site context and observations on the trees;
- local planning policies relevant to the consideration of trees on the site;
- the impact of the proposed development upon the tree population in and around the site;
- methods of reducing impacts on trees; and
- measures to be taken to protect trees during the proposed works.

2.0 Introduction

2.1 Instructions

Arbor-Care Ltd (Professional Consulting Tree Service) was retained to undertake an on-site tree survey of all trees that could be potentially be impacted by the proposed scheme and within the site extents (Figure 1), the findings of the report will be used to inform design of development works and support a planning application for same.

The objective of the impact assessment was to identify the areas that contained trees, groups of trees, and to ensure where possible that these areas would be retained and to identify the trees that are to be removed to facilitate the development.

The survey concentrated on the large mature trees along the stream bank. The survey concentrated on the trees along the southern bank of the stream, within and adjacent area the proposed development area.

The below impact assessment report is based on the British standard *BS 5837:2012 Trees in relation to design, demolition and construction recommendations*, this standard gives recommendations and guidance on the principles to be applied to achieve a satisfactory juxtaposition of trees, including shrubs, hedges and hedgerows, with structures. It sets out to assist those concerned with trees in relation to construction to form balanced judgements. This impact assessment report will be accompanied by an inventory of trees and hedgerows on site and a tree protection plan. The Arboricultural Impact Assessment and a tree protection plan was prepared for the site identifying trees that may be impacted on by the proposed development based on the proposed design.

2.2 Methodology

An initial tree survey and visual condition assessment was on the 31st of January 2023. The purpose of this report and in accordance with *BS 5837: 2012 Trees in relation to design, demolition and construction*. *Recommendations* only trees with diameters of 75mm or greater were surveyed.

Also in accordance with section 4.4.2.3 of the British standard document where trees formed obvious groups these were assessed and recorded as groups. All trees were individually tagged with a metal disc. This was placed on the northern side of the tree where practical.

> *Section 4.4.2.3 of BS 5837: 2012 states:*
>
> *Trees growing as groups or woodland should be identified and assessed as such where the arboriculturist determines that this is appropriate. However, an assessment of individuals within any group should still be undertaken if there is a need to differentiate between them, e.g. in order to highlight significant variation in attributes (including physiological or structural condition).*
>
> *NOTE: The term "group" is intended to identify trees that form cohesive arboricultural features either aerodynamically (e.g. trees that provide companion shelter), visually (e.g. avenues or screens) or culturally, including for biodiversity (e.g. parkland or wood pasture), in respect of each of the three subcategories.*

The survey concentrated primarily on the significant trees located within the development area and has been based on the topographical survey plan provided.

The objective of this survey was to gather information regarding the trees within or adjacent to the development area and the impact the proposed scheme may have on the trees. **Please refer to Appendix A for the tree inventory**.

Significant trees can be equated as those trees whose visual importance to the surrounding area are sufficient to justify special efforts to protect/preserve and whose loss would have an irremediable adverse impact on the local environment. Significance can also be placed depending on the trees age, another variable to imply significance can be the aesthetic merit of the tree based on its unusual size, intrinsic physical features or outstanding appearance or occurring in a unique location or context, and thus provides a special contribution as a landmark or landscape feature.

All above parts of the trees were visually examined. Tree diameters (DBH) were estimated at 1.5

meter above grade as per standard arboricultural practice. Tree height was measured with the use of a clinometer (Where practical). A generalised system was employed to describe the overall health of the trees. The system uses a three tier rating scale with the following descriptors:

Specimen condition 3-tier rating system

- Poor- 1-30%
- Fair- 31-60%
- Good- 61-100%

3.0 Initial Tree Survey Overview

3.1 The Site is bounded by Deansgrange stream at Streamville Court/Killiney Hill Bridge. The stream is liable to flooding therefore a flood relief scheme is required. The banks of the stream are lined on the southern side with large mature deciduous trees. The trees are of high amenity and ecological value. The roots of the trees are also binding the bank of the stream. The trees also provide significant screening for the properties.

Figure 1 Site location highlighted in red

4.0 The Trees.

A breakdown of the Tree Categories on site as per BS 5837 2012 is set out in the table below:

Category	Quantity	Category %
A-Tree of high quality	15	83%
B-trees of good quality	1	5.5%
C (Low quality or trees less than 75mm diameter)	1	5.5%
U (remove due to poor condition)	1	5.5%
Total trees	18	100%

Large mature trees along the banks of the stream

5.0 Statutory and Non-Statutory Designations

The National Planning Framework (NPF) seeks to ensure that new development is sustainable and underlines the importance of Green Infrastructure, of which trees form an integral part. This encompasses recognition of the importance of trees in relation to the management of air, soil and water quality along with other associated ecosystem services and climate change adaption. The NPF also seeks to achieve the protection and enhancement of landscapes and a net gain in biodiversity.

The site is located within the jurisdiction of *Dunlaoighre Rathdown County Council*. The Local Planning Authorities have a statutory duty to consider both the protection and planting of trees when considering planning applications. The potential impact of development on all trees (including those not protected by a Tree Preservation Order or other statutory designation) is therefore a material consideration. I have reviewed *County Council Development Plan 2022-2028 Tree Preservation Orders (TPO's).* There are no TPO's identified within the development site.

6.0 The Proposed Development

Development Description

Permission for:

The proposed flood defence measure at Killiney Hill Road will consist of new walls of up to 1.5m in height along the boundaries of the properties upstream of the bridge and an upgrade to the existing bridge parapet. The new flood defence walls will be constructed of reinforced concrete and supported by precast or cast in situ piles & an interconnecting ground beam. This foundation has been specifically designed to mitigate any impact the foundations may have on the existing mature tree roots. In locations where the trees are not impacted, the walls will be supported by a conventional strip foundation. The new walls will be constructed a total length of 240m; 110m and 130m on the northern and southern embankments respectively. At the upstream face of the existing bridge, c.13m of stone parapet will be upgraded and reinforced. The walls will be clad on both façades and hand railings will be installed as required.

Please refer to the drawing 19110-JBB-00-XX-DR-Z-02833_KHR Buildability Layout Rev P01 for an overview of the works and construction constraints.

Figure 2: Proposed Development

Arboricultural Impact Assessment

7.0 Analysis of the Proposal in Respect of Trees

This impact assessment sets out the likely principal direct and indirect impacts of the proposed development on the trees on or immediately adjacent to the site and suitable mitigation measures to allow for the successful retention of significant trees or to compensate for trees to be removed, where appropriate.

The full impact of the scheme is not fully known at this stage. However given the nature of the works it is predicted that tree numbers 5202, 5203 and 5204 may have to be removed. However given the high amenity value of these trees every effort will be given in order to retain these trees. The full level of impact will not be known until excavation works commence. It is therefore recommended that excavation works are supervised by a qualified arborist , in order to monitor the level of root severance if at the time of works it is determined by the arborist that the level of impact is too great and that the stability of these trees is compromised it will then be decided that the trees are removed to ground level.

7.1 The arboricultural impact of the proposed scheme is unknown at this stage until the excavations works commence. However it must be stated that all essential works will be undertaken within the root protection area of the trees. Therefore it is essential the any works are undertaken with great care in order to ensure every effort is given to retain these trees.

7.2 In the context of the overall development works the following points are also noted:

- **Arboricultural works** –No other tree pruning has been identified at this stage, however it is predicated that some lower limbs may have to be crown raised to facilitate works.
- Following the completion of the development, a **tree condition assessment** will be required on all retained trees for health and safety purposes.
- **Tree protection measures** - All retained trees can be successfully protected during the proposed development by exploring various engineering solutions.
- No materials or equipment other than those required to install tree protection will be delivered to the site until all fencing is in place.
- **Compound area** – The proposed site compound has not been designed; there is sufficient space available throughout the site to avoid any unnecessary impacts to retained trees, provided the tree protection measures as detailed within this report are carried out.
- **Site access.** unknown
- **Daylight and sunlight levels** - Shading by trees have not been assessed in relation to this proposal.
- **Drainage and services** – All new service runs should be located outside the RPAs of retained trees to avoid impacting their condition. If it is found necessary to locate services within tree RPAs, it is recommended that these works are carried out under arboricultural supervision. Methods of work should follow the recommendations in the NJUG guidance. BS5837 (2012) recommends the NJUG guidance as a normative reference to be used in these circumstances.
- **Boundary treatments** – Please refer to the landscape plan for further information
- **Landscape operations** - Landscaping operations will typically take place at the end of the construction period. These works will normally require the removal of protective fencing to facilitate access for works. There is a risk that plant and machinery may damage soil structure where tree roots are growing. These risks can be managed by maintaining good professional standards of work and working to a method statement. The principle of avoiding soil disturbance or changes in levels within the RPAs of retained trees should be followed unless arboricultural advice has been sought

8.0 Discussion & Conclusion

General Change

8.1 My assessment is that the retention of the trees is essential and will have to be retained to avoid a negative impact on the character and appearance of the immediate surrounding landscape;

Proposal in relation to local planning policy

8.2 The proposed development complies with local planning policy as it relates to trees. A tree survey has been carried out in accordance with best practice and where possible trees have been retained and can be successfully protected during construction.

Conclusion

8.4 The proposal has been assessed in accordance with BS5837:2012 and special working methods have been recommended to minimise tree impacts.

8.5 Provided the recommendations and methods of work, as outlined within this report, are adhered to, the proposed development can be successfully carried out without having a negative impact on the character or appearance of the surrounding landscape.

9.0 Recommendations

9.1 The proposal should be carried out in accordance with the recommendations outlined within this report.

9.2 The positioning of tree protective barriers should be installed as detailed within the Tree Protection Plan.

Appendix A: Tree Survey

Key abbreviations used in the survey

Ref No	Specific identification number given to each tree or group. T=Tree/H=Hedge/G=Group/W=Woodland/S=Shrub.	
Tag No.	Tree marked with individual tree tag of this reference number on site.	
Species	Common name followed by botanical name shown in *italics*	
RPA	Root Protection Area (As defined by BS5837)	
Stem diameter	Diameter of main stem, measured in millimetres at 1.5 m above ground level. (MS = Multi-stem tree measured in accordance with BS5837 Annexe C)	Av / Average: indicates an average representative measured dimension for the group or feature
Spread	The width and breadth of the crown. Estimated on the four compass points in metres.	
Crown clearance	The estimated height (in metres) above ground level of the lowest significant branch attachments.	
#	Estimated dimensions	
*	Indicates estimated position of tree (not indicated on topographical survey).	
P	Privately owned tree (e.g. tree not located in the public highway or adjacent public land).	
Category	Categorisation of the quality and benefits of trees on Site as per Table 1 and 2 of BS5837:2012. 1=Arboricultural quality/value 2=Landscape quality/value 3=Cultural quality/value (including conservation)	
	A=High quality/value 40yrs+ (light green). B=Moderate quality/value 20yrs+ (mid blue) C=Low quality/value min 10yrs/stem diameter less than 150mm (grey). U=Unsuitable for retention (dark red).	
Life stage	**Young (Y):** Newly planted tree 0-10 years. **Semi-Mature (SM):** Tree in the first third of its normal life expectancy for the species (significant potential for future growth in size). **Early Mature (EM):** Tree in the second third of its normal life expectancy for the species (some potential for future growth in size) **Mature (M):** Tree in the final third of its normal life expectancy for the species (having typically reached its approximate ultimate size). **Over Mature (OM):** Tree beyond the normal life expectancy for the species. **Veteran (V):** Tree which is of interest biologically, aesthetically or culturally because of its condition, size or age.	
Structural condition	**Good:** No significant structural defects **Fair:** Structural defects which can be resolved via remedial works. **Poor:** Structural defects which cannot be resolved via remedial works. **Dead:** Dead.	
Physiological condition	**Good:** Normal vitality including leaf size, bud growth, density of crown and wound wood development. **Fair:** Lower than normal vitality, reduced bud development, reduced crown density, reduced response to wounds. **Poor:** Low vitality, low development and distribution of buds, discoloured leaves, low crown density, little extension growth for the species. **Dead:** Dead **Fair/Good** = Indicates an intermediate condition **Fair – Good** = Indicates a range of conditions (e.g. within a group)	
Preliminary management recommendations	Works identified during the tree survey as part of sound arboricultural management, based on the current context of the Site (where relevant reference has been made to tree management based on the potential future context of the site).	
Works to facilitate the development	Tree works identified as necessary to facilitate the Proposed Development following a desk top analysis of the proposals in relation to tree constraints.	

Tree Survey Schedule-Deansgrange FRS

Tree No	Species	Age class	Size (mm)	Height (M)	Crown Sp. (M)	Crown Cl.(M)	Condition	Structural/Physiological Observations	Impact of the development	PMR	Cat	RPA(m)
5201	*Acer pseudoplatanus* Sycamore	EM	200	6	N=2 S=2 E=2 W=2	2	Fair	An early mature sycamore is fair overall condition	No impact	Retain	C2	300
5202	Sycamore	M	550	18	N=3 S=3 E=3 W=3	2	Good	A large mature sycamore located on the lower bank	Level of impact will be determined during excavation stage	May have to be removed	A2	6.5m
5203	*Fraxinus excelsior* Ash	M	700	20	N=6 S=6 E=4 W=4	6	Good	A large mature ash in good condition there is no evidence of ash die back	Level of impact will be determined during excavation stage	May have to be removed	A2	8m
5204	*Tilia spp.* Lime	M	800	22	N=6 S=6 E=6 W=6	2	Good	A large mature lime located 7m south of the bank of the stream	Level of impact will be determined during excavation stage	May have to be removed	A2	9m
5205	Sycamore	EM	200	6	N=2 S=2	2	Poor	An early mature sycamore suppressed with ivy and in decline	No impact	Remove based on	U	

					E=2 W=2					its condition		
5206	Lime	M	600	18	N=8 S=8 E=6 W=6	2	Good	A large mature Lime displaying a good overall condition	Unknown	Retain Remove the basal suckers	A2	7m

Tree No	Species	Age class	Size (mm)	Height (M)	Crown Sp. (M)	Crown Cl.(M)	Condition	Structural/Physiological Observations	Impact of the development	PMR	Cat	RPA(m)
5207	Beech	M	730	18	N=6 S=6 E=6 W=6	2	Good	A large mature beech displaying a good overall condition	Minimal impact	Retain	A2	8.3m
5208	Lime	M	500	14	N=6 S=6 E=6 W=6	2	Good	A mature lime displaying good overall condition	Minimal impact	Retain	A2	6m
5209	Lime	M	500	14	N=6 S=6 E=6 W=6	2	Good	A mature lime displaying good overall condition	Minimal impact	Retain	A2	6m
5210	Lime	M	500	14	N=6 S=6 E=6 W=6	2	Good	A mature lime displaying good overall condition	Minimal impact	Retain	A2	6m
5211	Lime	M	500	14	N=6 S=6 E=6 W=6	2	Good	A mature lime displaying good overall condition	Minimal impact	Retain	A2	6m
5212	Lime	M	500	14	N=6 S=6 E=6 W=6	2	Good	A mature lime displaying good overall condition	Minimal impact	Retain	A2	6m

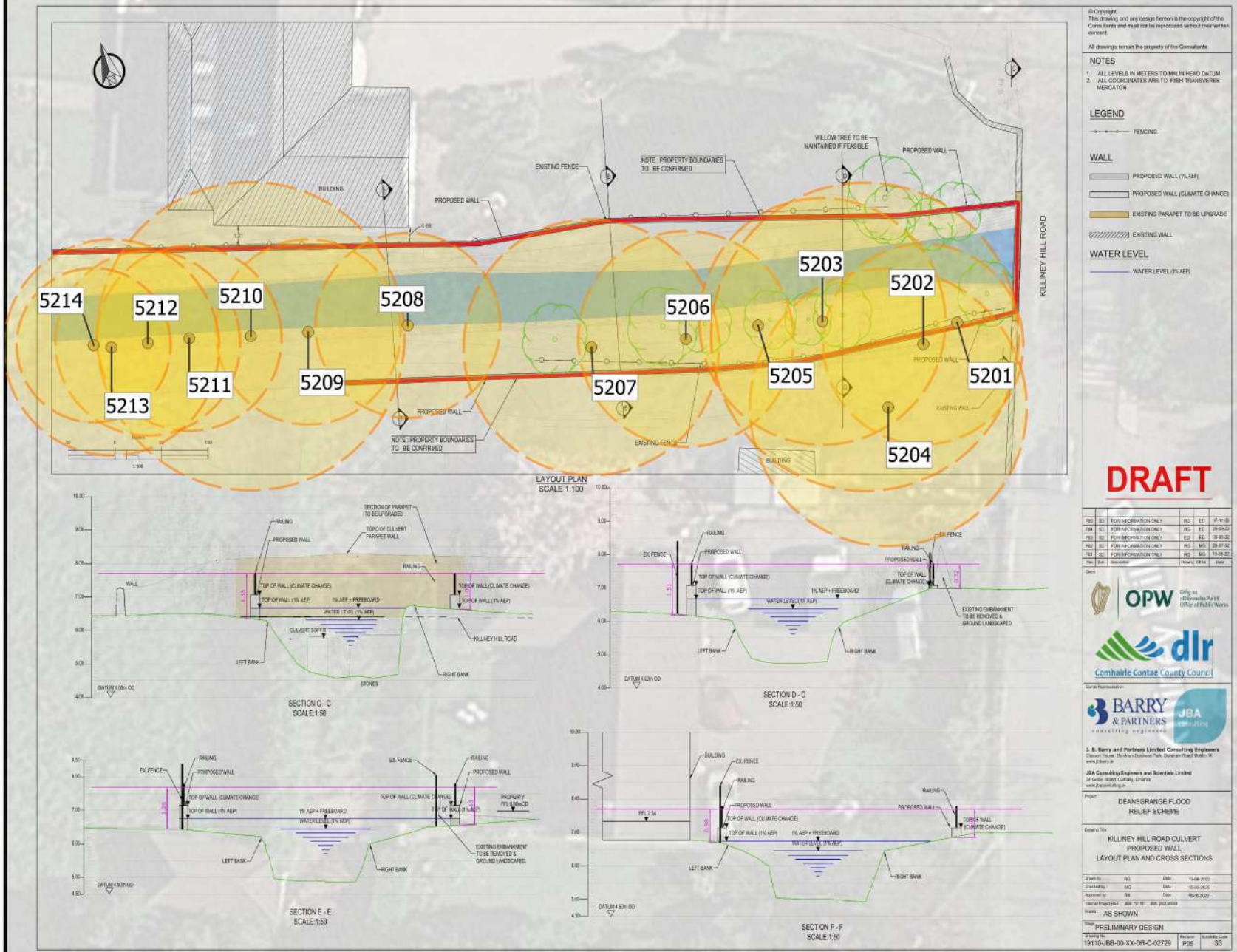
Tree No	Species	Age class	Size (mm)	Height (M)	Crown Sp. (M)	Crown Cl.(M)	Condition	Structural/Physiological Observations	Impact of the development	PMR	Cat	RPA(m)
5213	Ash	M	600	16	N=3 S=3 E=3 W=3	2	Good	A large ash displaying a good overall condition	Minimal impact	Retain	A2	7m
5214	Sycamore	M	400	16	N=4 S=4 E=4 W=4	2	Good	A mature sycamore displaying good overall condition	Minimal impact	Retain	B2	5m

Legend

- Proposed wall
- Tree Locations
- Root Protection Area

7.5 15 m

JBA consulting



Legend

- Proposed wall
- Tree Locations
- Root Protection Area

7.5 15 m

© Google Maps

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Streamville Ct
Streamville Ct
R119
Killiney Hill Rd
R119
5214
5212
5210
5208
5213
5211
5209
5207
5206
5203
5202
5205
5201
5204
Legend
Proposed wall
Tree Locations
Root Protection Area
Projected RPA
10
20 m
© Google Maps
JBA consulting

Legend

- Proposed wall
- Tree Locations
- Root Protection Area
- Projected RPA

10 20 m

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Appendix B: Arboricultural Method Statement

Introduction

This report has been prepared in accordance with British Standard 5837: Trees in relation to design, demolition and construction – Recommendations (2012) which provides a methodology for the assessment and protection of trees and other significant vegetation on development sites.

Sequence of Operations

- Carry out the proposed tree works.
- Installation of tree protection measures.
- Enabling works.
- Construction of proposal and the installation of drainage and services.
- Landscaping.

Alternative sequences can be discussed and agreed with the local authority and project manager if required.

Supervision

All key / critical activities that will affect trees during construction will be inspected and monitored bythe approved arboricultural consultant *if so requested by the local authority.*

- Pre-commencement meeting with site manager and local authority to confirm location of treeprotection measures.
- Inspection of all tree works and tree protection measures prior to the commencement ofworks.
- Supervision during the excavation works within the RPAs of retained trees.
- Supervision during the installation of all services/wall within tree RPAs.
- Supervision during any other works that may affect retained trees.
- Inspection upon completion.

Arboricultural Method Statement	
Scope	**Methodology**
Pre-commencement meeting	Prior to the commencement of works, a meeting between the arboriculturalconsultant, local authority and the site manager will be held in order to discuss the tree protection measures and proposed works required in closeproximity to trees. (if requested) Contact details of all parties will be circulated to ensure all team members are able to communicate correctly. The site manager will be responsible for the protection of all retained trees for the duration of the project. Whenever necessary, the site manager will engage the arboricultural consultant to ensure trees are adequately protected. The appointed arboricultural consultant will be available for verbal advice throughout site works.
Tree Works	Please refer to the Tree Work Schedule at Appendix A for a list of all proposed tree works. The location of trees to be removed are highlighted on the Tree Removals Plan at Appendix B. It is the responsibility of the Site Manager to ensure all tree works have been approved by the local planning authority. All tree works will be carried out by a reputable arboricultural contractor inaccordance with the recommendations given in BS 3998:2010 – Tree Work Recommendations. All tree works should be carried out in accordance with Section 40 of the Wildlife Act 1976 and Section 46 of the Wildlife (Amendment) Act 2000. It is the responsibility of the arboricultural contractor to ensure that no protected species are harmed whilst carrying out site clearance or tree surgery works.
Tree Protection	The position of protective fencing for construction is shown on the Tree Protection Plan. Protective fencing will be constructed and installed using fencing in accordance with BS5837:2012, please refer to the attached Tree Protection Plan for the specification. Alternatives to those shown must be agreed in advance by the client approved, arboricultural consultant.

	Any machinery / site operative within tree RPAs must operate on the appropriate ground protection at all times, this will include the installation and removal of ground protection. No materials or equipment other than those required to erect protective fencing will be delivered to the site before the fencing is installed. Signs will be fixed to every third panel stating, *'Tree Protection Area Keep Out – Any incursion into the protected area must be with the agreement ofthe local authority or arboricultural consultant*'. The main contractor will inform the local authority and the arboricultural consultant that tree protection is in place before site clearance works commence. No alteration, removal or repositioning of the tree protection will take placeduring construction without the prior consent of the arboricultural consultant.
Compound Area	The proposed site compound area has not yet been designed; however, the considerations below must be followed: The site compound must be located outside the designated TPZs as highlighted on the Tree Protection Plan at Appendix B. No excavation works within tree RPAs are permitted to install temporary services for site cabins and facilities. Any temporary services within tree RPAs must be above ground and protected accordingly. No operating generators or toxic liquids will be stored within the RPAs of retained trees during construction. Overhanging tree canopies must be taken into consideration when transporting, installing and removing site cabins near tree crowns. A banksman will be present during this process to ensure that all operations are carried out in a controlled manner and no part of the cabin meets overhanging tree crowns.
Installation of fencing within RPAs	The installation of fencing within the RPAs of retained trees will be carried out using the following methodology: Post holes will be carefully positioned as far away from the stem of trees as possible (minimum 50 cm) to minimise contact with tree stems and

	significant tree roots. Holes will be manually excavated with the use of hand tools only and where roots greater than 25mm in diameter or large fibrous roots are present, theposition of the hole will be slightly altered to avoid potential root damage. If the position of the hole cannot be altered, roots greater than 25mm in diameter or large fibrous roots will be protected with flexible plastic pipes and retained within the pit. In some cases, individual roots less than 25mm in diameter may be pruned, making a clean cut with a suitable sharp sterile tool (e.g. secateurs or hand saw). Once the required depth has been excavated, the hole will be lined using 1000-gauge polythene and filled with the appropriate concrete mix.
Landscape Operations	All landscape operations within the protected area will be carried out by hand, using hand tools only, unless otherwise agreed with by the arboricultural consultant.
	No dumping of spoil or rubbish, parking of vehicles or plant, storage ofmaterials or temporary accommodation will be undertaken within the TPZs. All tree roots within the RPAs greater than 25mm diameter will be retainedand worked around. Soil levels will not be increased or reduced within the RPAs of trees without prior agreement from the arboricultural consultant.

General Principals to Avoid Damage to Trees	All tree works will be carried out in accordance with the recommendations given in BS 3998 (2010). No fires will be permitted within 20m of the crown of any tree. No materials, vehicles, plant or personnel will be permitted into the tree protection zones at any time without the prior consent of the arboriculturalconsultant. Any liquid materials spilled on site will be immediately cleared up and removed from the site. If liquid fuel or cement products are spilled within 2m of the tree protection zone, the contractor will report the incident to thearboricultural consultant immediately. The contractor will report any damage to trees or shrubs, whether caused by construction activities or from any other cause, to the arboricultural consultant immediately.

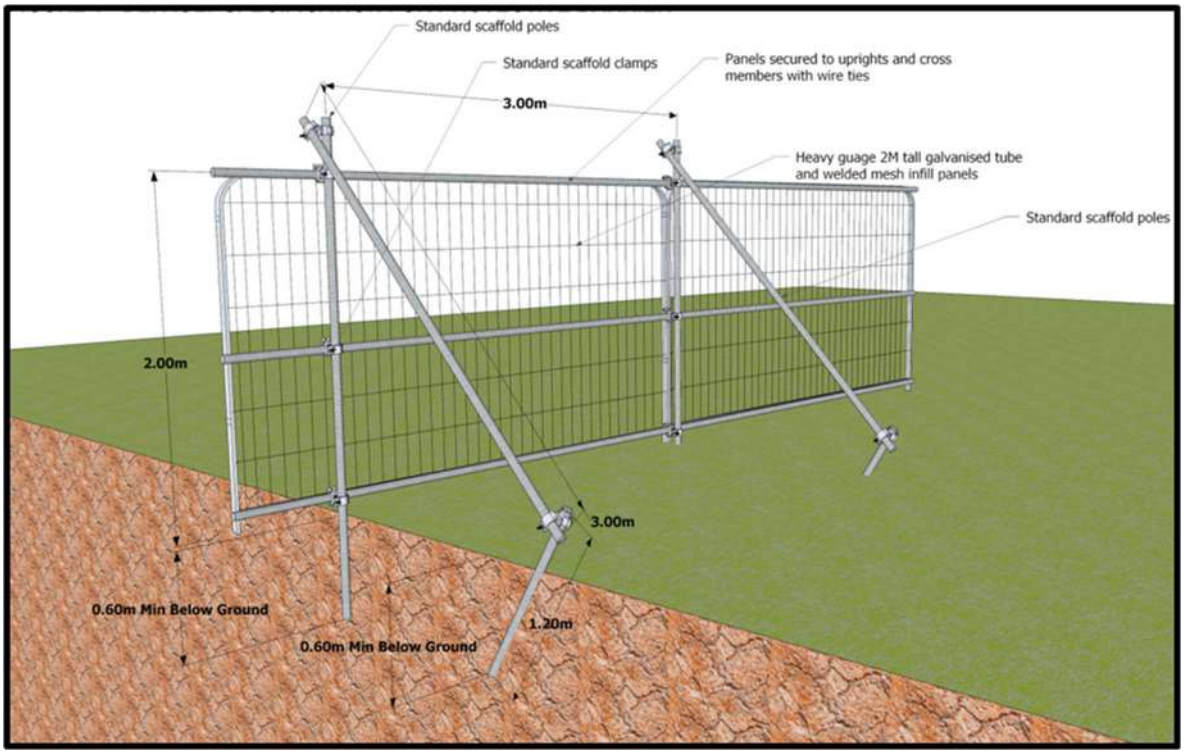

Figure 3 Default specification for tree protection barrier in accordance with BS5837:2012


PROTECTIVE FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND DRAWINGS FOR THIS DEVELOPMENT.


TREE PROTECTION AREA
KEEP OUT !
(TOWN & COUNTRY PLANNING ACT 1990)
TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A TREE PRESERVATION ORDER.
CONTRAVENTION OF A TREE PRESERVATION ORDER MAY LEAD TO CRIMINAL PROSECUTION
ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY

This report was prepared by:

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Yours in Conservation,
Michael Garry.
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C Landscape Masterplan

Landscape Plan
scale 1:500

PLANTING LISTING

PROPOSED NATIVE TREE AND SHRUB FOR HABITAT ENHANCEMENT AND SCREENING

Tree Species	Girth / height	No.
Alnus glutinosa	12-14cm gt	2
Betula pubescens	12-14cm gt	5
Pinus sylvestris	1.75-2.0m ht	3
Quercus robur	12-14cm gt	5

PROPOSED SMALL NATIVE TREES / SHRUBS

Species	Height	No.
Ilex aquifolium	40-60cm	5
Corylus avellana	40-60cm	8
Euonymus europaeus	40-60cm	5
Rhamnus cathartica	40-60cm	5
Viburnum opulus	40-60cm	6

PROPOSED NATIVE TREES, TOLERANT OF WETTER CONDITIONS CLOSER TO THE MAIN COURSE OF THE PROPOSED STREAM

Species (native species)	Girth	No.
Alnus glutinosa	12-14cm	2
Betula pendula	12-14cm	2
Quercus robur	12-14cm	2
Salix alba	12-14cm	4

PROPOSED NATIVE HEDGEROW (Double staggered row)

Species (native species)		Height	No.
Crataegus monogyna	(45%)	40-60cm	469
Euonymus europaeus	(10%)	40-60cm	104
Ilex aquifolium	(15%)	40-60cm	156
Prunus spinosa	(20%)	40-60cm	208
Rosa canina	(10%)	40-60cm	104

PROPOSED GRASSLAND / LOWLAND WILDFLOWER MEADOW THROUGHOUT

Local meadow seed to be harvested from Shanganagh / Fern Hill meadows to contribute to Biodiversity Harvesting project.

PROPOSED WETLAND AREA HABITAT ENHANCEMENT / MIXED VEGETATION TREATMENT

Species (Indicative)
Caltha palustris
Carex rostrata
FIlipendula ulmaria
Hydrocotyle vulgaris
Iris pseudacorus
Mentha aquatica
Myosotis scorpioides
Sagittaria sagittifolia
Sparganum erectum
Stachys palustris
Valeriana officinalis

KEY

- EXISTING TREES TO BE RETAINED AND PROTECTED
- EXISTING TREES TO BE REMOVED IN AREAS BEING EXCAVATED OR FILLED IN PROPOSAL - LOCATION TO BE AGREED ON SITE AT LATER STAGE
- PROPOSED NATIVE TREE TO BE PLANTED IN CLUSTERS, FOR HABITAT ENHANCEMENT AND SCREENING
- PROPOSED SMALL NATIVE TREE/SHRUB, TOLERANT OF WETTER CONDITIONS TO ENHANCE WETLAND HABITAT
- PROPOSED NATIVE TREE TO BE PLANTED IN CLUSTERS, TOLERANT OF WETTER CONDITIONS TO ENHANCE WETLAND HABITAT
- PROPOSED NATIVE HEDGEROW AND FENCE TO WETLAND BOUNDARY (UPPER POND: 135 l.m / LOWER POND: 125.4 l.m)
- PROPOSED GRASSLAND/MEADOW THROUGHOUT (TOTAL EXISTING & PROPOSED AREA: sq.m)
- PROPOSED WETLAND AREA
- PROPOSED MOWN GRASS FOOTPATH
- INDICATIVE AREA FOR POTENTIAL HABITAT ENHANCEMENT AND MIXED VEGETATION TREATMENT (Area: 394 sq.m)
- PROPOSED FLOOD STORAGE AREAS LINING TO ENGINEER'S SPECIFICTION
- EXISTING COURSE OF DEANSGRANGE RIVER
- PROPOSED TARMAC FOOTPATH (PROPOSED TO TIE IN WITH EXISTING)
- EXISTING FOOTPATH TO BE REMOVED
- EXTENTS OF 1% FLOOD EVENT
- PROPOSED SEATING
- PROPOSED INTERPRETATION BOARD

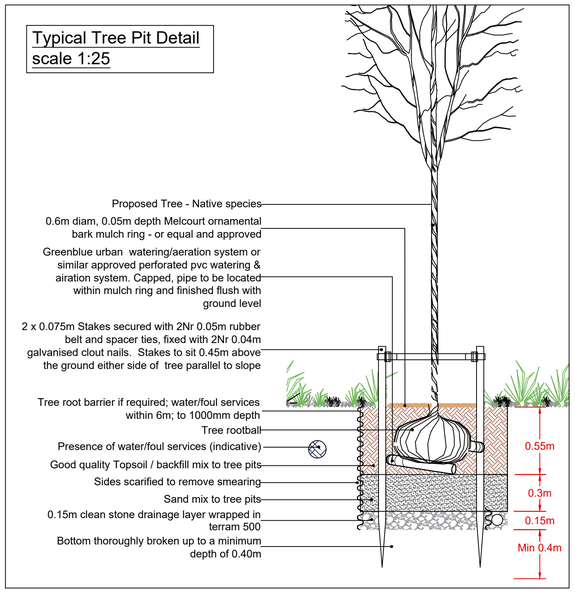
Site Location (NTS)

Landscape Strategy:

A multifunctional landscape that can act as an area for biodiversity enhancement through native planting proposals. Potential to promote educational activities with further enhance through marginal planting and the inclusion of a gradient of habitats based on the available per season water. Informational boards at entrances and points of interest (i) focusing on the ecological and engineered functions of the space. Potential for mown paths through the vegetation to keep the maintenance requirements low and increase the amenity value of the space. An adaptable vegetation management regime to promote the uninterrupted life cycles and safe use of space.

Lowland Grassland

Typical Tree Pit Detail
scale 1:25



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Project
Deansgrange FRS - Landscape Glenavon Storage

Title
Conceptual Plan of Landscape Interventions for

Client
Dun Laoghaire Rathdown County Council

Drawn:	MIT 29/06/2023	Designed:	MIT 14/03/2023
Checked:	CP 29/06/2023	Approved:	BOC 14/03/2023
Project:	2020s0059	Scale:	As Shown @ A1

Drawing Number:	Status:	Revision:	Sheet Size:
CER-JBAI-XX-XX-DR-L-0001	A1	C01	A1

D Relevant Policy and Legislation

The legislation discussed below is intended as a guide only and does not replace formal legal advice.

D.1 Biodiversity Policy Guidance

'Biodiversity: The National Biodiversity Action Plan 2017-2021 (DCHG, 2017) sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity' and has been developed in response to The Earth Summit, held in Rio de Janeiro in 1992 (UN Convention on Biological Diversity) and subsequent EU and International Biodiversity strategies and policies. As part of the Action Plan process Local Authorities (LA) must produce Biodiversity Action Plans (BAP). BAPs highlight local biodiversity issues and set out a series of objectives and action plans for the conservation of priority species and habitats where they occur in each district or county.

D.2 Designated Sites and Nature Conservation

D.2.1 Statutory Designated Nature Conservation Sites

Sites with statutory designations receive varying degrees of legal protection under Irish statute (i.e. Wildlife Act 1976 and Wildlife (Amendment) Act (2000) and European Directives (i.e. the EC Birds Directive (2009/147/EC) and EC Habitats Directive (92/43/EC). The EU directives were transposed into Irish national law and subsequent amendments were revised and consolidated in the European Communities (Birds and Natural Habitats) Regulations 2011 and Irish Statutory Instrument 477/2011

There are a number of statutory designations used for sites of high nature conservation value in Ireland, which are applied depending upon the importance of the site in a local, regional, national or international context. These include:

- National
- Natural Heritage Area (NHA)
- Wildfowl Sanctuary
- Statutory Nature Reserve
- Refuge for Fauna
- European
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- International
- UNESCO Biosphere Reserve
- Ramsar Convention Site
- National Park (Category II) Sites

D.2.2 Non-Statutory Designations

Non-statutory sites are afforded no statutory legal protection, but are normally recognised by local planning authorities and statutory agencies as being of local nature conservation value A proposed Natural Heritage Area (pNHA) is an area deemed to be of special interest containing important wildlife habitat and often containing rare or threatened species. They may also be selected on the basis of their geology or geomorphology.

D.2.3 Protected and Notable Species

A number of species are protected under Irish and international legislation. In Ireland, primary protection is provided under the 1976 Wildlife Act and Wildlife (Amendment) Acts (2000 & 2010) and revision 2018. Species of European importance receive additional protection in Ireland under the Birds and Natural habitats Regulations 2011.

The Flora (Protection) Order (2015) makes it illegal to cut, uproot or damage a listed species in any way. It is illegal to alter, damage or interfere in any way with their habitats.

E National Biodiversity Data Centre (2023)

E.1 Recent records (since 2010) of species that are protected or of conservation concern within 1km of the Deansgrange Stream

Common Name	Latin Name	Designation/Threat Level	Record Date
		Amphibians	
Common Frog	*Rana temporaria*	EU Habitats Directive: Annex V Wildlife Act 1976 & Amendments	14/06/2020
Smooth Newt	*Lissotriton vulgaris*	Wildlife Act 1976 & Amendments	30/04/2011
		Birds	
Arctic Tern	*Sterna paradisaea*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Barn Owl	*Tyto alba*	Birds of Conservation Concern - Red List	31/12/2011
Barn Swallow	*Hirundo rustica*	Birds of Conservation Concern - Amber List	09/05/2020
Bar-tailed Godwit	*Limosa lapponica*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Black Guillemot	*Cepphus grylle*	Birds of Conservation Concern - Amber List	31/12/2011
Black-headed Gull	*Larus ridibundus*	Birds of Conservation Concern - Red List	18/10/2014
Black-legged Kittiwake	*Rissa tridactyla*	Threatened Species: OSPAR Convention Birds of Conservation Concern - Amber List	31/12/2011
Black-tailed Godwit	*Limosa limosa*	Birds of Conservation Concern - Amber List	31/12/2011
Brent Goose	*Branta bernicla*	Birds of Conservation Concern - Amber List	12/01/2013
Common Coot	*Fulica atra*	EU Birds Directive - Annex II & III Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Common Greenshank	*Tringa nebularia*	Birds of Conservation Concern - Amber List	31/12/2011
Common Guillemot	*Uria aalge*	Birds of Conservation Concern - Amber List	31/12/2011
Common Kestrel	*Falco tinnunculus*	Birds of Conservation Concern - Amber List	31/12/2011
Common Kingfisher	*Alcedo atthis*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Amber List	04/09/2016
Common Linnet	*Carduelis cannabina*	Birds of Conservation Concern - Amber List	06/09/2012
Common Redshank	*Tringa totanus*	Birds of Conservation Concern - Red List	31/12/2011
Common Sandpiper	*Actitis hypoleucos*	Birds of Conservation Concern - Amber List	10/07/2014
Common Shelduck	*Tadorna tadorna*	Birds of Conservation Concern - Amber List	14/10/2011
Common Snipe	*Gallinago gallinago*	EU Birds Directive - Annex II & III Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Common Starling	*Sturnus vulgaris*	Birds of Conservation Concern - Amber List	31/12/2011
Common Swift	*Apus apus*	Birds of Conservation Concern - Amber List	09/05/2020
Common Tern	*Sterna hirundo*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Amber List	06/07/2018
Dunlin	*Calidris alpina*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Eurasian Curlew	*Numenius arquata*	EU Birds Directive- Annex II Bird Species Birds of Conservation Concern - Red List	21/05/2016
Eurasian Oystercatcher	*Haematopus ostralegus*	Birds of Conservation Concern - Amber List	31/12/2011
Eurasian Reed	*Acrocephalus scirpaceus*	Birds of Conservation Concern - Amber List	11/11/2012

Common Name	Latin Name	Designation/Threat Level	Record Date
Warbler			
Eurasian Teal	*Anas crecca*	EU Birds Directive - Annex II & III Bird Species Birds of Conservation Concern - Amber List	10/06/2012
Eurasian Tree Sparrow	*Passer montanus*	Birds of Conservation Concern - Amber List	28/05/2012
Eurasian Wigeon	*Anas penelope*	EU Birds Directive - Annex II & II Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Eurasian Woodcock	*Scolopax rusticola*	EU Birds Directive - Annex II & III Bird Species Birds of Conservation Concern - Amber List	31/12/2011
European Golden Plover	*Pluvialis apricaria*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Red List	31/12/2011
European Shag	*Phalacrocorax aristotelis*	Birds of Conservation Concern - Amber List	31/12/2011
Great Black-backed Gull	*Larus marinus*	Birds of Conservation Concern - Amber List	31/12/2011
Great Cormorant	*Phalacrocorax carbo*	Birds of Conservation Concern - Amber List	31/12/2011
Great Crested Grebe	*Podiceps cristatus*	Birds of Conservation Concern - Amber List	31/12/2011
Great Northern Diver	*Gavia immer*	EU Birds Directive - Annex I Bird Species	31/12/2011
Greater Scaup	*Aythya marila*	EU Birds Directive - Annex II & III Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Herring Gull	*Larus argentatus*	Birds of Conservation Concern - Red List	31/12/2011
House Martin	*Delichon urbicum*	Birds of Conservation Concern - Amber List	31/12/2011
House Sparrow	*Passer domesticus*	Birds of Conservation Concern - Amber List	25/07/2012
Lesser Black-backed Gull	*Larus fuscus*	Birds of Conservation Concern - Amber List	06/09/2012
Little Egret	*Egretta garzetta*	EU Birds Directive - Annex I Bird Species	09/05/2020
Little Grebe	*Tachybaptus ruficollis*	Birds of Conservation Concern - Amber List	05/04/2012
Little Gull	*Larus minutus*	EU Birds Directive - Annex I Bird Species	19/12/2015
Manx Shearwater	*Puffinus puffinus*	Birds of Conservation Concern - Amber List	31/12/2011
Mediterranean Gull	*Larus melanocephalus*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Mew Gull	*Larus canus*	Birds of Conservation Concern - Amber List	31/12/2011
Mute Swan	*Cygnus olor*	Birds of Conservation Concern - Amber List	31/12/2011
Northern Gannet	*Morus bassanus*	Birds of Conservation Concern - Amber List	31/12/2011
Northern Lapwing	*Vanellus vanellus*	EU Birds Directive - Annex II Bird Species Birds of Conservation Concern - Red List	16/02/2012
Northern Shoveler	*Anas clypeata*	EU Birds Directive Annex II & III Bird Species Birds of Conservation Concern - Red List	23/07/2012
Peregrine Falcon	*Falco peregrinus*	EU Birds Directive - Annex I Bird Species	31/08/2017
Razorbill	*Alca torda*	Birds of Conservation Concern - Amber List	31/12/2011
Red-breasted Merganser	*Mergus serrator*	EU Birds Directive - Annex II Bird Species	31/12/2011
Red-throated Diver	*Gavia stellata*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Ringed Plover	*Charadrius hiaticula*	Birds of Conservation Concern - Amber List	31/12/2011

Common Name	Latin Name	Designation/Threat Level	Record Date
Roseate Tern	*Sterna dougallii*	EU Birds Directive - Annex I Bird Species OSPAR Convention: Threatened Species Birds of Conservation Concern - Amber List	31/12/2011
Sand Martin	*Riparia riparia*	Birds of Conservation Concern - Amber List	31/12/2011
Sandwich Tern	*Sterna sandvicensis*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Amber List	31/12/2011
Sky Lark	*Alauda arvensis*	Birds of Conservation Concern - Amber List	31/12/2011
Stock Pigeon	*Columba oenas*	Birds of Conservation Concern - Amber List	31/12/2011
Tufted Duck	*Aythya fuligula*	EU Birds Directive - Annex II & III Bird Species Birds of Conservation Concern - Amber List	09/05/2020
Whooper Swan	*Cygnus cygnus*	EU Birds Directive - Annex I Bird Species Birds of Conservation Concern - Amber List	20/04/2012
Yellowhammer	*Emberiza citrinella*	Birds of Conservation Concern - Red List	31/12/2011
Invertebrates			
Grayling	*Hipparchia semele*	Threatened Species: Near threatened	31/08/2010
Small Heath	*Coenonympha pamphilus*	Threatened Species: Near threatened	10/08/2017
Wall	*Lasiommata megera*	Threatened Species: Endangered	24/05/2010
Andrena	*Melandrena nigroaenea*	Threatened Species: Vulnerable	26/03/2022
Large Red Tailed Bumble Bee	*Bombus (Melanobombus) lapidarius*	Threatened Species: Near threatened	02/04/2021
Tawny Mining Bee	*Andrena fulva*	Threatened Species: Regionally Extinct	04/04/2021
Flowering plant			
Cornflower	*Centaurea cyanus*	Threatened Species: Regionally Extinct	30/06/2019
Mammals (Marine)			
Bottle-nosed Dolphin	*Tursiops truncatus*	EU Habitats Directive: Annex IV Wildlife Act 1976 & Amendments	22/01/2012
Common Dolphin	*Delphinus delphis*	EU Habitats Directive: Annex IV Wildlife Act 1976 & Amendments	16/02/2011
Common Porpoise	*Phocoena phocoena*	EU Habitats Directive: Annexes II & IV Wildlife Act 1976 & Amendments OSPAR Convention	09/04/2019
Grey Seal	*Halichoerus grypus*	EU Habitats Directive: Annex IV Wildlife Act 1976 & Amendments	09/10/2020
Mammals (Terrestrial)			
Brown Long-eared Bat	*Plecotus auritus*	EU Habitats Directive: Annex IV Wildlife Act 1976 & Amendments	01/05/2012
Eurasian Badger	*Meles meles*	Wildlife Act 1976 & Amendments	15/07/2015
Eurasian Pygmy Shrew	*Sorex minutus*	Wildlife Act 1976 & Amendments	05/05/2018
Eurasian Red Squirrel	*Sciurus vulgaris*	Wildlife Act 1976 & Amendments	16/07/2018
Lesser Noctule	*Nyctalus leisleri*	EU Habitats Directive: Annex IV Wildlife Act 1976 & Amendments	01/05/2012
Common Pipistrelle	*Pipistrellus pipistrellus sensu lato*	EU Habitats Directive: Annex IV Wildlife Act 1976 & Amendments	01/05/2012
Soprano Pipistrelle	*Pipistrellus pygmaeus*	EU Habitats Directive: Annex IV Wildlife Act 1976 & Amendments	01/05/2012

Common Name	Latin Name	Designation/Threat Level	Record Date
West European Hedgehog	*Erinaceus europaeus*	Wildlife Act 1976 & Amendments	20/06/2021
Reptiles			
Common Lizard	*Zootoca vivipara*	Wildlife Act 1976 & Amendments	22/08/2018

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