Tymon Park Intergenerational Centre Development, Co. Dublin

Ecological Impact Assessment (Final)

April 21

2021s0272

South Dublin County Council

JBA Project Manager

Patricia Byrne
Block 660 Unit 8
The Plaza
Greenogue Business Park
Rathcoole, Dublin

Revision History

Revision Ref / Date Issued	Amendments	Issued to
S3-P01 / 02-04-2021	Draft Report	South Dublin County Council
A3-C01 / 14-04-2021	Final Report	South Dublin County Council
A3-C02 / 16-04-2021	Amendments following review	South Dublin County Council

Contract

This report describes work commissioned by South Dublin County Council, by an email dated 19/02/2021. William Mulville, Malin Lundberg and Mark Desmond of JBA Consulting carried out this work.

Prepared by ..... Malin Lundberg BSc (Hons), MSc
Ecologist

William Mulville BSc (Hons), MSc, ACIEEM
Ecologist

Mark Desmond BSc (Hons) MSc
Assistant Ecologist

Reviewed by ..... Patricia Byrne BSc (Hons), PhD, MCIEEM
Senior Ecologist

Purpose

This document has been prepared as a Final Report for South Dublin County Council. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

JBA Consulting has no liability regarding the use of this report except to South Dublin County Council.

Copyright

Carbon Footprint

A printed copy of the main text in this document will result in a carbon footprint of 247g if 100% post-consumer recycled paper is used and 315g if primary-source paper is used. These figures assume the report is printed in black and white on A4 paper and in duplex.

JBA is aiming to reduce its per capita carbon emissions.

Contents

List of Figures

List of Tables

Abbreviations

AA	Appropriate Assessment
EC	European Communities
EcIA	Ecological Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
GIS	Geographical Information Systems
NBDC	National Biodiversity Data Centre
NPWS	National Parks and Wildlife Service
pNHA	Proposed Natural Heritage Area
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SDCC	South Dublin County Council
SPA	Special Protection Area
SuDS	Sustainable Drainage System
WFD	Water Framework Directive
WWTP	Waste Water Treatment Plant
ZoI	Zone of Influence

1 Introduction

This Ecological Impact Assessment (EcIA) has been prepared by JBA Consulting in relation to a planning application by South Dublin County Council for the proposed development of an Intergenerational Centre located in Tymon Park, Templeogue, Co. Dublin.

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 existing site is in the south east corner of Tymon Park, Co. Dublin (Figure 1-1). It is adjacent to the pedestrian entrance and borders the car park on Wellington Lane. The site is situated directly south of the St Judes GAA Club entrance. Templeogue village centre is 2km east of the site with suburban housing spanning the distance between it and the site. The site is bordered by the Tymon Park ponds to south, with sparse woodland beyond for 400m. The R137 is further south again, followed by the River Dodder which is approximately 700m away at the closest point. Amenity grass and parkland of Tymon Park is present for 500m west of the site boundary and borders the M50 motorway. The River Poddle is located approximately 800m to the north at the closest point.

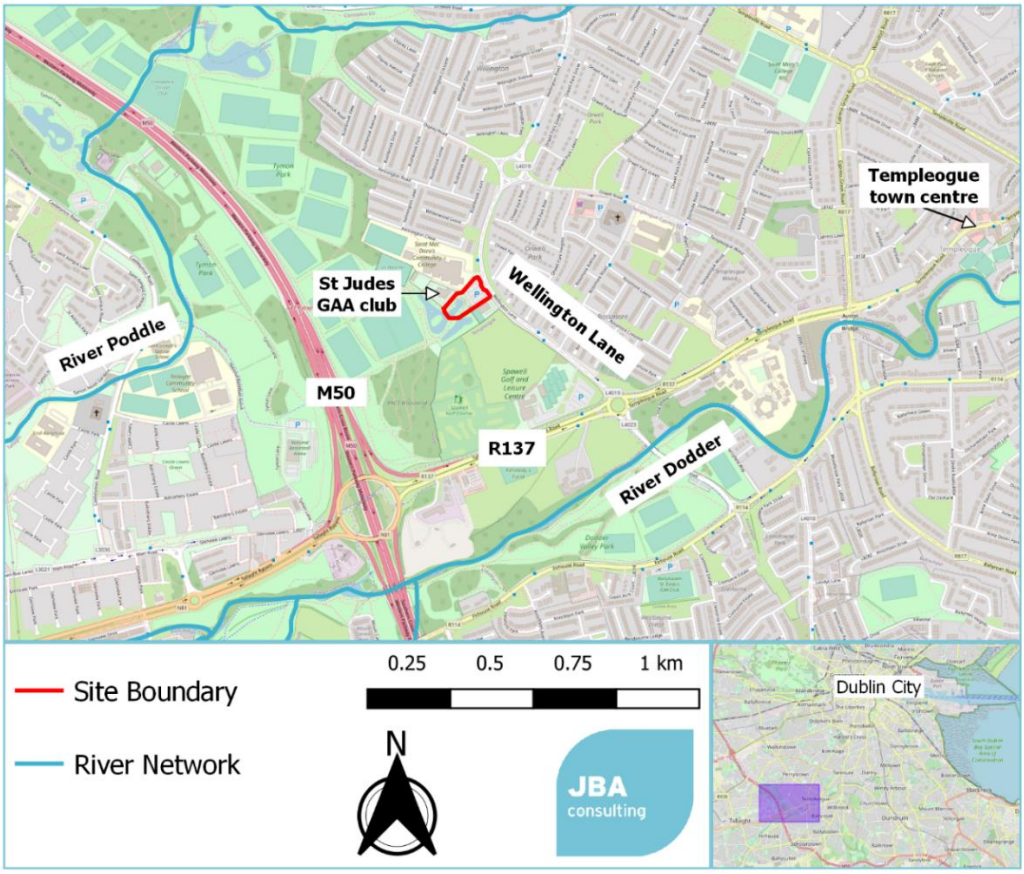


Figure 1-1: Site location and local watercourses (ESRI, 2021; OSM 2021)

2 Project Description

2.1 The 'Project'

The proposed development will consist of a single building, with associated semi-covered terrace and footpaths. The developments building will be split between a café with south facing terraced seating and a multifunctional indoor community space (Appendix A). The building itself will have a footprint of 190 m2 and a gross footprint of 449 m2 including terraces and associated paved area, outlined in Figure 2-1.

The landscape plan (Appendix B) for the proposed facility ensures the building is integrated into the parkland setting; the landscape plan realigns the vehicular route; upgrading the walking route into the park from Wellington Road and providing an enhanced pedestrian entrance to the park; putting the emphasis on pedestrian / wheelchair access and as well as providing cycle parking. The plan also provides for compensatory planting and enhances the pollinator planting within the area. The proposed green roof helps to integrate the facility into the parks landscape, provides an ecological habitat and enhances sustainable drainage.

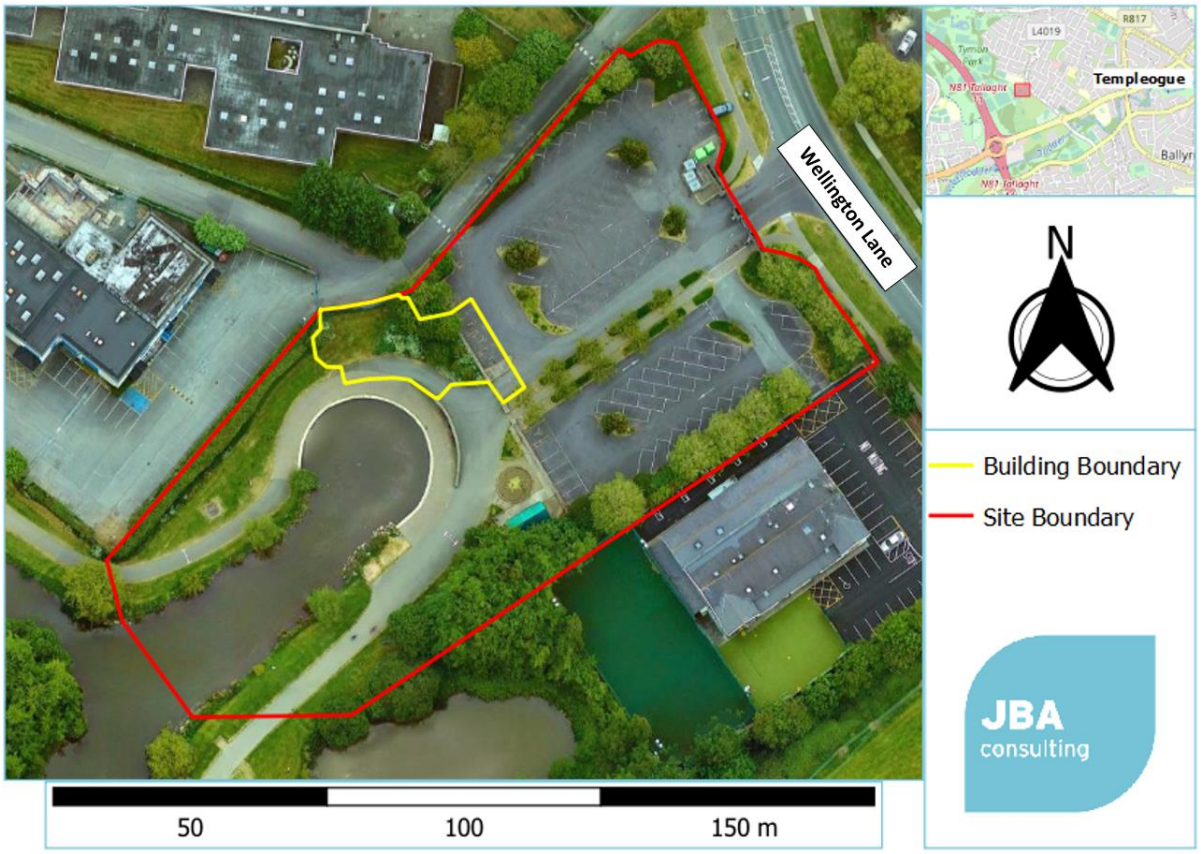


Figure 2-1: The boundaries of the proposed development

2.2 Construction Phase

The terrace and floor will be a concrete slab and the walls will be masonry clad in stone to front and render to rear. The roof will consist of concrete slab with a green roof planted with native pollinator friendly wildflower species to integrate the building with the parkland setting and for attenuation and biodiversity.

The estimated timeframe for construction is 12 months, circa June 2022 – May 2023.

Construction compound will be in a section of the adjacent car park.

Any waste produced will be removed from the site and disposed of at a licenced facility

2.3 Operation phase

The opening hours of the intergenerational centre is broadly in line with the parks opening hours. Individual events or meetings may extend the opening hours of the facility (though not the park) to 10pm year-round for events.

Foul water will connect to the existing foul sewer adjacent to the south side of the car park, adjacent to Wellington Lane. Surface water will be dealt with by green roofs and bioretention on site. The remainder will be dealt with by local soakaway or connection to surface water drain on Wellington Lane in consultation with SDCC Drainage Section.

The building will have external lighting, including forecourt, terrace and service terrace. Pond/flood lighting is also proposed.

3 Methodology

3.1 The EcIA Team

This EcIA was completed by William Mulville (BSc (Hons), MSc) and Malin Lundberg (BSc (Hons), MSc), experienced field ecologists with JBA and Mark Desmond (BSc (Hons), MSc), an assistant ecologist with JBA. The assessment report has been reviewed by Senior Ecologist Patricia Byrne (BSc (Hons), PhD), who has authored and reviewed numerous ecological assessments under the Habitats Directive. Patricia Byrne is a full member of the Chartered Institute of Ecological and Environmental Management (CIEEM).

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 Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, (CIEEM, 2018).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft) Environmental Protection Agency (EPA, 2017).
- Best Practice Guidance for habitat Survey and Mapping, The Heritage Council. (Smith et al. 2011).

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 was conducted using the National Biodiversity Data Centre (NBDC) Mapping System (NBDC, 2021). A 10km grid square was used to encompass the study area and species records were extracted from the map at a 10km² resolution.

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. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- (NPWS, 2019b). The Status of EU Protected Habitats and Species in Ireland. Habitats Assessment Volume 2. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- (NPWS, 2019c). The Status of EU Protected Habitats and Species in Ireland. Species Assessment Volume 3. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- Environmental Protection Agency (EPA) 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; Accessed March 2021.;
- All Ireland Red Data lists for vascular flora, mammals, butterflies, non-marine molluscs, dragonflies & damselflies, amphibians and fish;
- Water Framework Directive (WFD) 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. For the majority of the project, impacts will be limited to within the site boundary. However, for impacts relating to airborne emissions, surface and ground water and disturbance, the ZoI is extended to 1km for noise pollution, 5km for air pollution and ground/surface water pollution and extended to 10km to include any supported SPAs/SACs.

3.5.2 Field Surveys

Two surveys were carried out to inform the ecological baseline of the site. Habitat and Common Frog surveys were carried out on 26/02/2021 by William Mulville and Mark Desmond of JBA. A Smooth Newt survey was performed by Ross Macklin of Triturus Environmental Ltd. to assess for presence and breeding activity.

Habitat Survey:

The survey recorded habitats and flora within the site areas boundary, the presence or likely presence of protected species, as well as the presence of their potential habitat was recorded. Aerial photographs and site maps assisted the habitat survey. Habitats have been named and described following A Guide to Habitats in Ireland by Fossitt (2000). Nomenclature for higher plants principally follows that given in Webb's An Irish Flora (Parnell and Curtis, 2012).

Amphibian Surveys:

Common Frog *Rana Temporaria*

A walkover survey for Common Frog spawn was performed to assess the development area as a breeding site. This survey encompassed the pond within the site boundary at Tymon Park, covering the entire pond and areas outside the site boundary as the development will affect the pond as a whole. This survey encompassed the entire pond area.

The Survey methods were in general accordance with those outlined in the following

documents:

- Best Practise Guidance for Habitat Survey and Mapping, by the Heritage Council (Smith et al., 2011);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009);

Smooth Newt *Triturus vulgaris*

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, these small traces of environmental DNA (eDNA) can be detected to confirm the presence or absence of the target species within the waterbody. eDNA sampling for Smooth Newt Triturus vulgaris was carried out on 8 March 2021 *(*see Appendix F for results and methodology*).*

3.6 Screening of Ecological Features

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

The proposal has undergone Appropriate Assessment Screening under the Habitats Directive (92/43/EEC) and screening for Environmental Impact Assessment. The screenings concluded that there is no real likelihood of significant effects on the environment arising from the proposed development and a determination has been made that an Environmental Impact Assessment (EIA) is not required. However, an informal screening process is presented at the start of the results section of this report 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.

3.7 Assessment of the Effects on Ecological 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.

3.7.1 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 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 may 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.

Table 3-1: Examples of criteria used to define the value of ecological features

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 Wildlife Acts 1976 to 2018 and 2020 revision. A species included in the Irish Red Data Lists/Books. Significant populations of breeding birds.
Regional/County (South Dublin County)	Species and habitats of special conservation significance within South Dublin County. 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. Common and widespread species.

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

Table 3-2: Examples of criteria used to define the value of ecological features of local importance (NRA, 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 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

Level of Value	Examples of Criteria
	in maintaining habitat links

3.7.2 Magnitude of Impacts

Ecological impacts can be categorised and assessed in a number of ways. They can be considered to be:

- Positive - A change which improves the quality of the environment.
- Neutral - A change that does not affect the quality of the environment.
- Negative - A change which reduces the quality of the environment. A negative impact can be sufficiently minimised or eliminated by the adoption of appropriate mitigation measures.
- Uncertain - When the full consequences of a change in the environment cannot be described.

In addition, the nature of impact can also be described in a number of ways, including:

- Direct/Indirect - a direct impact could include the loss of a species or habitat, whereas an indirect impact could be as a result of noise, dust or disturbance.
- Irreversible - when the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost. Alternatively, impacts can be temporary in nature, with the baseline condition restored after a period of time; this could occur over the short-term (1-2 years), medium-term (2-10 years) or long-term (+10 years).
- Cumulative - the addition of many small impacts to create one larger, more significant impact.
- Synergistic: Where the resultant impact is of greater significance than the sum of its constituents.

These factors are assessed together to determine the magnitude of the impact on the status of a habitat or species population, and on the integrity of the site that supports them. Professional judgement is then used to assign the impacts on the receptors to one of four classes of magnitude, detailed in Table 3-3.

Table 3-3: Definition of magnitude.

Magnitude	Definition
High	An irreversible or long-term impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group. If adverse, this is likely to threaten its sustainability; if beneficial, this is likely to enhance its conservation status.
Medium	A medium to long-term impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group, which if adverse, is unlikely to threaten its sustainability (or if beneficial, is likely to be sustainable but is unlikely to enhance its conservation status.
Low	A short-term but temporary impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group that is within the range of variation normally experienced between years.
Negligible	A short-term but temporary impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group that is within the normal range of annual variation.

3.7.3 Significance of impacts

The significance of an impact is a product of the value of the ecological feature and the magnitude of the impact on it, moderated by professional judgement. Table 3-4 overleaf shows a matrix which is used for guidance in the assessment of significance, with impacts being considered to be of major, moderate or minor significance, or negligible. Impacts can also either be assessed as positive or negative using the same matrix.

Table 3-4: Significance of impacts matrix.

Value of feature	Magnitude of impact			
	High	Medium	Low	Negligible
International	Major	Major	Moderate	Neutral
National	Major	Moderate	Minor	Neutral
Regional / County	Moderate	Minor	Minor	Neutral
Local	Minor	Minor	Negligible	Neutral
Less than local	Negligible	Negligible	Negligible	Neutral

3.7.4 Residual Impacts

The project is assessed including some designed-in mitigation. This is done where mitigation is proven to be effective and will be implemented effectively with a high certainty. Where significant residual impacts are still identified, further mitigation measures will be proposed as part of the Ecological Impact Assessment process to avoid, reduce or minimise them. Each impact assessment section assigns a final significance level to the impact described, which considers and includes the implementation of any stated mitigation measures; these are the residual impacts.

3.8 Cumulative Impacts

Potential sources of cumulative impacts were identified based on the ecology of valued ecological features. Potential sources of cumulative impacts were sought within ranges, territories or catchments where there is the potential for a significant impact on a site or species. The plans and projects identified as potential sources of cumulative impacts are described in Section 5.

3.9 Limitations and Constraints

This EcIA is based on a site visit and existing data from the above-mentioned sources. The report necessarily relies on some assumptions and is inevitably subject to some limitations. These do not affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- Surveyor bias may lead to differences of opinion with regards to the ecological value of the affected area; however, best professional judgement has been used at all times and surveyors were sufficiently experienced to be able to assess the likely impacts that have occurred.
- 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. Any changes to the proposed works will require an assessment by a suitably qualified ecologist to determine if re-assessment is required.
- Adverse weather can cause delays to the schedule and alter the timing of works. This has been accounted for using a worst-case scenario where possible.
- The site visit was carried out in March 2021, and the data does not reflect the whole ecology of the site throughout the year. In particular, the timing of the survey did not allow for an assessment of the usage of the site by bat species. Further surveys for bats are proposed to be undertaken in late spring/summer. The precautionary principle is used at all times when determining potential ecological sensitivity of the site

4 Baseline Conditions

These baseline conditions present information gathered from existing reports and desk-based sources as detailed in Section 4.1 and site visit conducted on 26/02/2020.

4.1 Desk-based Assessment

4.1.1 Designated Sites

This section lists the designated sites of National importance. The Zone of Influence (ZoI) for this project is a 1**0**km general radius for statutory sites and non-statutory sites. Table 4-1 below lists these designated sites with their respective importance and distance from the proposed site development. Table 4-2 and Table 4-3 displays site descriptions and their respective ecological features. 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 site.

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

Name	Designation	Importance	Distance from site
Dodder Valley [000991]	pNHA	National	0.8km
Grand Canal [002104]	pNHA	National	4.1km
Glenasmole Valley [001209]	SAC, pNHA	International	4.9km
Lugmore Glen [001212]	pNHA	National	6.0km
Liffey Valley [000128]	pNHA	National	6.5km
Fitzsimon's Wood [001753]	pNHA	National	6.7km
Royal Canal [002103]	pNHA	National	8.0km
Wicklow Mountains [002122]	SAC	International	8.1km
Wicklow Mountains [004040]	SPA	International	8.1km
South Dublin Bay [000210]	SAC, pNHA	International	8.4km
South Dublin Bay and River Tolka Estuary [004024]	SPA	International	8.4km
Booterstown Marsh [001205]	pNHA	National	8.5km
Slade Of Saggart And Crooksling Glen [000211]	pNHA	National	8.6km
North Dublin Bay [000206]	pNHA	International	9.2km
Dolphins, Dublin Docks [000201]	pNHA	National	9.9km

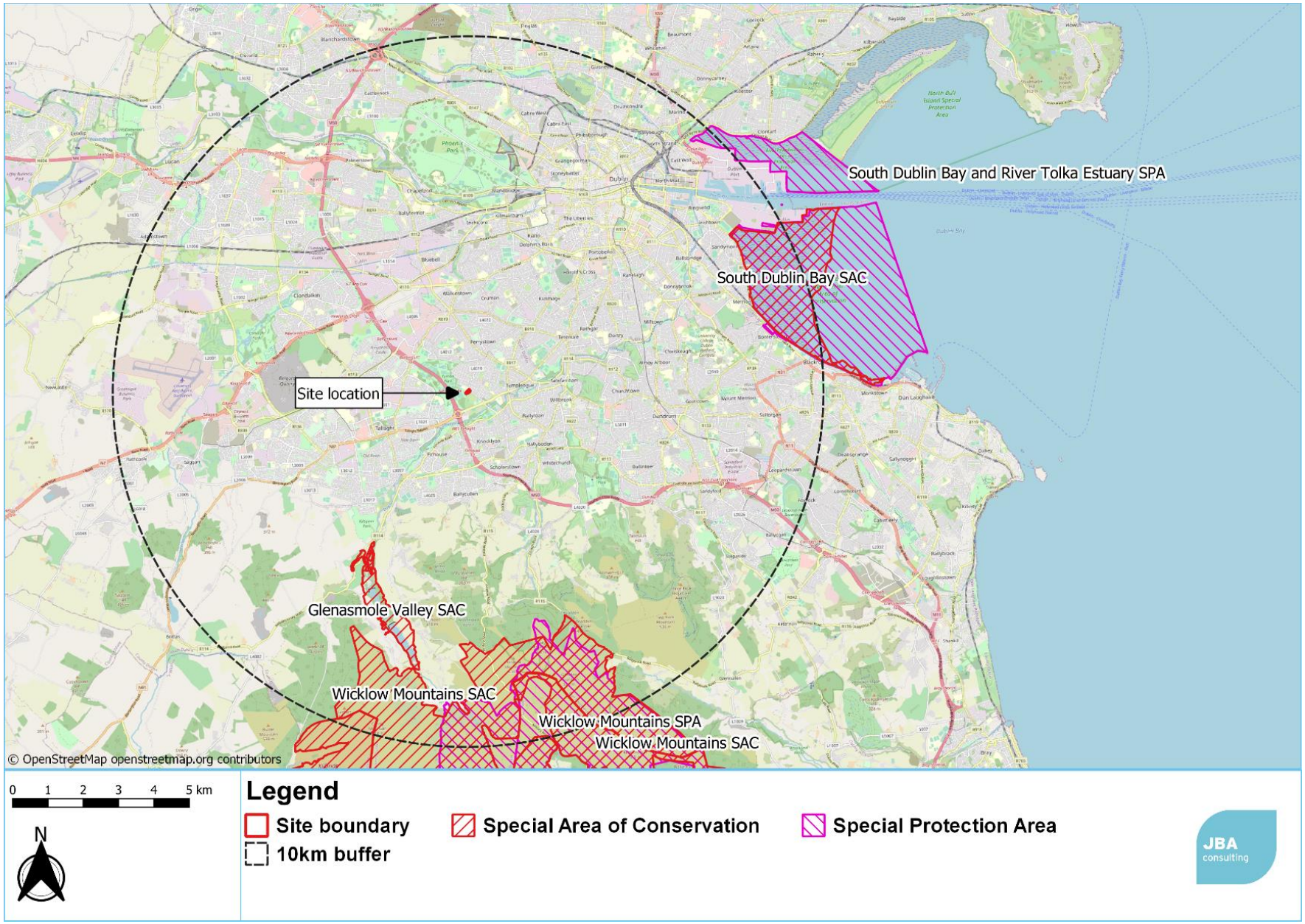


Figure 4-1: Statutory designated sites within the ZoI of the development (OSM, 2021)

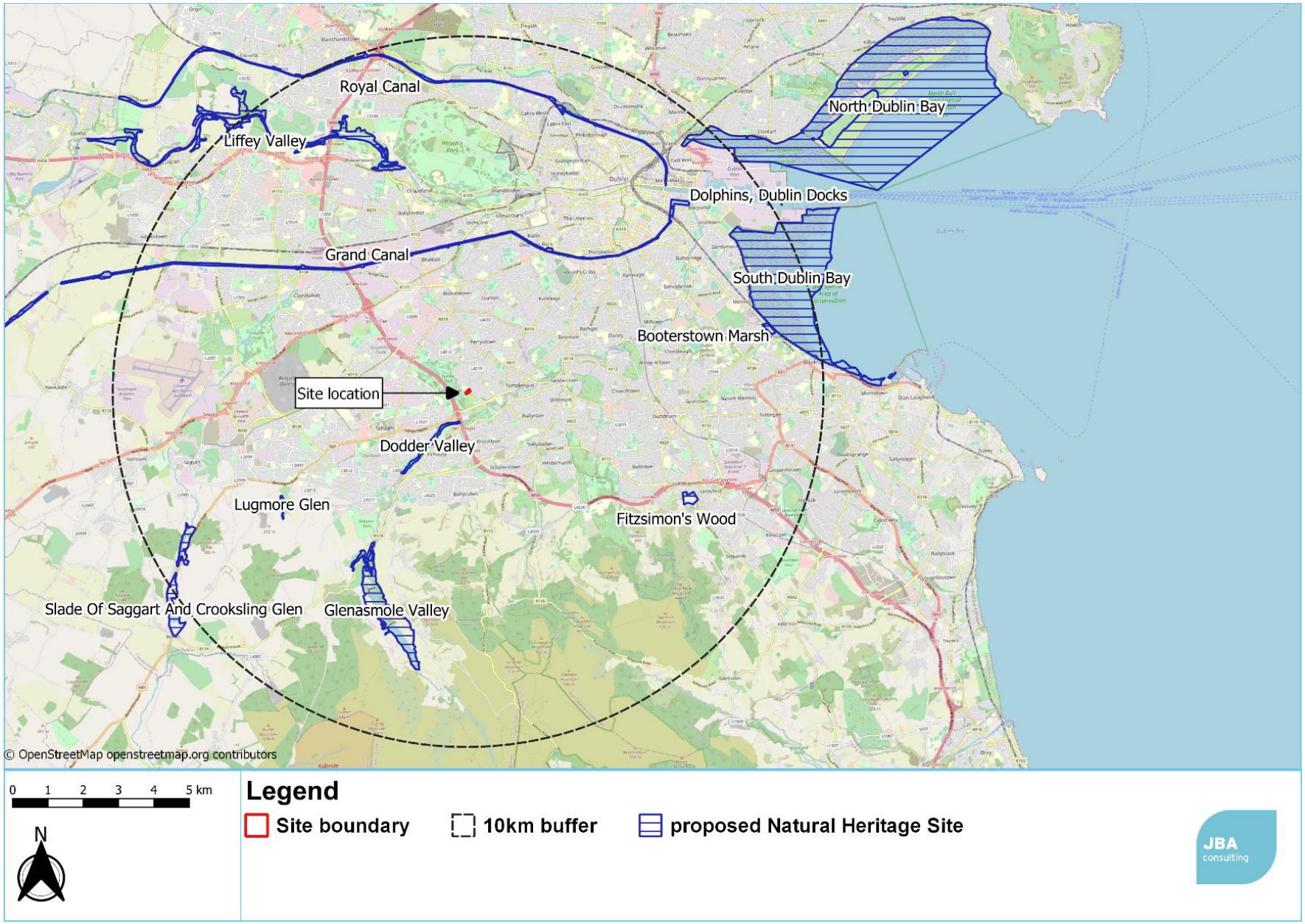


Figure 4-2: Non-statutory designated sites within the ZoI of the site works (OSM, 2021)

Table 4-2: Site briefs; Qualifying Interests; and project threats /pressures and their impacts and sources to the Natura 2000 sites within the ZoI.

Site Name	Brief	Qualifying Interests	Project-relevant Threats / Pressures: Impact (Source)
Glenasmole Valley SAC	Glenasmole Valley lies at the northern foothills of the Dublin and Wicklow Mountains. It is a glaciated valley, with drift deposits, consisting of fluvioglacial sands and gravels of varying thickness and rich in Carboniferous limestone, occurring on the slopes. Spring lines occur along both sides of the northern part of the valley. The River Dodder flows through the valley and within the site the river has been impounded to form two reservoirs. Associated with the reservoirs are areas of swamp and marsh vegetation. The valley is heavily wooded, mostly with mixed woodland of both deciduous and coniferous species but also some native woodland. Dry calcareous pasture grassland, improved to varying degrees, is a main habitat of the valley sides and occurs in association with wet grassland and, in places of seepage, fen or marsh type vegetation (NPWS, 2013).	- Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] - Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] - Petrifying springs with tufa formation (Cratoneurion) [7220] (NPWS, 2020)	No project-relevant threats or pressures identified. (Full list of threats / pressures - NPWS, 2017a)
Wicklow Mountains SAC	The site comprises the largest complex of upland habitats in eastern Ireland, with important examples of blanket bog, wet heath and dry heath, extensive in area and mostly of good quality. Alpine heath occurs at high levels, along with calcareous and siliceous rocky habitats harbouring an arctic-alpine flora. A fine series of oligotrophic lakes occur and some have *Salvelinus alpinus*. Several oakwoods of moderate quality, typical of the dry acidic woods of eastern Ireland, are found. Seven Red Data Book plant species occur, including the rare *Alchemilla alpina* and *Nitella gracilis* at its only Irish station. The site supports significant populations of breeding *Falco columbarius* and *Falco peregrinus*. The site is important for rare breeding passerines of oakwoods, notably *Phoenicurus phoenicurus* and *Phylloscopus sibilatrix*. The site also has breeding *Turdus torquatus* and *Lagopus lagopus. Lutra lutra* occurs on several of the riverine systems (NPWS, 2017b).	- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] - Natural dystrophic lakes and ponds [3160] - Northern Atlantic wet heaths with *Erica tetralix* [4010] - European dry heaths [4030] - Alpine and Boreal heaths [4060] Calaminarian grasslands of the Violetalia calaminariae [6130] - Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) - [6230] Blanket bogs (* if active bog) [7130] - Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110] - Calcareous rocky slopes with chasmophytic vegetation [8210] - Siliceous rocky slopes with chasmophytic vegetation [8220] - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] - *Lutra lutra* (Otter) [1355] (NPWS,2017c)	Urbanised areas, human habitation: Medium (both) (Full list of threats / pressures - NPWS, 2017c)

Site Name	Brief	Qualifying Interests	Project-relevant Threats / Pressures: Impact (Source)
Wicklow Mountains SPA	This is an extensive upland site, comprising a substantial part of the Wicklow Mountains. The underlying geology of the site is mainly of Leinster granites, flanked by Ordovician schists, mudstones and volcanics. The area was subject to glaciation and features fine examples of glacial lakes, deep valleys and moraines. Most of site is over 300 m, with much ground over 600 m and the highest peak of Lugnaquillia at 925 m. The substrate over much of site is peat, with poor mineral soil occurring on the slopes and lower ground. Exposed rock and scree are features of the site. The dominant habitats present are blanket bog, heaths and upland grassland. Fine examples of native Oak woodlands are found in the Glendalough area. The site, which is within the Wicklow Mountains National Park, is fragmented into about 20 separate parcels of land (NPWS, 2018).	- Merlin (*Falco columbarius*) [A098] - Peregrine (*Falco peregrinus*) [A103] (NPWS, 2020b)	No project-relevant threats or pressures identified. (Full list of threats / pressures - NPWS, 2018)
South Dublin Bay SAC	This intertidal site extends from the South Wall at Dublin Port to the West Pier at Dun Laoghaire, a distance of c. 5 km. Several permanent channels exist, the largest being Cockle Lake. A small sandy beach occurs at Merrion Gates, while some bedrock shore occurs near Dun Laoghaire. A number of small streams and drains flow into the site. The designated site possesses a fine and fairly extensive example of intertidal flats. Sediment type is predominantly sand, with 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 (NPWS, 2018b).	- 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] (NPWS, 2018b)	Urbanised areas, human habitation: High impact (outside) Paths, tracks, cycling tracks: Moderate impact (inside)# Walking, horse-riding and non-motorised vehicles: High impact (inside)# Discharges: Moderate impact (both) (Full list of threats / pressures - NPWS, 2018b)
South Dublin Bay and River Tolka Estuary SPA	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. A portion of the shallow bay waters is also included. The sediments are predominantly well-aerated sands. The sands support the largest stand of Dwarf Eelgrass on the east coast of Ireland. Sediments in the Tolka Estuary vary from soft thixotropic muds with a high organic content in the inner estuary to exposed, well aerated sands off the Bull Wall. The site possesses extensive intertidal flats which support wintering	- 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]	Urbanised areas, human habitation: High impact (outside) Walking, horse-riding and non-motorised vehicles: High impact (inside)# (Full list of threats / pressures - NPWS, 2018d)

Site Name	Brief	Qualifying Interests	Project-relevant Threats / Pressures: Impact (Source)
	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, Ringed Plover, Red Knot, Sanderling, Dunlin and Bar-tailed Godwit. It is an important site for wintering gulls, especially Black-headed Gull 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, Common Tern and Artic Tern (NPWS, 2018d).	- 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)	

* = priority Annex I habitat

= indirect threat via the increase in the local populace and workforce; and recreational activities as a result of the development

Table 4-3: Site briefs and ecological features of proposed Natural Heritage Areas within their respective 10km ZoI.

Site Name	Brief	Ecological Features of Conservation Concern
Dodder Valley pNHA	The vegetation consists of woodland scrub mainly of willows (Salix spp.), but up to thirteen species of tree have been recorded. The understorey vegetation contains a good variety of plant species. Along the banks there are wildflower meadows with a good diversity of plant species. 48 bird species have been recorded in the area and part of the river bank supports a Sand Martin (Riparia riparia) colony of up to 100 pairs (NPWS, 2009a).	Natural riverbank vegetation Birds, including Sand Martin (*Riparia riparia*)
Grand Canal pNHA	The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The Grand Canal proposed Natural Heritage Area (pNHA) comprises the canal channel and the banks on either side of it. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The diversity of the water channel is particularly high in the eastern section of the Main Line - between the Summit level at Lowtown and Inchicore. Otter spraints are found along the towpath, particularly where the canal passes over a river or stream. The Smooth Newt (*Lissotriton vulgaris*) breeds in the ponds on the bank at Gollierstown in Co. Dublin. The rare and legally protected Opposite-leaved Pondweed (*Groenlandia densa*) (Flora Protection Order 1987) is present at a number of sites in the eastern section of the Main Line, between Lowtown and Ringsend Basin in Dublin (NPWS, 2009b).	- Otter (*Lutra lutra*) - Smooth Newt (*Lissotriton vulgaris*) - Opposite-leaved Pondweed (*Groenlandia densa*)
Glenasmole Valley pNHA	AS per the description of the Glenasmole Valley SAC in Table 4-2.	See Table 4-2.
Lugmore Glen pNHA	This small wooded glen is located south-east of Saggart in Co Dublin. It is quite a narrow valley cut in glacial drift. A small stream winds through the valley. The wood is mainly comprised of	Broadleaved woodland

Site Name	Brief	Ecological Features of Conservation Concern
	dense Hazel (*Corylus avellana*) but also contains Ash (*Fraxinus excelsior*), Elder (*Sambucus nigra*) and Blackthorn (*Prunus spinosa*). The herb layer is quite rich, especially towards the stream, and the threatened Yellow Archangel, listed in the Irish Red Data Book, has also been recorded within the site (NPWS, 2009c).	Yellow Archangel (*Lamiastrum galeobdolon*)
Liffey Valley pNHA	The Liffey Valley site is situated along the River Liffey between Leixlip Bridge on the Kildare-Dublin border and downstream of the weir at Glenaulin, Palmerstown, Co. Dublin. The river is a Salmon river and there are a series of weirs along the river between Palmerstown and Leixlip. The main terrestrial habitat included within the site is mixed deciduous woodland on fertile, limey alluvium and boulder clay, in which Beech is dominant in some areas. These woodlands occur on both sides of the river and normally consist of old estate woodlands. A wet marsh occurs on the strip of land between the Mill Race and the river east of the metal bridge and west of the paint factory. This marsh is fed by seepage from the Mill Race and plant species such as Bulrush (T*ypha latifolia*), Marsh-marigold (*Caltha palustris*) and sweet-grass (*Glyceria* spp.) occur here. The threatened Green Figwort (*Scrophularia umbrosa*), a species listed in the Irish Red Data Book, is recorded from a number of stations along the river within the site. The rare and legally protected Hairy St. John's-wort (*Hypericum hirsutum*) (Flora Protection Order 1987) has been recorded from the woodlands in this site. The threatened Yellow Archangel, listed in the Irish Red Data Book, is also recorded from these woodlands (NPWS, 2009d).	- Atlantic Salmon (*Salmo salar*) - Green Figwort (*Scrophularia umbrosa*) - Hairy St. John's-wort (*Hypericum hirsutum*) - Yellow Archangel (*Lamiastrum galeobdolon*)
Fitzsimon's Wood pNHA	Fitzsimon's Wood 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 (NPWS, 2009e).	Mature woodland with *Birch Betula* spp.
Royal Canal pNHA	The Royal Canal is a man-made waterway linking the River Liffey at Dublin to the River Shannon near Tarmonbarry. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The hedgerow, although diverse, is dominated by Hawthorn (*Crataegus monogyna*). The vegetation of the towpath is usually dominated by grass species. Otter spraints are found along the towpath, particularly where the canal passes over a river or stream. The rare and legally protected Opposite-leaved Pondweed (Flora Protection Order 1987) is present at one site in Dublin, between Locks 4 and 5. *Tolypella intricata* (a stonewort listed in the Red Data Book as being vulnerable) is also in the Royal Canal in Dublin, the only site in Ireland where it is now found. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods (NPWS, 2009f).	- Otter (*Lutra lutra*) - Opposite-leaved Pondweed (*Groenlandia densa*) - *Tolypella intricata*
South Dublin Bay pNHA	Same as for South Dublin Bay SAC in Table 4-2.	See Table 4-2.
Booterstown Marsh pNHA	Booterstown Marsh is separated from Merrion Strand to the east by an embankment which carries the Dublin to Wexford railway, and to the west it is bounded by the road from Dublin to Blackrock. The marsh overlies glacial tills which in turn lie on Black Limestone. Almost the entire marsh may be flooded at irregular intervals and salinity fluctuates throughout the site under the influence of rainfall and tidal cycles. Consequently, the site exhibits an interesting gradient from	- Saltmarsh - Wetland bird species - Borrer's Saltmarshgrass

Site Name	Brief	Ecological Features of Conservation Concern
	freshwater plant communities in the northwest to a more saline-tolerant flora in the south-east. The protected plant Borrer's Saltmarshgrass (*Puccinellia fasciculata*), known only from a few locations in Ireland, is found here. Booterstown Marsh is a site of local/regional ornithological importance. Of particular interest are the high concentrations of Snipe which occur in winter - numbers up to 100 are normal, but as many as 400 (Jan. 1988) have been recorded (NPWS, 2009g).	
Slade of Saggart and Crooksling Glen pNHA	This site is located in the south-west of Co. Dublin. The northern half of the site comprises a river valley with steep tree-covered sides, while the southern side is flatter and contains two small lakes, the Brittas Ponds. The wooded areas have a well-developed ground flora. Brittas Ponds is a Wildfowl Sanctuary. The site supports the Red Data Book species Yellow Archangel (*Lamiastrum galeobdolon*) and the rare invertebrate *Halticoptera patellana* (Hymenoptera) has been recorded at the site (NPWS, 2009d).	- Wooded river valley - Wetland - *Halticoptera patellana* (Hymenoptera) - Yellow Archangel (*Lamiastrum galeobdolon*) - Wildfowl species
North Dublin Bay pNHA	The North Bull Island sand spit is a relatively recent depositional feature, formed as a result of improvements to Dublin Port during the 18th and 19th centuries. The seaward side of the island has a fine sandy beach. A substantial area of shallow marine water is included in the site. The interior of the island is excluded from the site as it has been converted to golf courses. Nature conservation is a main land use within the site. The North Bull Island dune system is one of the most important systems on the east coast and is one of the few in Ireland that is actively accreting. It possesses extensive and mostly good quality examples of embryonic, shifting marram and fixed dunes, as well as excellent examples of humid dune slacks. Both Atlantic and Mediterranean salt marshes are well represented, and a particularly good marsh zonation is shown. The salt marshes grade into mudflats and sandflats, some of which are dominated by annual Salicornia species. Petalwort (*Petalophyllum ralfsii*) occurs at its only known station away from the western seaboard (NPWS, 2018a).	- 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] - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] - Mediterranean salt meadows (*Juncetalia maritimi*) [1410] - Embryonic shifting dunes [2110] - Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] - Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] - Humid dune slacks [2190] - Petalwort
Dolphin's, Dublin Docks	The site is small and includes two mooring 'dolphins' near Pigeon House Harbour. The site is used by nesting terns; approximately 350 pair of Common Terns Sterna hirundo were recorded in 2006 (Dublin City Council, 2008).	Common Tern (*Sterna hirundo*)

Given the distance and the lack of surface water pathways, the statutory designated sites (SACs and SPAs) are not considered to be impacted by the proposed development. Therefore, they are not carried forward for further assessment in the report.

Of the non-statutory designated sites (pNHAs), only Dodder Valley pNHA has the potential to be impacted by the proposed development and is carried forward for further assessment. All other sites are screened out due to distance and the lack of pathways between the proposed development and the pNHA sites.

4.1.2 Protected Species

National Biodiversity Data Centre (NBDC)

Records of protected flora and fauna including invertebrates, amphibians, fish, birds and mammals collated from the NBDC (2021) database, present within the surrounding 10km within the past 10 years are listed in Appendix E.1. 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 and the date of the last record of this species at this location.

4.1.3 Invasive Non-native Species

A full list of recorded Invasive Non-native Species (INNS) collated from the NBDC (2021) database, present within the surrounding 10 km within the past 10 years is provided in Appendix E.2. INNS listed on the third schedule of the EC (Birds and Natural Habitats) Regulations 2011 S.I. No. 477/2011 are shown in Table 4-4 below.

Table 4-4: Proximity of invasive non-native species to the proposed site

Invasive Non-native Species	Proximity to Site
Giant-rhubarb *Gunnera tinctorial*	0.6km
Japanese Knotweed *Fallopia japonica*	0.7km
Eastern Grey Squirrel *Sciurus carolinensis*	0.7km
Harlequin Ladybird *Harmonia axyridis*	0.9km
Red-eared Terrapin *Trachemys scripta*	0.9km
American Mink *Mustela vison*	0.9km
Indian Balsam *Impatiens glandulifera*	1.0km
Three-cornered *Garlic Allium triquetrum*	1.2km
Giant Hogweed *Heracleum mantegazzianum*	1.7km
Brown Rat *Rattus norvegicus*	1.9km
Himalayan Knotweed *Persicaria wallichii*	2.0km
Fallow Deer *Dama dama*	2.0km
Fallopia japonica x sachalinensis = F. x bohemica	2.8km
American Skunk-cabbage *Lysichiton americanus*	3.0km
Canadian Waterweed *Elodea canadensis*	4.2km
Rhododendron ponticum	5.1km
Sika Deer *Cervus nippon*	7.9km

4.2 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.

4.2.1 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 (refer below).

4.2.2 Surface Water Status

The current WFD status (2013-2018) of the River Dodder, section DODDER_040, located by the proposed works is 'Poor' and is also considered to be 'At Risk' (EPA, 2021). This 'Poor' classification status was a result of a biological element of the WFD classification where the invertebrate status is 'Poor'. River Poddle, section PODDLE_010, has not been assigned a status though it is 'At Risk' (EPA, 2021).

The proposed works will need to ensure that the goal of 'Good Status' is achievable by the 2021 target date, and that the proposed works will not result in any reduction of status.

4.2.3 Groundwater Status

The groundwater body which underlies the proposed works site is the Dublin groundwater body (IE_EA_G_008). The WFD status for this groundwater body is currently marked as 'Good'; while its risk status is currently under review (EPA, 2021).

The proposed activities will need to ensure that the proposed works will have no negative effect on this groundwater body and will support their maintaining 'Good' status into the future.

4.3 Site Visit and Survey Results

A baseline ecological survey of the site was conducted by JBA Ecologists, William Mulville and Mark Desmond, on 26/02/2021. Habitats and species recorded are presented in detail in the following sections.

4.3.1 Habitats

The value of each habitat is based on the site visit. Habitats recorded in and around the site boundary are displayed in Table 4-5 and Figure 4-3. The habitat map is also available to view in Appendix C.

Table 4-5: Habitats recorded during site visit

Habitat	Fossitt Code
Buildings and artificial surfaces	BL3
Amenity grassland (improved)	GA2
(Mixed) broadleaved woodland	WD1
Artificial lakes and ponds	FL8
Ornamental/non-native shrub	WS3
Reed and large sedge swamps	FS1
Hedgerows	WL1
Treelines	WL2

Figure 4-3: Habitat map

Buildings and artificial surfaces (BL3)

Artificial surfaces make up a large percentage of the surface area within the site boundary and includes pathways around the sites pond area and Tymon Park's car parking. This habitat does not contain significant species presence and is considered of less than local ecological importance.

Amenity grassland (improved) (GA2)

This habitat borders artificial surfaces as well as the pond within the site boundary. Floral species recorded include Perennial Rye-grass *Lolium perenne*, Daisy *Bellis perennis*, Dock *Rumex* spp., Creeping Buttercup *Ranunculus repens*, Hogweed *Heracleum sphondylium* and assemblages of Ground Ivy *Glechoma hederacea* where amenity grassland borders the broadleaved woodland. The non-native species, Winter Heliotrope *Petasites fragrans* was recorded in the north grassland verge. This habitat is considered of less than local ecological importance.

(Mixed) broadleaved woodland (WD1)

Broadleaved woodland separates the two ponds in Tymon Park and is present directly adjacent to the proposed building site (Figure 4-4). Bird nests were found in the woodland to south of the site. No bat roosting sites were observed. Floral species include Willow *Salix* spp., Beech *Fagus sylvatica*, Silver Birch *Betula pendula*, Ivy *Hedera hibernica*, Ground Ivy, Hogweed and Cow Parsley *Anthriscus sylvestris*. This habitat is considered to be of higher local ecological importance.

Figure 4-4: Patch of mixed broadleaved woodland

Artificial Lakes and Ponds (FL8)

An artificial pond habitat is found in the centre of the site area, adjacent to proposed building works (Figure 4-5 overleaf). Sections of pond showed signs eutrophication and sediment input from areas of surface water run-off (outside the site boundary) leading to areas of increased turbidity. Macrophytes were not identifiable but presence of frog spawn was recorded approximately 60 metres outside the sites' boundary line, and within the same habitat. This identifies this habitat as a breeding site for amphibians and is therefore of higher local ecological importance.

Figure 4-5: Artificial lake and pond habitat, amenity grassland and hedgerow

Ornamental/non-native shrub (WS3)

Small areas of non-native, ornamental shrubbery bordered both broadleaved woodland habitats. This habitat is considered of less than local ecological importance.

Reed and large sedge swamps (FS1)

Common Reed *Phragmites australis*, Soft Rush *Juncus effuses*, with Willow *Salix* spp. saplings and Willowherb *Epilobium* spp. occurring sporadically, create two linear wet reed habitats. One exists along the banks of the pond within the site boundary and the other along the banks of the pond just south of the site boundary. This habitat is important cover for amphibians and aquatic invertebrates and is therefore considered to be of higher local ecological importance.

Hedgerows (WL1)

A linear hedgerow habitat exists along the northern site boundary line which includes Hawthorn *Crataegus monogyna*, Bramble *Rubus fruticosus* agg., Ivy and Willowherb (Figure 4-5). This habitat is important cover for small birds and mammals and is therefore considered to be of local ecological importance.

Treelines (WL2)

A treeline borders the carpark in the north and south. The trees are early mature and do not have bat roost potential. No bird nests were observed. This linear habitat is of low local ecological importance.

4.3.2 Flora

No protected floral species were recorded by the JBA Ecologists during the ecological walkover survey of the proposed site. Furthermore, the NBDC shows no record of any protected flora species being present within the site or its immediate vicinity (NBDC, 2021).

4.3.3 Fauna

Otter

The ecological walkover survey found no evidence of Otter *Lutra lutra* habitation within or directly adjacent to the site. Records on NBDC (2021) website shows that Otter is present along River Dodder. However, given that there is no watercourse connected with the ponds at the site, the species is not likely to occur within the site. Otter is therefore not carried forward in the assessment.

Terrestrial mammals (Badger, Irish Hare, Hedgehog and Pygmy Shrew)

The ecological walkover survey found no evidence of Badger *Meles meles* habitation within or directly adjacent to the site. However, there are recent records from 2016 (NBDC) of observed Badger activity within 500m of the site and within Tymon Park. Under the precautionary principal, Badger will be carried forward for further assessment in this report.

Other mammals protected under the Wildlife Act and/or the EU Habitats Directive that have been recorded under the NBDC within 2km of the site include:

- Irish Hare *Lepus timidus subsp. hibernicus*
- Hedgehog *Erinaceus europaeus*
- *Pygmy Shrew Sorex minutus*

No evidence of these mammals was found during the ecological survey, but they may occur within the vicinity of the development. Under the precautionary principal, these species will be carried forward for further assessment in this report.

In the context of this site, these species are considered to be of high local ecological importance.

Bats

Desk Study

Six species of bat, namely Common Pipistrelle *Pipistrellus pipistrellus*; Soprano Pipistrelle *Pipistrellus pygmaeus*; Leisler's Bat *Nyctalus leisleri*; Daubenton's Bat *Myotis daubentonii*; Nathusius's Pipistrelle Pipistrellus nathusii; and Natterer's Bat Myotis nattereri have been recorded in recent years within 10km of the proposed development (NBDC, 2021). The suitability index of the area for bats is moderate (NBDC, 2021) and in the context of the urban landscape and the proximity to River Dodder, the site is considered to be of regional ecological importance for bats.

Bat presence

Features with bat roost potential were not recorded within the site.

Further bat surveys will be carried out over spring and summer months (May to September) of 2021 to allow for the preparation of a construction management plan and bat protection plan for construction and operational stages. Bats are therefore carried forward for further assessment in this report.

Breeding Birds

During the ecological walkover survey Mute Swan *Cygnus olor*, Black-headed Gull *Larus ridibundus*, Herring Gull *Larus argentatus*, Mallard *Anas platyrhynchos* and Tufted Duck *Aythya fuligula* were recorded within the pond. Mallard and Tufted Duck are protected under Annexes II and III of the EU Bird's Directive. Mute Swan and Tufted Duck are amber listed under Birds of Conservation Concern Ireland (BoCCI) and Black-headed Gull and Herring Gull are red listed (Colhoun and Cummins, 2013). BoCCI lists birds which are decreasing in Ireland and worldwide. Amber-listed species have an unfavourable status in Europe and have moderately declined in abundance, while red-listed species are globally threatened and have rapidly declined in abundance.

Blackbird *Turdus merula*, Blue Tit *Cyanistes caeruleus*, Wood Pigeon *Columba palumbus,* Goldcrest *Regulus regulus*, and Robin *Erithacus rubecula* were also recorded in the woodland habitat and bird nests were found in the woodland to south of the site. The two latter bird species are birds of conservation concern (Amber List - Breeding), while Wood Pigeon is afforded protection under Annexes II and III of EU's Birds Directive.

The site has been valued as being of high local ecological importance (higher value) for breeding birds (Mallard, Mute Swan, Tufted Duck, Wood Pigeon, Goldcrest and Robin).

Amphibians

Spawn of Common Frog *Rana temporaria* was recorded in the pond during the walkover survey (Figure 4-3 and Figure 4-6 overleaf). Common Frog is protected under Annex V of the EU Habitats Directive, Appendix III of the Berne Convention and the Wildlife Act 1976 (& Amendments).

Water samples have been collected to analyse the presence of eDNA from Smooth Newt *Lissotriton vulgaris* and a night-based survey will be conducted in April/May. Using the precautionary principle,

Smooth Newt is considered likely to be present within the site. The species is protected under the Wildlife Act 1976 (& Amendments).

Later eDNA sampling of the pondwater for Smooth Newt gave a negative result, indicating Smooth Newt does not occur in the waterbody. There will be a follow-up night torch survey of the pond to either confirm or correct these initial findings. Amphibians are considered to be of high local ecological importance.

Figure 4-6: Frog spawn recorded in the pond.

Insects

There is an exposed earth bank where wooden fencing is deteriorating around the woodland habitat at the footprint of the proposed intergenerational centre (Figure 4-7). This habitat is used by nesting solitary bees. Insects, such as solitary bees, are important pollinators of plants and for food production. Insects are in decline worldwide and in Ireland, several of them are rare or threatened due to reduction of suitable habitats.

The site is considered to be of high local ecological importance for insects (solitary bees).

Figure 4-7: Exposed earth bank providing habitat for solitary bees.

4.4 Invasive Non-native species

The walkover survey did not record any INNS listed on the third schedule of the EC (Birds and Natural Habitats) Regulations 2011 S.I. No. 477/2011. However, the non-native species Winter Heliotrope was recorded in the north grassland verge. The NBDC shows no record of any additional invasive non-native species being present on-site (NBDC, 2021).

4.5 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 4-6 below. 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 4-6: Summary of ecological features and the screening assessment.

Designated site / Ecological feature	Value	Screening
Dodder Valley pNHA	National	**Screened in**
Grand Canal pNHA	National	Screened out
Glenasmole Valley SAC, pNHA	International	Screened out
Lugmore Glen pNHA	National	Screened out
Liffey Valley pNHA	National	Screened out
Fitzsimon's Wood pNHA	National	Screened out
Royal Canal pNHA	National	Screened out
Wicklow Mountains SAC	International	Screened out
Wicklow Mountains SPA	International	Screened out
South Dublin Bay SAC, pNHA	International	Screened out
South Dublin Bay and River Tolka Estuary SPA	International	Screened out
Booterstown Marsh pNHA	National	Screened out
Slade Of Saggart And Crooksling Glen pNHA	National	Screened out
North Dublin Bay SAC, pNHA	International	Screened out
Dolphins, Dublin Docks pNHA	National	Screened out
Buildings and artificial surfaces	Less than local	Screened out

Designated site / Ecological feature	Value	Screening
Amenity grassland (improved)	Less than local	Screened out
(Mixed) broadleaved woodland	Local (high)	**Screened in**
Artificial lakes and ponds	Local (high)	**Screened in**
Ornamental/non-native shrub	Less than local	Screened out
Reed and large sedge swamps	Local (high)	**Screened in**
Hedgerows	Local (high)	**Screened in**
Treelines	Local (low)	Screened out
Otter	International	Screened out
Terrestrial mammals (Badger, Irish Hare, Hedgehog and Pygmy Shrew)	Local (high)	**Screened in**
Bats	Regional	**Screened in**
Breeding birds	Local (high)	**Screened in**
Amphibians	Local (high)	**Screened in**
Insects	Local (high)	**Screened in**

5 Other Relevant Plans and Projects

5.1 Cumulative Impacts

Potential sources of cumulative impacts were identified based on the ecology of valued ecological features. Potential sources of cumulative impacts were sought within ranges, territories or catchments where there is the potential for a significant impact on identified ecological features.

5.1.1 South Dublin County Council Development Plan 2016 - 2022

The South Dublin County Council (SDCC) Development Plan sets out an overall strategy for the proper planning and sustainable development of the County. The objectives include a target of increased population and continuing the consolidation of established urban areas, support and facilitate economic activity, promote the ease of movement by sustainable modes (walking, cycling and public transport). The Plan also aims to protect and enhance surface water quality, to support, improve and protect Natura 2000 sites, and to develop an integrated Green Infrastructure network to enhance biodiversity, provide accessible parks, open spaces and recreational facilities (SDCC, 2016a).

The plan also states that work will be in conjunction with Irish Water to protect existing water and drainage infrastructure, to promote investments aiming to support environmental protection and facilitate the sustainable growth of the county (SDCC, 2016a).

A Screening for Appropriate Assessment was carried out on the plan. This concluded that there are no likely significant direct, indirect or secondary impacts of the project on any Natura 2000 sites (SDCC, 2016b).

5.1.2 Greater Dublin Drainage Strategy 2005

The Greater Dublin Drainage Strategy sets out the strategic planning for the development of waste water treatment in the Greater Dublin area in relation to the Ringsend WWTP Upgrade, Greater Dublin Drainage Project and associated wastewater network drainage projects (Irish Water, 2018). The Ringsend WWTP Upgrade includes plans to expand the WWTP to its ultimate capacity, together with associated network upgrades required. The Greater Dublin Drainage Project is planned to relieve both the Ringsend WWTP and network loading by construction of a new WWTP at Clonshaugh, an orbital sewer and provision of an outfall pipe discharging 1km north east of Ireland's Eye.

The Ringsend WWTP upgrade is in progress and carried out in stages, with an increased capacity of 400,000 PE by Q1 2021 and the ultimate capacity of 2.4 million PE to be in operation by 2024 (Irish Water, 2018).

The Greater Dublin Drainage Project is strategically important to the Dublin Region in that it will provide capacity for residential and commercial growth (Irish Water, 2018).

5.1.3 River Basin Management Plan for Ireland 2018-2021 (RBMP, 2018)

The 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 (ERBDMP) 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 ERBD Management Plan (2009-2015) and the River Basin Management Plan for Ireland (2018-2021) aim to improve the management and water quality of the Eastern RBD. Preparation of the 2nd Cycle RBMPs 2018-2021 is now underway.

5.1.4 Other Projects

Other projects dated back three years are included overleaf (Table 5-1), which are not retention applications, home extensions and/or internal alterations, have been granted planning permission in the locality (approx. 1km) of the proposed site.

Table 5-1: Projects granted planning permission since January 2018 in vicinity of proposed site.

Planning Reference	Address	Application Status	Decision date	Summary of development
SD18A/0280	CLG Naomh Jude, Wellington Lane, Templeogue, Dublin 6W	Granted Permission	27/09/2018	Construction of a single storey gym extension to the north of the existing clubhouse and construction of new skills walls to two sides of previously approved all-weather training pitch to the west of the existing clubhouse building (Ref: SD16A/0271).
SD18A/0327	6, Wellington Cottages, Templeogue, Dublin 6W	Granted Permission	28/01/2019	2 two storey, detached 5 bed dwellings and all associated works.
SD19A/0106	Social & Local Enterprise Alliance DAC, Bolbrook Enterprise Centre, Avonmore Road, Tallaght, Dublin 24	Granted Permission	05/09/2019	Demolition of 42sq.m including the entrance lobby, reception area and adjacent office; construction of extension of 140sq.m; fenestration and emergency egress doors; decorative cladding to exterior; logo and signage to facade; minor works associated with interior alterations; the works to the Community Enterprise Hall building include new fenestration and emergency egress doors; decorative cladding to exterior; logo and signage to facade; minor works associated with interior alterations; bicycle shelter; hard and soft landscaping and all associated site works.
SD20A/0206	Ballyboden St. Endas GAA, Pairc Ui Mhurchu, Firhouse Road, Dublin 16	Granted Permission	07/10/2020	The removal of existing storage containers at the rear of the existing clubhouse and construction of extended single storey changing facilities, storage areas and meeting room. The works also include internal alterations to male and female wc areas.
SD20A/0323	Bolbrook Enterprise Centre, Avonmore Road, Tallaght, Dublin 24	Granted Permission	9/2/2021	Amend granted planning permission SD19A/0106 from current tea/coffee station to an artisan coffee shop with an area of 140sq.m encompassing an internal seating and casual meeting area.

5.2 Summary of Cumulative Impacts

Following the desktop assessment of the potential adverse impacts from the relevant plans and projects identified above; adverse cumulative or in-combination impacts on the valued ecological features in the context of this proposed development are not anticipated given the proximity, scale and nature of these plans and projects / developments.

6 Potential Impacts

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 maintenance works and the site's operation following the works are assessed under the following:

- Disturbance to habitats and species
- Habitat loss
- Impacts on water quality

The following sections describes 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.

6.3 Construction Phase

6.3.1 Dodder Valley pNHA

Potential impact on Dodder Valley pNHA from the proposed development would be via land and air pathways, e.g. loss of supporting habitat or creation of dust during works. However, given the small scale of the proposed works and that the habitats within the footprint of the development are not directly related to the ecological features of Dodder Valley pNHA, the proposed development will not have any impact via land pathways. Any dust generated at the site will be local and the prevailing wind is south-west (Windfinder.com, 2021), thus away from the designated site. The proposed development will have a negligible impact on Dodder Valley pNHA.

6.3.2 Habitats and Species

(Mixed) broadleaved woodland; Hedgerows and breeding birds

The proposed development will require the removal of 11 trees of low to moderate quality within the woodland that is within the footprint of the building. Part of the hedgerow will also be removed due to the proposed building. A further 3 trees of low quality will be removed from the woodland to the south to accommodate the new maintenance entrance. Local bird species will potentially be physically disturbed from their foraging activities during the construction works and removal of vegetation during the breeding season could result in the loss of individuals, including young of the species. The temporary disturbance caused by noise and vibration will have an overall negligible impact on the local bird population. The potential mortality of individuals due to removal of trees and hedgerow would have a minor, short-term impact on a species group of local importance. Therefore, mitigation will be prescribed to avoid this scenario.

Artificial lakes and ponds; Reed and large sedge swamps; and amphibians

Potential for ecological impact on the habitats and amphibians focuses on impacts to water quality. This could be caused by accidental introduction of pollutants (hydrocarbon leakages from working machinery) and excess sediment from the excavation and soil works. The topography of the site is sloping towards the pond and as such here is potential for pollutants and sediment to enter the pond. This could lead to degradation of the pond habitat and water quality and the species it supports, notably Common Frog. In the absence of surface water-based mitigation during construction, this could result in a short to long-term, minor impact on these ecological features of local importance.

Terrestrial mammals: Badger, Irish Hare, Hedgehog and Pygmy Shrew

While no signs of Badger, Irish Hare, Hedgehog or Pygmy Shrew habitation were present during the ecological walkover, this does not ensure that the local mammal species don't occasionally visit the site area for foraging. Bearing this in mind, impacts may arise in the form of disturbance to foraging and commuting activities, as well as potential loss of life to individuals in the case of the accidents within the construction site (e.g. accidental trappings), after failure to exclude entry. The unmitigated effect to this development would result in a short-term, negligible impact on these species of local ecological importance.

Bats

The six species of bats that are potentially using the site are likely to only use it as commuting and foraging habitat.

Impacts during construction relate to external lighting and noise disturbance which could reduce the quality of foraging and commuting habitat for bats. Noise effects associated with the works would be temporary during diurnal parts of the day and no nocturnal noise effects are anticipated. Reduced habitat quality due to lighting during construction will be temporary. However, lighting used incorrectly could also impact on surrounding habitats and potentially making bat roosts present elsewhere unsuitable due to increased lighting in the area.

The proposed development is not anticipated to have an adverse impact on population numbers of the bat species identified as using the site, as there will be no reduction in potential roosting locations due to the proposed development.

Further bat surveys will be carried out over late spring and summer months (May to September) of 2021 to appropriately assess the usage of the site by bats and potential impacts the construction of the development may have on bats. This will allow for the preparation of a construction management plan and appropriate avoidance or mitigation measures for bats during construction and operation.

Insects

The development of the proposed intergenerational centre will require the removal of the earth bank that is providing nesting habitat for solitary bees. Nesting habitat for bees is scarce in the area and was not recorded anywhere else within the site boundary. The unmitigated effect of the proposed development could result in the loss of individuals nesting in the earth bank. It will also result in the loss of nesting habitat for the bee population in the area. Solitary bees don't fly very far and nest close to flowers that they can feed on, in this immediate area Stachys lantana is of importance for bees, bumblebees and other insects. As such, the loss of nesting habitat could result in a reduction of solitary bees in the area.

6.4.1 In the absence of mitigation, the loss of nesting habitat would result in a medium to long-term, minor impact on the solitary bees which are of local ecological importance.

Operational Phase

Dodder Valley pNHA

6.4.2 The operational phase of the development may increase the number of visitors to the site. Any disturbance caused by visitors will be local and not impact on the Dodder Valley pNHA. The operational phase of the development will have a neutral effect on Dodder Valley pNHA.

Habitats and Species

(Mixed) broadleaved woodland; Hedgerows; and breeding birds

The operational phase of the development may cause noise and human disturbance. Birds habiting the area would be used to human presence and noise disturbance given the urban landscape and the present usage of the park. Disturbance is unlikely to cause stress to this group. Operational impacts on these habitats and species will be neutral.

Artificial lakes and ponds; Reed and large sedge swamps; and amphibians

Operational impacts via surface water are not anticipated as the development will have green roofs and attenuation of surface water on site which will connect to existing surface water sewer at Wellington Lane.

Lighting is proposed to be installed by the pond and at the exterior of the building. Impact from lighting on amphibians is not fully known, however it may impact on their foraging behaviour and make them more vulnerable to predators. As a precaution, it is considered to have a long-term, minor impact on amphibians which are of high local importance.

Terrestrial mammals: Badger, Irish Hare, Hedgehog and Pygmy Shrew

Operational noise effects and human activity associated with the operation of the development would be temporary and intermittent during diurnal parts of the day and no nocturnal noise effects are anticipated. In the absence of mitigation, disturbance would have a negligible impact on these species.

Bats

Impacts during the operation of the site relate to external lighting at the front and rear of the building and lighting of the pond. The lighting could illuminate previously unlit commuting and foraging habitats, making it unsuitable for bats. The two ponds within and south of the proposed site are the only waterbodies in the south eastern end of Tymon Park and is likely to be important for bat commuting and foraging from the River Dodder and provide connectivity to the main ponds in the Greenhills end (north / north west) of Tymon Park.

Tymon Park is surrounded by urbanised areas, where impacts of lighting are already occurring, including flood lighting of nearby sports grounds which may prevent the bats from commuting further in the park when these lights are on. The increased lighting in the proposed site could have an adverse impact on bats using the site, particularly to light-sensitive species such as Daubenton's Bat which is highly associated with water. New lighting within the proposed site could therefore, cumulatively with existing lighting in surrounding area, impact on bat activity.

In order to fully assess the impact of this development to bats, further bat surveys will be carried out during the active season, May to September 2021, prior to any construction works commencing. This will inform designs regarding lighting of the ponds and buildings during their operational phase.

Insects

The landscape plan of the site incorporates planting of wildflowers and provides rammed earth walls which will provide both feeding and nesting habitat for solitary bees. The overall effect to this species group during operation is considered to be positive and long-term.

6.5 Invasive Non-native Species

No INNS listed on the third schedule of the EC (Birds and Natural Habitats) Regulations 2011 S.I. No. 477/2011 were recorded on site. However, there is also potential for construction machinery to get contaminated with fragments of invasive species, brought from outside areas which could result in the spread of invasive species within the site.

6.6 Summary of Impacts

The following potential significant impacts have been identified and possible mitigation is discussed in the next section:

- Pollution and siltation impacts upon the artificial lake and pond habitat and on amphibians.
- Loss of nesting habitat and potential mortality of protected bird species.
- Disturbance of commuting and foraging terrestrial mammals, including bats, as well as potentially accidental fatal entrapment for terrestrial mammals.
- Lighting disturbance to nocturnal species.

The mitigation is based on that proposed in existing 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 Construction Phase

7.1.1 General measures

Site Compound

- The site compound shall be located within the site boundary.
- The site's compound must be located at the car park at least 50m away from the ponds in Tymon Park. These compound isolation measures must be strictly adhered to ensure no spills reach the waterbody.
- Only plant and materials necessary for the construction of the works will be permitted to be stored at the compound location.
- No parking of machinery within tree root protection zones.
- Site establishment by the Contractor will include the following:

  - Site offices;

  - Site facilities (canteen, toilets, drying rooms, etc.);

  - Office for construction management team;

  - Secure compound for the storage of all on-site machinery and materials;

  - Temporary car parking facilities;

  - Temporary fencing for mammal exclusion and tree root protection zones;

  - 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.

  - The contents of any tank will be clearly marked on the tank, and a notice displayed requiring that valves and trigger guns be locked when not in use.

  - 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.

7.1.2 Habitats and Species

(Mixed) broadleaved woodland; and breeding birds

Removal and pruning of trees and hedgerow will be conducted outside of the breeding bird season (March – September 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.

Trees and hedgerows to be retained will be fenced off and no works are to be undertaken within the tree root protection zone.

The loss of trees and hedgerow will be replaced with 10 new birch trees (minimum 18-20cm girth at planting) and c.472 m^2 new pollinator friendly native hedging.

Artificial lakes and ponds; reeds and large sedge swamps; and amphibians

Water Quality

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

- CIRIA C532 Control of water pollution from construction sites. Guidance for consultants and contractors (CIRIA, 2020 - www.ciria.org)
- CIRIA C515 Groundwater control – design and practice, 2nd ed. (CIRIA, 2020 - www.ciria.org)
- CIRIA Guidance C741: *Environmental good practice on site guide* (Charles & Edwards, 2015; CIRIA, 2020 - www.ciria.org)
- Inland Fisheries Ireland (2016) *Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters*
- Inland Fisheries Ireland (2020) Planning for Watercourses in the Urban Environment. A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning
- Adoption of a surface water plan including appropriate barrier controls to prevent any potentially polluted surface water from the site reaching the ponds within and adjacent to the site.
- At no point should there be storage of any materials or vehicles/machinery within 50m of the ponds within and adjacent to the site.
- 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.
- Adoption of a surface water plan including appropriate erosion and silt controls (e.g. trenches, silt fences), when performing excavations on-site in order to prevent any uncontrolled flow of surface water (with high sediment loading) from the site into the ponds within and adjacent the site.

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 a Waste Management Plan that will be prepared prior to commencement of works. 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 procedures 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
- Spill kits will contain gloves to handle contaminated materials and sealable disposal sacks.
- 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.

7.1.3 Terrestrial mammals: Badger; Irish Hare; Hedgehog; Pygmy Shrew and Bats

Bat activity surveys will be carried out over spring and summer months (May to September) of 2021 to allow for the preparation of a construction management plan and appropriate mitigation for bats during the construction phase. Further mitigation measures may be incorporated following the results of the surveys.

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 hours, to limit disturbance to nocturnal and crepuscular animals;
- Due to the potential presence of Badger; Irish Hare; Hedgehog; and bat species, 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 retained vegetation (woodland/trees; hedgerows; and the pond).
- 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 animals 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.

7.1.4 Insects

The female of solitary bees lay the eggs so that eggs which will become females are at the back of the nest and eggs that will become males are closest to the entrance. The larvae of solitary bees stay in the nest throughout the winter and emerge as adults the following spring, male bees emerge first and females later. The window between when bees are emerging and the females begin to make their nests is short, so there will be a loss of nests and individuals. The following mitigation will minimise this impact:

- The new rammed earth walls will be created prior to removal of the existing nesting habitat in order to provide a new suitable nesting habitat for solitary bees. If this is not possible, alternative temporary embankments should be constructed in the vicinity of the construction site prior to the disturbance of the existing nesting bank to provide alternative nesting sites during the construction period.
- The existing nesting habitat will not be removed during the winter when the larvae are in the nests. The habitat should be removed in late spring, early summer when most of the adult bees have emerged.

7.1.5 Biosecurity

Although no INNS listed on the third schedule of the EC (Birds and Natural Habitats) Regulations 2011 S.I. No. 477/2011 are present on site, there is a risk that such species could be introduced during construction via machine tracks, boots or clothes that have been contaminated. Measures will put in place to ensure that there is no spread of invasive non-native species or diseases. The Check-Clean-Dry approach will be followed, ensuring that all machinery, equipment and PPE used on site should be cleaned properly before entering the development site and again before leaving the development site.

For more information refer to: www.nonnativespecies.org/checkcleandry.

7.2 Operational Phase

7.2.1 Habitats and Species

Amphibians and Bats: Lighting Design

Bat activity surveys will be carried out over spring and summer months (May to September) of 2021 to fully investigate the function served by these ponds for commuting and foraging bats in the area. This information will guide the appropriateness and the designs for any suitable lighting for the facility during its operational phase. Preliminary mitigation measures are proposed below, however further avoidance or mitigation measures may be incorporated following the results of the surveys.

Hours of illumination:

- Site lighting, including lighting of the pond if appropriate, should be switched off or at lower light output during inactive site hours (i.e. when the park and intergenerational centre is closed to the public); this would reduce impacts on bats and amphibians in the locality. Additionally, lighting should be controlled by occupancy / motion sensors so that it will remain off / low if there is no pedestrian traffic nearby.

Lighting levels and type:

- 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 to reduce the blue light component.

Column height of lamp posts:

- As bats most likely forage in the unlit areas surrounding the site, the introduction of new lighting as a result of the new development, with accompanying light spillage, is anticipated to result in the bats becoming averse to commuting and foraging within the proposed site and potentially the adjacent habitats also. In order to reduce the amount of light spillage where it is not needed, the height of lamp columns should be restricted. The use of low-height lighting bollards will be considered in a final lighting design.

Insects - Solitary bees

Rammed earth walls providing nesting habitat for solitary bees will be incorporated with the new terraced planting beds with pollinator friendly herbs. The new nesting habitat will compensate for the loss of the existing habitat and the incorporation of pollinator friendly plants will further enhance the habitat for these species. Details on enhancement measures which will also benefit insects and solitary bees are provided in section 7.2.2 below.

7.2.2 Biodiversity Enhancement

As many of the trees as possible will be retained and the major part of the hedgerow on site will be retained. The Landscape Plan includes an overall enhancement of biodiversity in the area, including planting of trees and pollinator friendly hedging within the car park and the public park. Terraced pollinator friendly planting beds with rammed earth walls providing habitat for solitary bees will be provided south west of the intergenerational centre and another area of pollinator friendly planting will be provided east of the pedestrian entrance.

The planting should incorporate native species of trees, shrub and wildflowers as it supports the highest abundance and diversity of invertebrate species, which in turn serve as prey for local bird and bat species.

The intergenerational centre will have a green roof which will integrate the building into the landscape. The green roof is part of the SuDS implemented on site and will provide habitat for species. Native wildflower species (e.g. those associated with native dry grasslands) will be planted on the roofs. This will benefit a range of invertebrate species. Suitably planted green roofs can also provide important foraging habitats for birds.

Below list provides details on proposed enhancement measures:

- A green roof, planted with native meadow wildflower and grass species, will reduce rainwater runoff, provide an ecological habitat, enhance local biodiversity and provide visual amenity.
- 10 new birch trees (minimum 18-20cm girth at planting) at two separate picnic areas to the south and west;
- 200m^2 new pollinator friendly planting within 4 new and 1 expanded planting beds. Three if the beds will be terraced, retained by rammed earth wall providing circa 6m2 nesting habitat for solitary mining bees.
- 8m^2 pollinator friendly planting within planters in two picnic areas
- 472 m^2 new pollinator friendly native hedging.

The Landscape Plan is provided in Appendix B.

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 Do Nothing Scenario

Under the current use of the site there is a neutral effect on the general ecology of the area. If the proposed works were not to go ahead, it is likely that the current regime of management of the land will continue as currently with no residual impacts.

8.2 Construction Phase

Preparation of the site for development will result in disturbance to the foraging and commuting habitat for protected species such as terrestrial mammals, bats and breeding birds. Construction works will be limited to daytime hours to limit disturbance to nocturnal animals.

The exposed earth which is currently used as nesting habitat by solitary bees will be removed due to the construction of the proposed building.

Implementation of mitigation measures during the construction phase, such as protection of retained vegetation, timing of removal of the solitary bee nesting habitat and creation of new nesting habitat, along with good site management and construction practices will help to minimise any significant and/or permanent impact on the environment. Further, measures for control of surface water will be in place to avoid any impact on water quality of the artificial lake and pond habitat and the species using the habitat (amphibians).

With the proposed mitigation implemented the residual impact during the construction phase is assessed to be of negligible impact. However, to fully assess the residual impact on bats during construction, further surveys are required and will be undertaken between May and September 2021 when bats are active.

8.3 Operational Phase

The proposed mitigation to the lighting design will be guided by the additional bat surveys that will be undertaken in late spring/early summer. These mitigation measures will include the avoidance and the reduction of light impacts on bats and amphibians, including the switching off or reduction in intensity of any permitted lighting when the park and the proposed facility are closed.

The proposed Landscape Plan will enhance the biodiversity on site, including trees, pollinator friendly planting and earth banks providing nesting habitat for solitary bees.

The residual impact during the operational phase of the development is expected to be neutral to positive due to the enhancement of the local habitats. However, to fully assess the residual impact on bats during operation, further surveys are required and will be undertaken between May and September 2021 when bats are active.

9 Monitoring

9.1 Post-development Monitoring of Bats

A monitoring programme for bats for the following three years after construction should be developed. The programme should monitor the usage of the site by bats and redress any potential on-going impacts.

10 Summary of Impact Assessment

10.1 EcIA Table

Table 10-1 presents a summary of the impacts envisaged when mitigation approaches 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 10-1: Summary of Impacts; Mitigations; Significance of Residual Impacts

Ecological Features	Impacts	Importance of Feature	Significance of impact without Mitigation	Mitigation	Significance of Residual Impacts
Construction Impacts					
Dodder Valley pNHA	Dust generated by the development settling on vegetation	National	Negligible significance: Temporary impact	N/A	Neutral significance
(Mixed) broadleaved woodland	Degradation of habitat due to removal of trees	High local	Negligible significance: Short-term impact	Strict adherence to: - Retained trees and hedgerows will be fenced off and no works are to be undertaken within the tree root protection zone. - Any removal of trees will be conducted outside of the bird nesting season (March to September inclusive). If this is not possible, a breeding bird survey will be undertaken in advance of the works to ensure that there will be no impacts on nesting birds. The survey will be carried out by an appropriately qualified ecologist, i.e. able to identify bird species and experience in undertaking breeding bird surveys. If nests are found, they will be safeguarded, with an appropriate buffer, until the chicks have successfully fledged.	Neutral significance
Hedgerows	No impact	High local	Neutral significance		Neutral significance
Breeding birds	Physical disturbance Loss of nesting habitat	High local	Minor significance Short-term impact		Neutral significance
Artificial lakes and ponds	Reduction in water quality as a result of polluting inputs, namely hydrocarbons and excess sediments	High local	Minor significance Short to long-term impact	Strict adherence to: - Best practice guidance / mitigation measures relating to pollution control and spill prevention for the protection of surface water; and the	Neutral significance
Reed and large sedge		High local			Neutral significance

Ecological Features	Impacts	Importance of Feature	Significance of impact without Mitigation	Mitigation	Significance of Residual Impacts
swamps				habitats and species reliant on them; as well as general disturbance of nocturnal animals, i.e. amphibians.	
Amphibians	Degradation of habitat due to reduced water quality caused by polluting inputs, namely hydrocarbons and excess sediments	High local	Minor significance Short to long-term impact		Neutral significance
Terrestrial mammals (Badger, Irish Hare, Hedgehog and Pygmy Shrew)	Disturbance to foraging, denning and commuting activities within the vicinity of the site. Potential loss of life through accidental entrapment in construction setting.	High local	Negligible significance Short-term impact	Strict adherence to: - Limiting the hours of work to daytime hours. - Clearing away materials which are not in use which animals can become entangled.	Neutral significance
Bats	Disturbance to foraging and commuting activities within the vicinity of the site.	Regional	Minor significance Short-term	- 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 retained vegetation. - Any pipes should be capped when not in use (especially at night) to prevent animals becoming trapped. Any excavations should be covered overnight to prevent animals from falling and getting trapped.	Further bat surveys will be carried out over spring and summer months of 2021 to allow for a proper assessment of the impacts.
Insects (solitary bees)	Loss of nesting habitat Direct loss of individuals	High local	Minor significance Medium to long-term	Strict adherence to: - Creation of rammed earth walls providing new nesting habitat for solitary bees prior to removal of the existing nesting habitat. - The removal of the nesting habitat	Not significant

Ecological Features	Impacts	Importance of Feature	Significance of impact without Mitigation	Mitigation	Significance of Residual Impacts
				will not be undertaken during winter months. It will be carried out at late spring, early summer.	
Operational Impacts					
Dodder Valley pNHA	No impact	National	Neutral significance	N/A	Not significant
(Mixed) broadleaved woodland	No impact	High local	Neutral significance	Enhancement measures include: - Planting of trees, pollinator friendly hedging, pollinator friendly herbaceous planting - Earth banks providing nesting habitats for solitary bees - Green roof on the intergenerational centre building These measures will provide further nesting habitat and food resources (insects and seeds) for birds.	Not significant
Hedgerows	Planting of pollinator friendly hedges will improve this habitat	High local	Positive impact Neutral significance		Moderate positive significance
Breeding birds	Operation noise and human disturbance	High local	Neutral significance		Moderate positive significance
Artificial lakes and ponds	No impact	High local	Neutral significance	N/A	Not significant
Reed and large sedge swamps	No impact	High local	Neutral significance	N/A	Not significant
Amphibians	Degradation of habitat due to lighting	High local	Minor significance Long term	Strict adherence to: - Lighting design mitigation, including lights switched off or set at lower output when the park and intergenerational centre are closed to the public.	Not significant

Ecological Features	Impacts	Importance of Feature	Significance of impact without Mitigation	Mitigation	Significance of Residual Impacts
Terrestrial mammals (Badger, Irish Hare, Hedgehog and Pygmy Shrew)	Operation noise and human disturbance	High local	Negligible significance Long term	Enhancement measures include: - Planting of trees, pollinator friendly hedging, pollinator friendly herbaceous planting - Earth banks providing nesting habitats for solitary bees The measures will ensure landscape connectivity and foraging grounds for these species.	Moderate positive significance
Bats	Degradation of commuting and foraging habitat due to operational lighting	Regional	Minor significance Long term	Strict adherence to: - Lighting design mitigation ensuring no disturbance to local bat activity in the vicinity of the development. Enhancement measures include: - Planting of trees, pollinator friendly hedging, pollinator friendly herbaceous planting - Earth banks providing nesting habitats for solitary bees - Green roof on the intergenerational l centre building These measures will provide commuting habitat and food resources (insects) for bats, subject to appropriate lighting design to allow bat access.	Further bat surveys will be carried out over spring and summer months of 2021 to allow for a proper assessment of the impacts. A 3-year monitoring programme should be in place to monitor bats usage of the site and redress any potential on-going impacts.

Ecological Features	Impacts	Importance of Feature	Significance of impact without Mitigation	Mitigation	Significance of Residual Impacts
Insects (solitary bees)	Creation of rammed earth walls and planting of pollinator friendly plants will improve the habitat for these species	High local	Long term Positive impact, provided mitigation measures are strictly adhered to during construction, i.e. removal of existing earth bank is done at appropriate time so the existing bee populations are not destroyed.	Enhancement measures include: - Planting of pollinator friendly hedging and pollinator friendly herbaceous planting - Earth banks providing nesting habitats for solitary bees - Green roof on the intergenerational centre building will provide wildflowers for solitary bees to feed on	Moderate positive significance

11 Conclusion

The construction and operation of this proposed development has been shown to potentially impact a number of different habitats with local importance (mixed broadleaved woodland; artificial lakes and ponds; and reed and large sedge swamps) and faunal groups (breeding birds; amphibians; Badger; Irish Hare; Hedgehog; Pygmy Shrew; bat species; and solitary bees) whose ecological importance ranges from local to regional.

Further bat surveys will be carried out over spring and summer months of 2021 to allow for a full impact assessment on bats and to prepare a construction management plan and bat protection plan for construction and operational stages of the project. The significance of impact on bats cannot be assessed prior to the surveys.

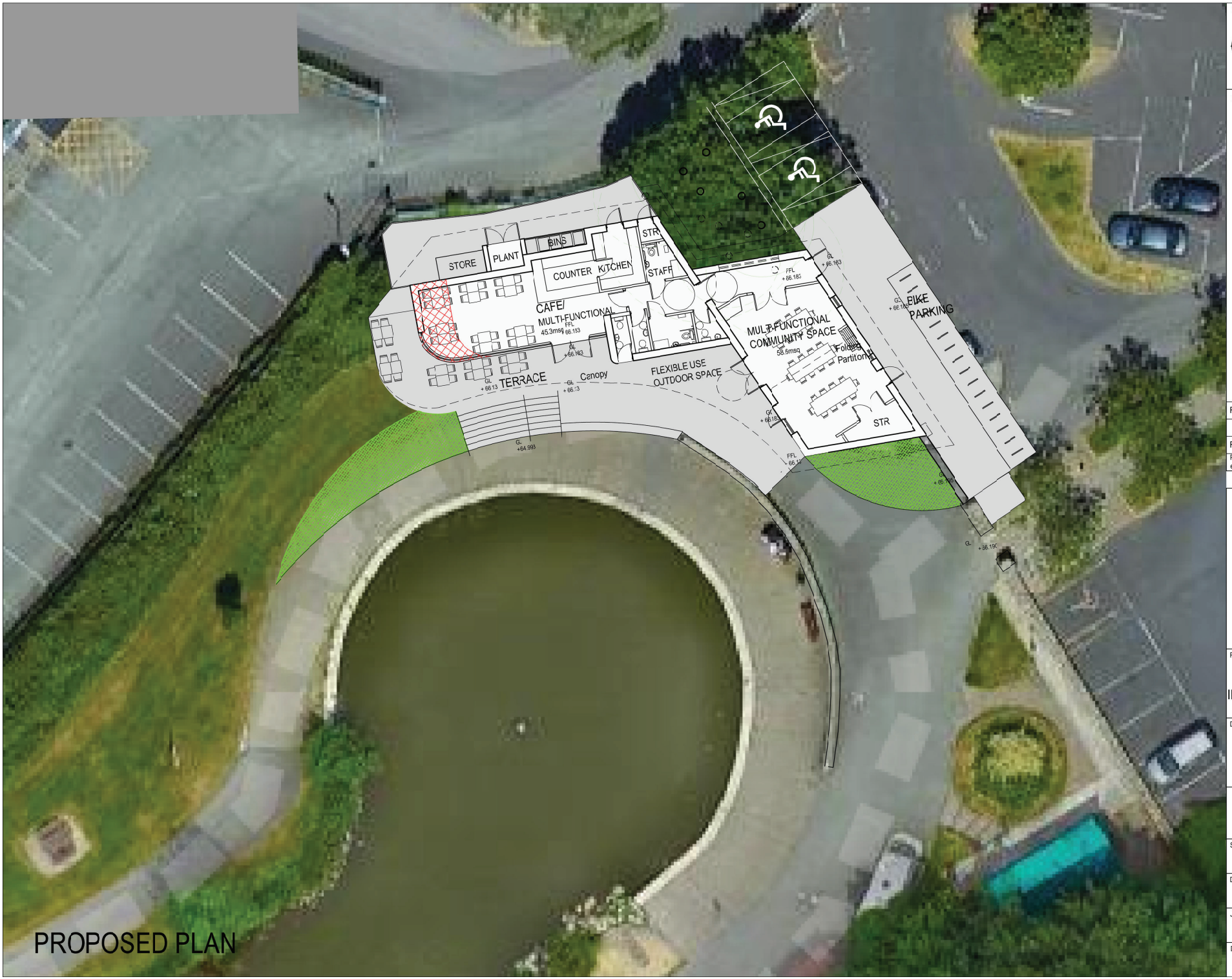
For all other habitats and species, based upon the information supplied and provided that the development is constructed in accordance with the mitigation measures outlined above, there will be no significant impact in combination with other projects and plans, as result of the development and associated works on the ecology of the area and in particular on the following designated conservation sites:

- Dodder Valley pNHA [000991]
- Grand Canal pNHA [002104]
- Glenasmole Valley SAC, pNHA [001209]
- Lugmore Glen pNHA [001212]
- Liffey Valley pNHA [000128]
- Fitzsimon's Wood pNHA [001753]
- Royal Canal pNHA [002103]
- Wicklow Mountains SAC [002122]
- Wicklow Mountains SPA [004040]
- South Dublin Bay SAC, pNHA [000210]
- South Dublin Bay and River Tolka Estuary SPA [004024]
- Booterstown Marsh pNHA [001205]
- Slade Of Saggart And Crooksling Glen pNHA [000211]
- North Dublin Bay SAC, pNHA [000206]
- Dolphins, Dublin Docks pNHA [000201]

Furthermore, the substantial remedial / supplementary tree, shrub and wildflower planting /sowing within the proposed development, outlined by the landscape plan, will enhance the value of the sites for biodiversity and the operation of the development will have an overall positive effect on biodiversity.

Appendices

A Site Layout Plan



NORTH:

NOTES / LEGENDS:

Part of Cafe seating area can be omitted as contingency if tender returns are over budget

REVISION	DATE	NO.
REVISION	DATE	NO.
Projecton removed and building shifted east accordingly	15/10/20	A

Comhairle Contae
Átha Cliath Theas
South Dublin County Council
Architects' Department,
County Hall, Tallaght,
Dublin 24.
Tel: 01 414 9000

County Architect - Eddie Conroy
B. Arch., M. Arch.Sc. FRAI.

PROJECT:

TYMON PARK
INTERGENERATIONAL CENTRE

DRAWING:

PROPOSED PLAN

SKETCH DESIGN

SCALE:	PAPER SIZE:
1:200	A3
DRAWN BY:	CHECKED BY:
AMN	AL
JOB NO.	DRAWING NO.
20014	20014-19
DATE OF ORIGIN:	REV:
JUN 2020	A

B Site Landscape Plan

01 / P02 PROPOSED SITE/ LANDSCAPE/ DRAINAGE PLAN

SCALE = 1:500 @A1

LEGEND

- SITE BOUNDARY
- BUILDING OUTLINE

LANDSCAPE LEGEND

- EXISTING TREES
- PROPOSED NATIVE/ POLLINATOR FRIENDLY TREES
- EXISTING TREE/HEDGE TO BE REMOVED
- EXISTING HEDGEROW
- PROPOSED NATIVE/ POLLINATOR PERENNIEL PLANTING
- PROPOSED PLANTERS WITH PERENNIELS
- PROPOSED PAVEMENT 01 / REINFORCED IN SITU CONCRETE AGGREGATE SURFACE
- PROPOSED PAVEMENT 02 / POWERWASH EXISTING BRICK PAVING
- PROPOSED PAVEMENT 03 / RESIN BOUND GRAVEL
- EXISTING STONE WALL
- PROPOSED STONE WALL TO MATCH EXISTING

LANDSCAPE STRATEGY:
AMENITY, BIODIVERSITY, WATER ATTENUATION/TREATMENT
BUILDING DESIGN AND LOCATION TO OPTIMISE TREE RETENTION; GREEN ROOF (NATIVE WILDFLOWER MEADOW SPECIES); ROOF RAINWATER RUNOFF TO PLANTED BIORETENTION BEDS; MITIGATION PLANTING WITH NATIVE/POLLINATOR FRIENDLY TREES AND TERRACED POLLINATOR FRIENDLY PLANTING BEDS RETAINED BY RAMMED EARTH WALLS CREATING SOLITARY BEE HABITAT; PICNIC AREAS WITH NATIVE TREES AND POLLINATOR FRIENDLY PERENNIEL PLANTERS; CARPARK HEDGE PLANTING; NEW SECTIONS OF STONE WALL TO MATCH EXISTING; CENTRAL PEDESTRIAN ENTRANCE; CYCLE PARKING;
RELOCATED MAINTENANCE VEHICLE ACCESS; ENTRANCE GROUND SURFACE CONCRETED TO MATCH BUILDING TERRACE; CONCRETE KERBS/LOW CONCRETE WALLS DOUBLE AS SEATING.

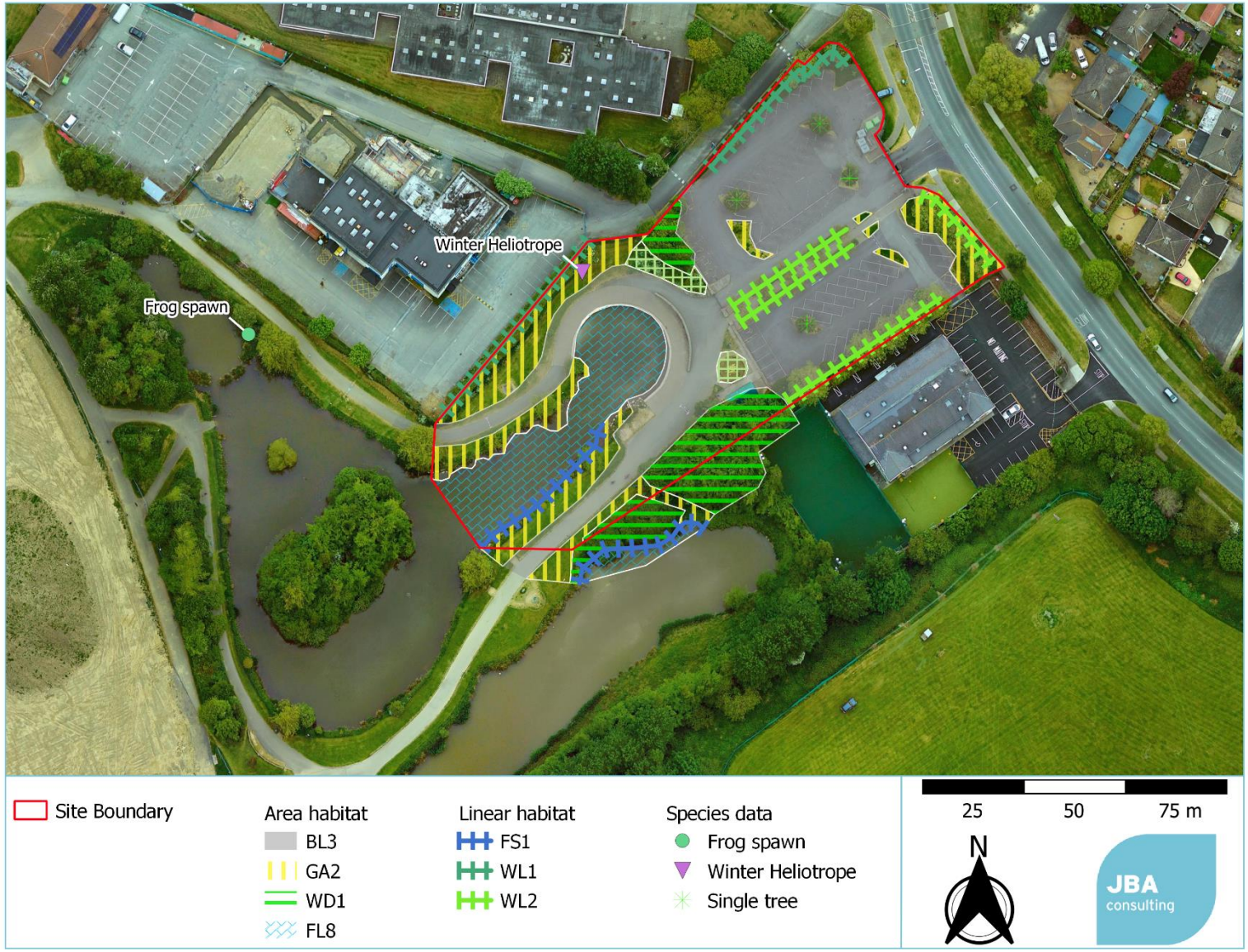
INTERGENERATIONAL CENTRE PART-8 2021

SHEET P02 PROPOSED SITE PLAN - LANDSCAPE

PART 8

Comhairle Contae Átha Cliath Theas
South Dublin County Council

C Habitat Map



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 Acts 1976 to 2018 and 2020 revision, 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 Wildlife Acts 1976-2018 and revision 2020. 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 (2021)

E.1 Recent records (within 10 years) of protected species within the ZoI (Grid Square O12)

Species name	Title of dataset	Designation
Amphibians		
Common Frog (*Rana temporaria*)	Amphibians and reptiles of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Smooth Newt (*Lissotriton vulgaris*)	Amphibians and reptiles of Ireland	Protected Species: Wildlife Acts
Birds		
Barn Owl (*Tyto alba*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Barn Swallow (*Hirundo rustica*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Black-headed Gull (*Larus ridibundus*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Brent Goose (*Branta bernicla*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Common Coot (*Fulica atra*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I Bird Species, Annex III, Section II Bird Species Birds of Conservation Concern - Amber List
Common Eider (*Somateria mollissima*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section II Bird Species, Annex III, Section II Bird Species || Birds of Conservation Concern - Amber List
Common Goldeneye (*Bucephala clangula*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section II Bird Species || Birds of Conservation Concern - Amber List
Common Grasshopper Warbler (*Locustella naevia*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Common Greenshank (*Tringa nebularia*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Common Kestrel (*Falco tinnunculus*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Common Kingfisher (*Alcedo atthis*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex I Bird Species || Birds of Conservation Concern - Amber List
Common Linnet (*Carduelis cannabina*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Common Pheasant (*Phasianus colchicus*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I & Annex III, Section I Bird Species
Common Pochard (*Aythya ferina*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I Bird Species, Annex III, Section II Bird Species Birds of Conservation Concern - Amber List
Common Redshank (*Tringa totanus*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Common Sandpiper (*Actitis hypoleucos*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List

Common Snipe (*Gallinago gallinago*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I & Annex III, Section III Bird Species || Birds of Conservation Concern - Amber List
Common Starling (*Sturnus vulgaris*)	Ireland's BioBlitz	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Common Swift (*Apus apus*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Common Wood Pigeon (*Columba palumbus*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I & Annex III, Section I Bird Species
Eurasian Curlew (*Numenius arquata*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section II Bird Species || Birds of Conservation Concern - Red List
Eurasian Oystercatcher (*Haematopus ostralegus*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Eurasian Teal *(Anas crecca*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I Bird Species, Annex III, Section II Bird Species Birds of Conservation Concern - Amber List
Eurasian Tree Sparrow (*Passer montanus*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Eurasian Woodcock (*Scolopax rusticola*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I & Annex III, Section III Bird Species || Birds of Conservation Concern - Amber List
European Golden Plover (*Pluvialis apricaria*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I & Annex III, Section I Bird Species || Birds of Conservation Concern - Red List
Great Black-backed Gull (*Larus marinus*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Great Cormorant (*Phalacrocorax carbo*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Herring Gull (*Larus argentatus*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
House Martin (*Delichon urbicum*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
House Sparrow (*Passer domesticus*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Lesser Black-backed Gull (*Larus fuscus*)	Ireland's BioBlitz	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Little Egret (*Egretta garzetta*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex I Bird Species
Little Grebe (*Tachybaptus ruficollis*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Mallard (*Anas platyrhynchos*)	Ireland's BioBlitz	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I & Annex III, Section I Bird Species
Mew Gull (*Larus canus*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Mute Swan (*Cygnus olor*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Northern Lapwing (*Vanellus vanellus*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section II Bird Species || Birds of Conservation Concern - Red List

Northern Shoveler (*Anas clypeata*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I Bird Species, Annex III, Section III Bird Species || Birds of Conservation Concern - Red List
Peregrine Falcon (*Falco peregrinus*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex I Bird Species
Red Grouse (*Lagopus lagopus*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I & Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Red Kite (*Milvus milvus*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Rock Pigeon (*Columba livia*)	Ireland's BioBlitz	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Sand Martin (*Riparia riparia*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Sky Lark (*Alauda arvensis*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Snowy Owl (*Bubo scandiaca*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex I Bird Species || Birds of Conservation Concern - Amber List
Spotted Flycatcher (*Muscicapa striata*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Stock Pigeon (*Columba oenas*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Tufted Duck (*Aythya fuligula*)	Birds of Ireland	Protected Species: Wildlife Acts || EU Birds Directive >> Annex II, Section I Bird Species, Annex III, Section II Bird Species Birds of Conservation Concern - Amber List
Whinchat (*Saxicola rubetra*)	Birds of Ireland	Protected Species: Wildlife Acts || Birds of Conservation Concern - Amber List
Yellowhammer (*Emberiza citrinella*)	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Birds of Conservation Concern - Red List
Plants		
Blue Fleabane (*Erigeron acer*)	Online Atlas of Vascular Plants 2012-2020	Threatened Species: Endangered
Bog Orchid (*Hammarbya paludosa*)	Online Atlas of Vascular Plants 2012-2020	Threatened Species: Vulnerable
Wood Bitter-vetch (*Vicia orobus*)	Online Atlas of Vascular Plants 2012-2020	Threatened Species: Endangered
Insects		
Dark Green Fritillary (*Argynnis aglaja*)	Butterflies of Ireland	Threatened Species: Vulnerable
Marsh Fritillary (*Euphydryas aurinia*)	Butterflies of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Threatened Species: Vulnerable

Small Heath (*Coenonympha pamphilus*)	Butterflies of Ireland	Threatened Species: Near threatened
Andrena (Melandrena) nigroaenea	Bees of Ireland	Threatened Species: Vulnerable
Gipsy Cuckoo Bee (*Bombus (Psithyrus) bohemicus*)	Bees of Ireland	Threatened Species: Near threatened
Large Red-tailed Bumble Bee (*Bombus (Melanobombus*) lapidarius)	Bees of Ireland	Threatened Species: Near threatened
Megachile (Delomegachile) willughbiella	Bees of Ireland	Threatened Species: Near threatened
Moss Carder-bee (Bombus (*Thoracombus) muscorum*)	Bees of Ireland	Threatened Species: Near threatened
Tawny Mining Bee (*Andrena (Andrena) fulva*)	Bees of Ireland	Threatened Species: Regionally Extinct
Reptiles		
Common Lizard (*Zootoca vivipara*)	Amphibians and reptiles of Ireland	Protected Species: Wildlife Acts
Mammals		
Brown Long-eared Bat (*Plecotus auritus*)	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Daubenton's Bat (*Myotis daubentonii*)	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Eurasian Badger (*Meles meles*)	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Eurasian Pygmy Shrew (*Sorex minutus*)	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Eurasian Red Squirrel (*Sciurus vulgaris*)	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
European Otter (*Lutra lutra*)	Mammals of Ireland 2016-2025	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Lesser Noctule (*Nyctalus leisleri*)	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Nathusius's Pipistrelle (*Pipistrellus nathusii*)	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Natterer's Bat (*Myotis nattereri*)	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts

Pine Marten (*Martes martes*)	Mammals of Ireland 2016-2025	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Red Deer (*Cervus elaphus*)	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Irish Hare (*Lepus timidus subsp. hibernicus*)	Mammals of Ireland 2016-2025	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Irish Stoat (*Mustela erminea subsp. hibernica*)	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts

E.2 Invasive Non-Native Species Records within 10km of the site (Grid Square O12)

Species name	Date of last record	Title of dataset	Designation
Arthurdendyus triangulatus	11/03/2015	New Zealand Flatworm (Arthurdendyus triangulates) Database	High Impact Invasive Species
American Skunk-cabbage (*Lysichiton americanus*)	01/05/2017	National Invasive Species Database	Medium Impact Invasive Species || EU Regulation No. 1143/2014 || Regulation S.I. 477 (Ireland)
Black Currant (*Ribes nigrum*)	24/05/2015	Online Atlas of Vascular Plants 2012-2020	Medium Impact Invasive Species
Butterfly-bush (*Buddleja davidii*)	14/12/2020	Online Atlas of Vascular Plants 2012-2020	Medium Impact Invasive Species
Canadian Fleabane (*Conyza canadensis*)	30/09/2016	Ireland's BioBlitz	Medium Impact Invasive Species
Canadian Waterweed (*Elodea canadensis*)	30/09/2016	Ireland's BioBlitz	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Cherry Laurel (*Prunus laurocerasus*)	03/04/2020	Online Atlas of Vascular Plants 2012-2020	High Impact Invasive Species
Fallopia japonica x sachalinensis = F. x bohemica	23/06/2012	National Invasive Species Database	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Giant Hogweed (*Heracleum mantegazzianum*)	04/06/2020	Online Atlas of Vascular Plants 2012-2020	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Giant-rhubarb (*Gunnera tinctoria*)	30/05/2020	Online Atlas of Vascular Plants 2012-2020	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Himalayan Honeysuckle (*Leycesteria formosa*)	22/07/2020	Online Atlas of Vascular Plants 2012-2020	Medium Impact Invasive Species
Himalayan Knotweed (*Persicaria wallichii*)	23/06/2012	National Invasive Species Database	Medium Impact Invasive Species || Regulation S.I. 477 (Ireland)
Indian Balsam (*Impatiens glandulifera*)	31/12/2017	National Invasive Species Database	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Japanese Knotweed (*Fallopia japonica*)	27/09/2020	Online Atlas of Vascular Plants 2012-2020	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Rhododendron ponticum	07/06/2020	Online Atlas of Vascular Plants 2012-2020	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Sycamore (*Acer pseudoplatanus*)	14/05/2020	Online Atlas of Vascular Plants 2012-2020	Medium Impact Invasive Species
Three-cornered Garlic (*Allium triquetrum*)	17/12/2020	Online Atlas of Vascular Plants 2012-2020	Medium Impact Invasive Species || Regulation S.I. 477 (Ireland)
Traveller's-joy (*Clematis vitalba*)	04/04/2017	Online Atlas of Vascular Plants 2012-2020	Medium Impact Invasive Species

Wall Cotoneaster (*Cotoneaster horizontalis*)	31/03/2014	Discrete vascular plant surveys	Medium Impact Invasive Species
Harlequin Ladybird (*Harmonia axyridis*)	01/09/2020	Ladybirds of Ireland	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	30/09/2016	Ireland's BioBlitz	Medium Impact Invasive Species
Red-eared Terrapin (*Trachemys scripta*)	08/08/2020	Amphibians and reptiles of Ireland	Medium Impact Invasive Species || EU Regulation No. 1143/2014
American Mink (*Mustela vison*)	23/03/2014	Atlas of Mammals in Ireland 2010-2015	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Brown Rat (*Rattus norvegicus*)	24/08/2018	Mammals of Ireland 2016-2025	High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Eastern Grey Squirrel (*Sciurus carolinensis*)	25/12/2018	Mammals of Ireland 2016-2025	High Impact Invasive Species || EU Regulation No. 1143/2014 || Regulation S.I. 477 (Ireland)
European Rabbit (*Oryctolagus cuniculus*)	25/10/2018	Mammals of Ireland 2016-2025	Medium Impact Invasive Species
Fallow Deer (*Dama dama*)	26/06/2018	Mammals of Ireland 2016-2025	High Impact Invasive Species || Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts
House Mouse (*Mus musculus*)	01/12/2014	Atlas of Mammals in Ireland 2010-2015	High Impact Invasive Species
Sika Deer (*Cervus nippon)*	13/10/2018	Mammals of Ireland 2016-2025	High Impact Invasive Species || Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts

F eDNA Methodology & Results

SureScreen Scientifics

Folio No: E9101-2
Report No: 1.1
Client: TRITURUS ENVIRONMENTAL LTD
Contact: ROSS MACKLIN

TECHNICAL REPORT
ANALYSIS OF ENVIRONMENTAL DNA IN WATER FOR AQUATIC SPECIES DETECTION

SUMMARY

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

RESULTS

Date sample received in laboratory: 08/03/2021
Date results reported: 12/03/2021
Matters affecting result: None

TARGET SPECIES: Smooth Newt *(Lissotriton vulgaris)*

Lab ID	Site Name	Grid Reference	SIC	DC	IC	Result	Positive Replicates
C0265	**Ballycragh Pond**	**-**	Pass	Pass	Pass	**NEGATIVE**	**0/12**
C0266	**Sean Walsh Park Pond No.1**	**-**	Pass	Pass	Pass	**NEGATIVE**	**0/12**
C0267	**Sean Walsh Park Pond No.5**	**-**	Pass	Pass	Pass	**NEGATIVE**	**0/12**
C0268	**Sean Walsh Park Pond No.2**	**-**	Pass	Pass	Pass	**NEGATIVE**	**0/12**
C0270	**Big Pond, Tyman Park**	**-**	Pass	Pass	Pass	**NEGATIVE**	**0/12**
C0271	**Small Pond, Tyman Park**	**-**	Pass	Pass	Pass	**NEGATIVE**	**0/12**
C0272	**Ballymount**	**-**	Pass	Pass	Pass	**NEGATIVE**	**0/12**

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: **Dr Chris Troth (BSc)** Approved by: **Chris Troth**

METHODOLOGY

The samples detailed above have been analysed for the presence of target species eDNA following scientifically published eDNA assays and protocols which have been thoroughly tested, developed and verified for use by SureScreen Scientifics.

The analysis is conducted in two phases. The sample first goes through an extraction process where each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then tested via real time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species, ensuring no DNA from any other species present in the water is amplified.

If target species DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If target species DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

SureScreen Scientifics

INTERPRETATION OF RESULTS

SIC: **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.

DC: **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample, between the date it was made to the date of analysis. Degradation of the spiked DNA marker may indicate a risk of false negative results.

IC: **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result: **Presence of eDNA** [Positive/Negative/Inconclusive]

Positive: DNA was identified within the sample, indicative of species presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for species presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. Even a score as low as 1/12 is declared positive. 0/12 indicates negative species presence.

Negative: eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of species absence, however, does not exclude the potential for species presence below the limit of detection.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.

References

Charles, P., Edwards, P. (Eds.), 2015. Environmental Good Practice on Site Guide, Fourth edition. ed, CIRIA C, CIRIA: London.

CIEEM (2018) 'Guidelines For Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine'.

Colhoun, K., Cummins, S. (2013) 'Birds of conservation concern Ireland 2014 - 2019'.

DoHPLG (2018) 'River Basin Management Plan for Ireland 2018-2021', available: https://www.housing.gov.ie/sites/default/files/publications/files/rbmp_report_english_web_version_final_0.pdf [accessed 22 Jan 2019].

Dublin City Council (2008) 'Dublin City Biodiversity Action Plan 2008-2012', available: http://www.dublincity.ie/sites/default/files/content//SiteCollectionDocuments/DCC%20Biodiversity%20Action%20Plan.pdf [accessed 12 May 2019].

EPA (2017) Guidelines on the Information to Be Contained in Environmental Impact Assessment Reports DRAFT, DRAFT, Environmental Protection Agency, available: http://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf [accessed 24 Aug 2017].

EPA (2021) EPA Maps [online], Next Generation EPA Maps, available: https://gis.epa.ie/EPAMaps/ [accessed 15 Jan 2021].

Fossitt, J.A. (2000) A Guide to Habitats in Ireland, Heritage Council of Ireland series, Heritage Council/Chomhairle Oidhreachta: Kilkenny.

Greater Dublin Drainage Strategy, 2005. Greater Dublin Strategic Drainage Study - Final Strategy Report. Available online at: http://www.greaterdublindrainage.com/wp-content/uploads/2011/11/GDSDS-Final-Strategy-Report-April-051.pdf

IFI, 2016. *Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters,* Inland Fisheries Ireland.

IFI, 2020. Planning for Watercourses in the Urban Environment. A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning. Inland Fisheries Ireland.

Irish Water (2018) 'Greater Dublin Drainage Strategy - Overview & Future Strategic Needs', available: https://www.ringsendwwtpupgrade.ie/planning-sites/ringsend-planning/docs/planning-documents/technical-reports/180601_RGD%20Planning%20App%20-%20GDDS%20-%20Overview.pdf [accessed 18 Jun 2019].

Irish Water (2021) Ringsend Wastewater Treatment Plant Upgrade Project [online], Irish Water, available: https://www.water.ie/projects-plans/ringsend/ [accessed 12 Jan 2021].

NBDC (2021) Biodiversity Maps - Map Viewer [online], National Biodiversity Data Centre Biodiversity Maps, available: https://maps.biodiversityireland.ie/Map [accessed 14 Jan 2021].

NPWS (2009a) 'Dodder Valley 000991'.

NPWS (2009b) 'Site Synopsis Grand Canal 002104'.

NPWS (2009c) 'Lugmore Glen 001212 - Site Synopsis'.

NPWS (2009d) 'Site Synopsis Liffey Valley 000128'.

NPWS (2009e) 'Site Synopsis: Fitzsimon's Wood (001753) pNHA'.

NPWS (2009f) 'Site Synopsis Royal Canal 002103'.

NPWS (2009g) 'Site Synopsis: Booterstown Marsh (001205) pNHA'.

NPWS (2009h) 'Slade of Saggart and Crooksling Glen 000211 - Site Synopsis'.

NPWS (2013) 'Site Synopsis Glenasmole Valley SAC 001209', available: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY001209.pdf [accessed 12 Dec 2018].

NPWS (2017a) 'Natura 2000 Standard Data Form - Glenasmole Valley SAC', available: https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF001209.pdf [accessed 12 Dec 2018].

NPWS (2017b) 'Natura 2000 - Standard Data Form: Wicklow Mountains SAC 002122', available: https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF002122.pdf [accessed 24 Jun 2019].

NPWS (2017c) 'Natura 2000 Standard Data Form Holdenstown Bog SAC 001757', available: https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF001757.pdf [accessed 21 Jan 2019].

NPWS (2018) 'Wicklow Mountains SPA 004040 - Natura Standard Data Form', available: https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004040.pdf [accessed 13 Aug 2020].

NPWS (2019a) The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview., Unpublished NPWS Report, National Parks and Wildlife Service / Department of Culture, Heritage and the Gaeltacht, available: https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol1_Summary_Article17.pdf [accessed 30 Sep 2019].

NPWS (2019b) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments., Edited by: Dierdre Lynn and Fionnuala O'Neill, available: https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf [accessed 31 Oct 2019].

NPWS (2019c) The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments, Edited by: Dierdre Lynn and Fionnuala O'Neill, available: https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol3_Species_Article17.pdf [accessed 31 Oct 2019].

NPWS (2020a) 'Glenasmole Valley SAC 001209 - Conservation Objectives', available: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001209.pdf [accessed 13 Aug 2020].

NPWS (2020b) 'Wicklow Mountains SPA 004040- Conservation Objectives', available: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004040.pdf [accessed 13 Aug 2020].

NRA (2009) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes, National Roads Authority, available: http://www.tii.ie/technical-services/environment/planning/Ecological-Surveying-Techniques-for-Protected-Flora-and-Fauna-during-the-Planning-of-National-Road-Schemes.pdf [accessed 29 Nov 2017].

Parnell, J., Curtis, T. (2012) Webb's An Irish Flora [online], 8th ed, Trinity College Dublin, available: http://www.corkuniversitypress.com/product-p/9781859184783.htm [accessed 27 Feb 2018].

Preene, M, Roberts, T. O. L., and Powrie, W., (2016) Groundwater control: design and practice, second edition, C750, CIRIA, London, UK (ISBN: 978-0-86017-755-5).

SDCC (2016) 'South Dublin County Council Development Plan 2016-2022', available: https://www.southdublindevplan.ie/sites/default/files/documents/CDP%202016-2022%20(lower%20res).pdf [accessed 13 Dec 2018].

SDCC, 2016b. Screening for Appropriate Assessment South Dublin County Council Development Plan 2016-2022. Available online at: https://www.southdublindevplan.ie/sites/default/files/documents/AA%20Screening%20Report%20for%20SDCC%20Development%20Plan%202016-2022%20June%202016.pdf

Smith, G.F., O'Donoghue, P., O'Hora, K., Delaney, E. (2011) 'Best practice guidance for habitat survey and mapping', The Heritage Council: Ireland.

Windfinder.com (2021) Windfinder.Com - Wind and Weather Statistic Casement Aerodrome [online], Windfinder.com, available: https://www.windfinder.com/windstatistics/casement_aerodrome [accessed 12 Mar 2021].

JBA consulting

Offices at
Dublin
Limerick

Registered Office
24 Grove Island
Corbally
Limerick
Ireland

t: +353 (0) 61 345463
e:info@jbaconsulting.ie

JBA Consulting Engineers and Scientists Limited
Registration number 444752

JBA Group Ltd is certified to:
ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007

Visit our website
www.jbaconsulting.ie