

Carrickmines- Shanganagh River Flood Relief Scheme – Invasive Species Management Plan

Final Report

20/08/2026

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Contract

This report relates to the Carrickmines Shanganagh Flood Relief Scheme commissioned by Dún Laoghaire Rathdown County Council (DLRCC), on behalf of the Office of Public Works.

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Purpose

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Abbreviations

AEP	Annual Exceedance Probability
CIEEM	Chartered Institute of Ecology and Environmental Management
DLRCC	Dún Laoghaire Rathdown County Council
EC	European Communities
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EU	European Union
FRS	Flood Relief Scheme
GIS	Geographical Information Systems
ISI	Invasive Species Ireland
ISMP	Invasive Species Management Plan
INNS	Invasive Non-Native Species
NBDC	National Biodiversity Data Centre
NPWS	National Parks and Wildlife Service
pNHA	proposed Natural Heritage Area
SDZ	Strategic Development Zone
SW	Surface Water
TII	Transport Infrastructure Ireland

Executive Summary

JBA Consulting Engineers and Scientists Ltd. has been commissioned by Dún Laoghaire Rathdown County Council (DLRCC) to prepare an Invasive Species Management Report for the proposed Flood Relief Scheme (FRS) of the Carrickmines-Shanganagh Rivers. During the ecological surveys, there were a total of 13 invasive species recorded along the area of the Scheme, with five of these listed as Third Schedule species.

The level of impact and risk that these invasive species have are described within the report, with any potential cause for further spreading associated with the proposed project included. Locations of these invasive species are mapped and described within the report, with specific best practice removal or treatment methods for these invasive species also outlined. Where appropriate, it has been noted where other overlapping invasive species management plans have begun to impact the known areas of invasive non-native species within the scope of the proposed project.

The best practice guidance found for the invasive species has been modified if required to suit the works being carried out for the proposed project. This is mainly due to the limited space available to the project for areas dedicated to the disposal of invasive species.

1 Introduction

This document is the Invasive Species Management Plan (ISMP) for the Carrickmines-Shanganagh River FRS, hereafter referred to as the proposed Scheme. This work has been conducted by JBA Consulting Engineers and Scientists Ltd (hereafter 'JBA') and was commissioned by Dún Laoghaire Rathdown County Council (DLRCC).

The plan details the location of Invasive Non-native Species (INNS) within the project extent of the proposed Scheme, identified during ongoing monitoring. The main objectives of the invasive species management strategy for the scheme will be to:

- Prevent the spread of invasive plant species during the construction phase;
- Manage the growth of invasive plant species adjacent to flood defences to protect the integrity of the structures from the impacts of these species;
- Prevent the spread of invasive plant species during maintenance works in the future.

This ISMP shall be considered a live document that will be updated throughout the project stages.

This latest version will address the item raised in the ACP RFI Item 6a: *'In light of the request for extended habitat surveys, question 5 relates, clarify that all works areas have been surveyed for invasive species.'*

This includes updating the current known extent of the invasive species recorded within the work areas, including those that have reduced due to ongoing management by local authorities.

It will be updated by the contractor (the Employer for the construction works) prior to the commencement of the Construction Phase, to ensure that any additional measures required pursuant to conditions attached to any decision to grant approval are included in the plan.

The ISMP contains the construction mitigation measures outlined in other documents associated with the proposed project, it will be updated to include any additional measures required pursuant to conditions attached by DLRCC.

Following appointment, the contractor(s) will be required to develop a more specific Method Statement(s) and submit an updated ISMP that is cognisant of the proposed construction activities, equipment and plant usage, and environmental monitoring plan for the proposed Scheme. The appointed contractor(s) may only propose modifications to the ISMP which will not give rise to any impacts which are more significant than those already identified and assessed within the EIAR.

All of the measures set out in this ISMP will be implemented in full by the appointed contractor(s) and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in the EIAR.

1.1 Site Location and Context

The Carrickmines-Shanganagh River catchment is approximately 36km² in length and encompasses a wide variety of land uses ranging from rural mountainous areas in the west, to urban residential areas in the east. The proposed development will be situated primarily in the built-up residential parts of the catchment. A description of the works areas is outlined below, from west to east (upstream to downstream). References to the areas are as shown in Figure 1-1.

Clon Brugh (Figure 1-1, Defence 1.A and 1.B, and Figure 1-2) is a residential estate situated just east of the R117 Enniskerry Road. It comprises a mix of 3-4 storey apartment blocks and houses, with small green areas, car parking, and footpaths. The proposed works in this area will be located along an area of linear green space and footpath. The area surrounding Clon Brugh is also primarily residential, with green space to the west and south in the Dublin mountains foothills.

Belarmine Park (Figure 1-1, Defence 2.B and 2.D, and Figure 1-3) is a small public park surrounded by residential areas to the north, east, west, and southwest, and a school to the southeast. The Kilgobbin Stream flows through the park from roughly west to east through a wooded area, with grassy areas to the north and south. A small pond or wetland is also within the park. The stream enters a culvert at the eastern end of the park and emerges approx. 80m upstream of Kilgobbin Road. Works will be taking place at the boundary wall between the park and houses to the north in Sandyford Hall Grove and Sandyford Hall Crescent.

Kilgobbin Road (Figure 1-2, Defence 2.E and 2.G, and Figure 1-4) is a small road lined with trees and stone walls, with a narrow footpath on one side for much of its length. The works in this area will take place along the boundaries of two houses on the western side of the road, before running beneath the road and turning east down a narrow laneway, finally running across an area of open space to join back with the river approx. 220m downstream. The houses in this area are all detached, on large plots of land. Kilgobbin House is a protected structure (RPS No.1684) whose stone wall boundary will be removed and reconstructed as a flood wall. The stone walls in this area are of cultural heritage value.

The works at 3.A (Figure 1-1, Defence 3.A, and Figure 1-5) are centred around the Glenamuck Road North Roundabout, Ballyogan Grove/Castle View, and Priorsland. Works will be in close proximity to Carrickmines Castle (National Monument Service (NMS) /RPS designation here) and in view of houses along Ballyogan Grove/Castle View and Priorsland. Glenamuck Road North is a busy link road between Carrickmines and the M50 Junction 15, with access also to the Carrickmines Luas Park and Ride, and Leopardstown Racecourse. The proposed works along the northern side of the roundabout are adjacent to an existing footpath and segregated two-way cycle lane, while those along Ballyogan Grove/Castle View are adjacent to the existing road surface, and will replace an existing low stone wall.

Cherrywood Road (Figure 1-1, Defence 4.A, and Figure 1-6) is a tree-lined local road with detached houses on either side. It is situated between the M50 to the west and the N11 to the east, with the Cherrywood Strategic Development Zone (SDZ) to the north. Land use in this area is primarily residential, with large green spaces separating individual houses. The proposed works will take place within the property of three houses, adjacent to the river. The river has a riparian corridor here consisting of mature trees and other vegetation. Immediately downstream of this point, the river flows beneath the Cherrywood Viaduct, which is a protected structure (RPS No. 1783).

The works at Defence 5.D (Figure 1-1, 5.D, and Figure 1-7) will take place on the Carrickmines River, between a green field to the west and the rear of buildings on Bray Road to the east. Bray Road is a cul-de-sac adjacent to the N11 with a mix of commercial and residential buildings. The buildings back on to the river which flows south before crossing under the N11 in a culvert. A mix of trees line the river, with an open green field on its western side.

Defences 4.B and 4.C which are approximately 100m southeast of the Bray Road works, at Lower Brides Glen, works will take place within the garden of a private residence called Waterfall Cottage, and to the culvert beneath the N11. The N11 is a busy road corridor and changes to the M11 motorway approx. 500m south of the works area. The downstream end of the N11 culvert overflow works is within

Loughlinstown Woods, a densely wooded area which is also designated as a proposed Natural Heritage Area (pNHA).

Works at Defence 5.A (Figure 1-1) will take place along the Shanganagh River as it flows from west to east along Commons Road, under the Shanganagh Road Bridge, and between Shanganagh Wood and Brookdene. Upstream of the bridge, Commons Road has residential development along its south side, with the river adjacent to the north. The northern side of the river at this point is wooded, with one house and a bridge providing access at roughly the midway point of the works. North of the wooded area is housing. Shanganagh Road Bridge is a protected structure (RPS No. 1772) and is a narrow two-lane stone arch bridge. Downstream of the bridge, Shanganagh Wood and Brookdene are both residential roads, with a footpath adjacent to the river along Shanganagh Wood, and a riparian strip and tree line on the left (north) bank at Brookdene.

Bayview (Figure 1-1, Defence 5.C) is a residential area bound to the east by the railway line and a green area through which the Shanganagh River flows. Bayview comprises semi-detached and detached houses with front and rear gardens. Downstream of this point, the river flows beneath the railway line and past Shanganagh Wastewater Treatment Plant to the south, before discharging into the sea at Killiney Bay.

1.2 Description of Proposed Development

The Carrickmines-Shanganagh Flood Relief Scheme aims to develop a FRS for the Carrickmines-Shanganagh area with a SoP up to and including the 1% AEP event. Potential flood relief options for all locations within the study area where required were developed using combinations of those flood risk management measures which were determined to be technically viable. The measures proposed for the preferred option are listed in the table below (Table 1-1).

Data from the GDSDS was used in hydraulic modelling for the proposed development. The purpose of this was to inform catchment delineation, and the data was included in urban areas of the model to route flows to the watercourses. The data was not connected to the 2D zone of the model to avoid issues with mapping sewer and fluvial flooding.

Level information was used to understand potential impacts on the surface water (SW) network at key locations, such as balancing ponds at Belarmine Park. However, the SW networks itself and existing control measures were not modelled in detail. Measures to mitigate potential impacts on the drainage network, e.g., flap vales, will form part of the detailed design.

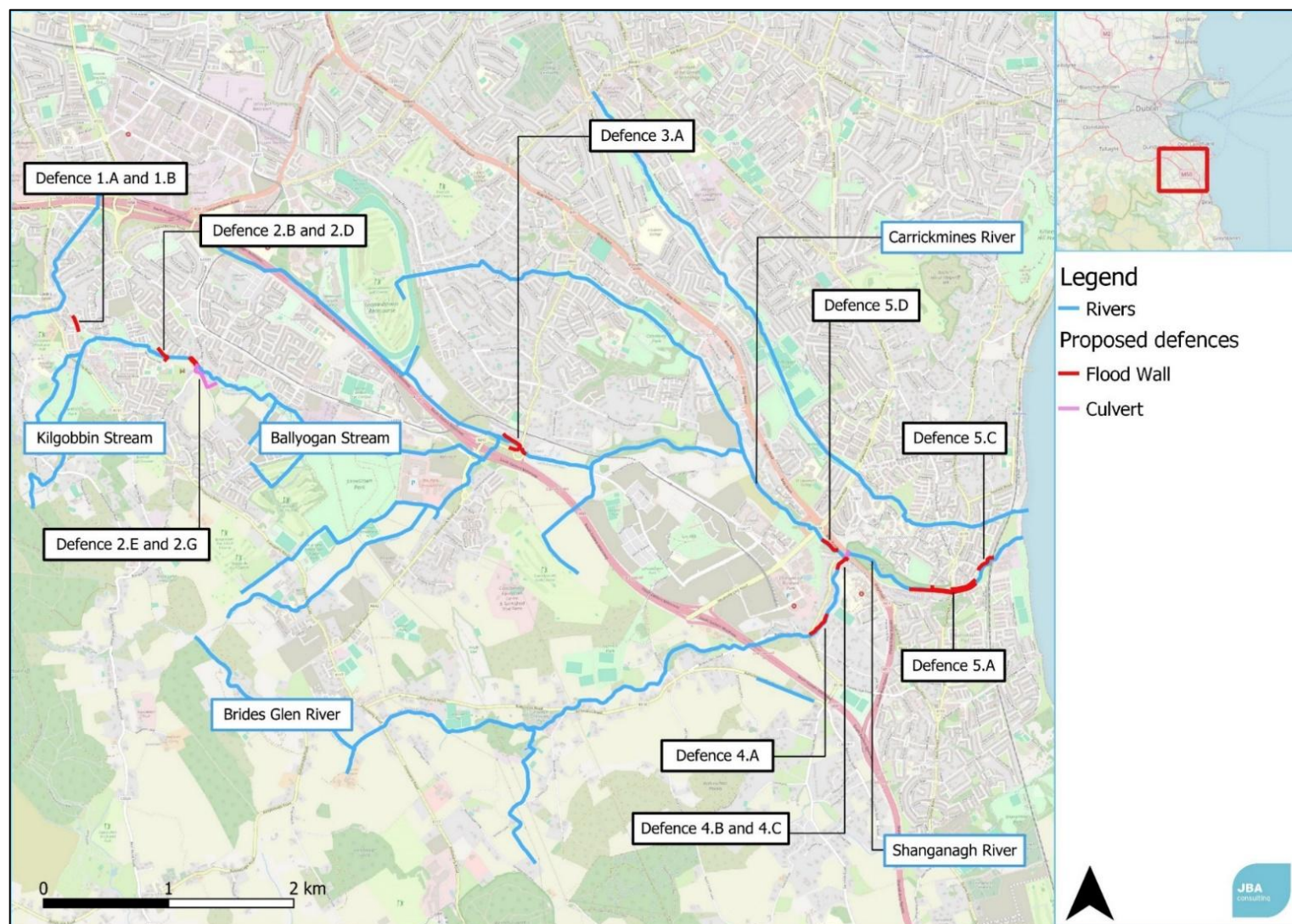


Figure 1-1: Carrickmines - Shanganagh FRS Overview



Figure 1-2: Proposed works at Clon Brugh – 1.A and 1.B

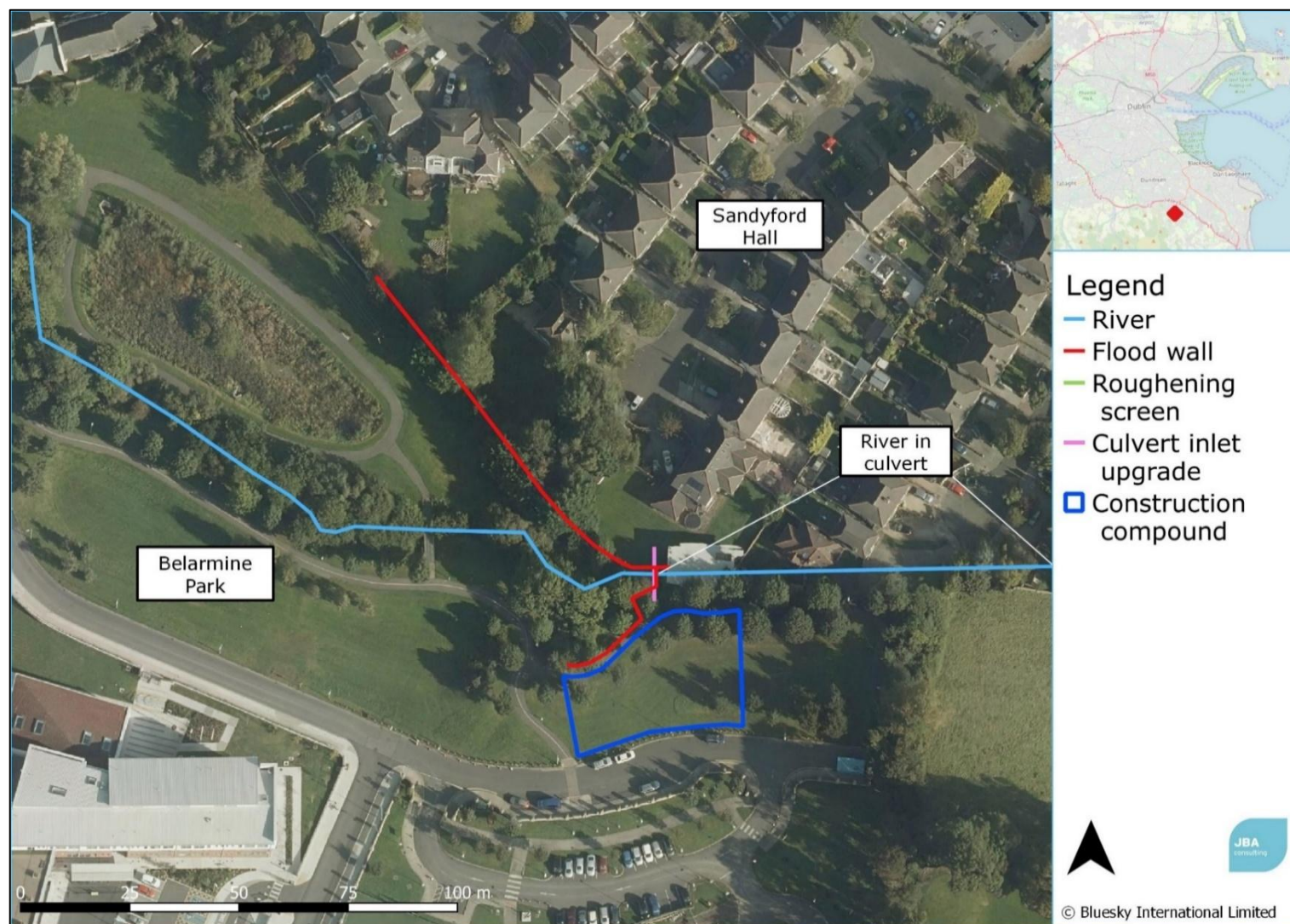


Figure 1-3: Proposed works at Belarmine Park – 2.B and 2.D



Figure 1-4: Proposed works at Kilgobbin Road – 2.E and 2.G



Figure 1-5: Proposed works at Glenamuck Road North - 3.A

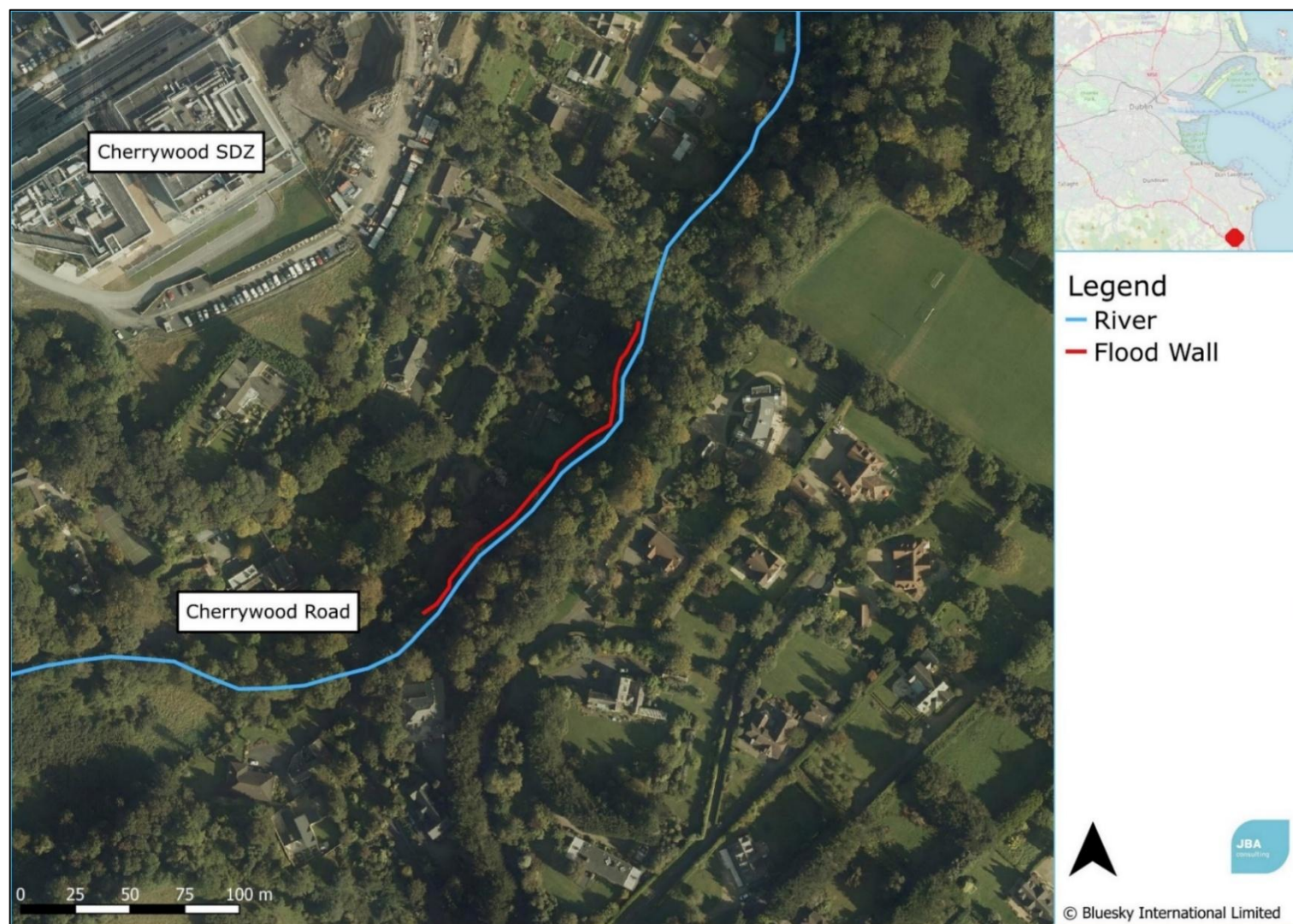


Figure 1-6: Proposed works at Cherrywood Road – 4.A

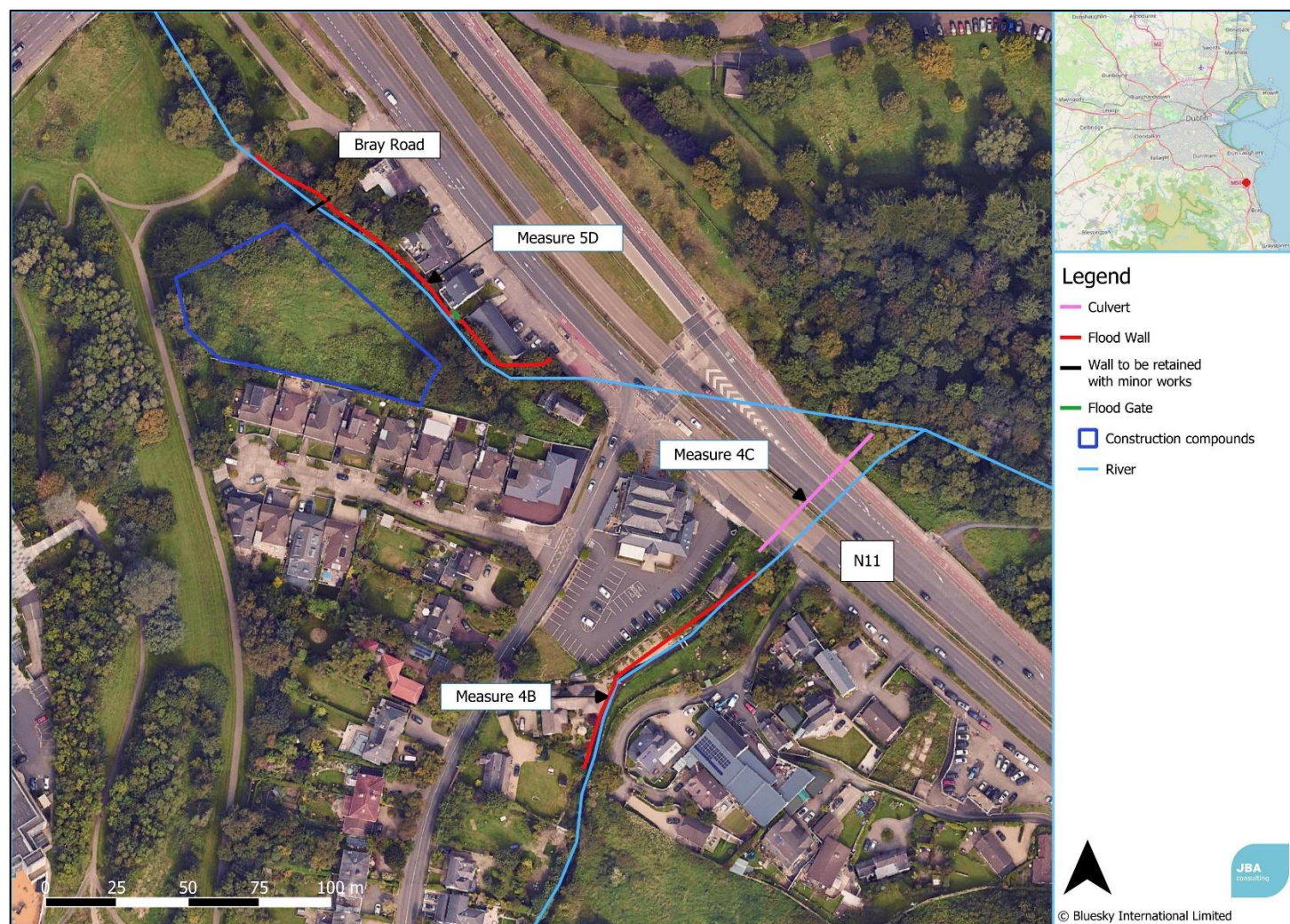


Figure 1-7: Proposed Works at Lower Brides Glen and Bray Road - 4.B, 4.C and 5.D

Table 1-1 Measures included in FRS

Measure	Mechanism	Description
1.A	Containment	Addition of defences at Clon Brugh
1.B	Containment	Closing existing openings at walls at Clon Brugh
2.B	Conveyance	Upgrade of Belarmine culvert inlet
2.D	Containment	Addition of defences at Bellarmine culvert inlet
2.E	Containment	Addition of defences upstream of Kilgobbin Road
2.G	Conveyance	Installation of Flood Relief Culvert upstream of Kilgobbin Road Bridge
3.A	Containment	Addition of defences around Glenamuck Rd North Roundabout
4.A	Containment	Addition of defences upstream of the existing Cherrywood Viaduct (Brides Glen River)
4.B	Containment	Addition of defences along upstream of N11 culvert (Brides Glen River)
4.C	Conveyance	Addition of flood relief culvert at the N11 crossing
5.A	Containment	Raising and addition of walls at Commons Road and Brookdene
5.C	Containment	Addition of defences upstream of railway line, at Bayview
5.D	Containment	Addition of defences at Bray Road

1.2.1 Clon Brugh – 1.A, 1.B

The proposed measures at Clon Brugh will protect from flood overflows from the Carysfort-Maretimo stream. This watercourse is not within the Carrickmines-Shanganagh catchment, however during flood events, flood water from this watercourse overflows into the Clon Brugh housing development. The measures as described below will be constructed along an open green space area, with a stretch of existing flood wall that will be realigned.

- Construction of c. 113m of new natural stone finished flood defence walls up to 1.35m high, along the southeastern part of Clon Brugh.
- Demolition of c. 16m of existing masonry walls and realignment works to the existing footpath.

1.2.2 Belarmine Park – 2.B, 2.D

Belarmine Park is a small open green space with housing to the north, east, west, and southwest, and a school to the south. Mature trees are present in the area of works.

- The installation of c.136m of new concrete finished flood defence wall up to 2.6m high above existing ground level at Belarmine Park adjoining Sandyford Hall & to the south of the existing culvert inlet.
- Removal of existing boundary walls to Sandyford Hall to facilitate the new flood defence walls.

- Upgrade of the existing inlet structure including screen replacement, removal of existing inlet flow restrictions and regrading of the existing stream channel.

1.2.3 Kilgobbin – 2.E, 2.G

Proposed measures in this area will be along the boundaries of private gardens, and underneath the public road. One of the houses, Kilgobbin House, is a protected structure.

- Demolition and replacement of c. 69m of an existing stone boundary wall to Kilgobbin House (NIAH Ref No. 60260003) with a new flood defence with natural stone finish wall to match existing heights.
- Construction of new flood defence wall with strengthening works to retain c. 13m of the existing boundary wall adjoining Kilgobbin Bridge. A new flood defence wall with natural stone finish of c. 87m and up to 1.7m in height will be installed on the western bank of the Ballyogan Stream between the existing culvert outlet and Kilgobbin Road Bridge.
- Installation of c. 298m of new overflow pipe from a proposed flow control weir at Kilgobbin Bridge to a discharge point adjoining Meadowbrook. Outlet works at the discharge point will include a new headwall and flow dissipation measures.

1.2.4 Glenamuck Road North Roundabout – 3.A

The area of works here is a busy link road between Glenamuck Road North and the M50 Junction 15, with access also to the Carrickmines Luas Park and Ride, and residential properties at Ballyogan Grove/Castle View and east of the Glenamuck Road North roundabout. The existing walls at Ballyogan Grove/Castle View have existing vegetation along them, including mature trees.

- Construction of c.163m of new natural stone finished flood defence walls up to 1.7m high on the banks of the Shanganagh River and upstream face of the bridge adjoining Glenamuck Road North. Enabling works will include removal of the existing bridge safety railing and demolition of existing walls.
- Installation of a new in-channel debris screen immediately upstream of the existing bridge.

1.2.5 Cherrywood Road – 4.A

This measure is within the gardens of 3 no. existing residential properties. Mature trees and vegetation are present along the river in this area.

- Construction of c. 173m of a new concrete finished flood defence wall up to 2.7m high, including demountable barriers and railings, along the banks of the Shanganagh River adjoining existing properties at Cherrywood Road, upstream of the existing viaduct.

1.2.6 Bray Road – 5.D

This measure will be constructed along the rear of commercial properties at Bray Road. This area is generally not accessible to the public, but is partially visible from houses in Cherrywood Park and the open green space to the west.

- Installation of c. 101m of new concrete and natural stone finished flood defence walls up to 3.4m high along the Carrickmines River and adjoining existing properties at Bray Road.

- Other works will include c. 75m of river channel realignment, the installation of a new flood gate, removal and replacement of the existing access bridge and strengthening works to the existing masonry arch at the boundary of Cherrywood Park.

1.2.7 Lower Brides Glen – 4.B

This measure will be constructed within a private garden (Waterfall Cottage).

- Construction of c.129m of new flood defence walls up to 2m in height above existing river channel level along the banks of the Brides Glen River adjoining existing properties immediately upstream of the existing culverted section beneath the N11 dual carriageway. Works include demountable barriers and decorative railings.

1.2.8 N11 Overflow Culvert – 4.C

The current proposal allows for the installation of an overflow culvert to the Loughlinstown River South under the N11 to alleviate flooding immediately upstream of the current culvert under the N11, consisting of the following elements. Several trees will require removal.

- Installation of c. 53m of new overflow pipe of 2.4m diameter beneath the N11 dual carriageway including inlet structure at Lower Brides Glen, and outlet structure at Loughlinstown Park.

1.2.9 Commons Road and Brookdene – 5.A

An existing flood wall is present along part of Commons Road and Shanganagh Wood, on the right bank of the Shanganagh River. This flood wall will be upgraded to the required height, with new flood wall built to match it at the western end of the area. In Brookdene on the north side of the river, a new flood wall will be constructed in green open space, between an existing treeline/woodland and the road.

- Structural remedial works to the existing Shanganagh Bridge (RPS Ref: 1773, NIAH 60260118) including underpinning existing foundations, installation of scour protection, reinforcement of the existing masonry parapet and other masonry repairs.
- Installation of c. 369m new flood defence walls, with patterned and stone finishes, up to 2.4m high in the environs of Commons Road and the Brookdene housing estate.
- Structural works to c. 453m of existing flood defence walls upstream and downstream of Shanganagh Bridge to increase the flood defence to an overall height of up to 3.6m above existing ground level to meet the required standard of protection.

1.2.10 Bayview – 5.C

This measure will be located in an existing green open space, to the rear and side of houses in Bayview. Access to the grass area will be maintained following construction.

- Installation of c. 104m new natural stone finished flood defence walls ranging from 1.1m high in the environs of the Bayview Estate to 4.2m high adjoining the existing culvert.
- Removal and replacement of c. 17m of existing boundary wall at Bayview Lawns with a new flood defence wall to match existing wall height and finishes.

1.3 Construction Activities

It is expected that the construction phase will take place over c. 18-24 months.

1.3.1 Construction Compounds

Several compound areas will be established during the construction phase, for use in different areas of the scheme. Establishment of these areas will include the following:

- Site offices;
- Site facilities (canteen, toilets, drying rooms, etc.);
- Secure compound for the storage of all on-site machinery and materials;
- Temporary car parking facilities;
- Temporary fencing;
- Site Security to restrict unauthorized entry;
- Bunded storage of fuels and refuelling 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;

Drainage collection system for washing area to prevent run-off into surface water system.

It is expected that the following areas will be used as construction compounds, subject to agreement with the landowners, where located in private lands. Where located in private lands, compounds will be temporarily acquired by agreement with the landowners.

- At Clon Brugh, in the open green space adjacent to the works area.
- At Belarmine Park, lands immediately south of the works area. The public open space in use as the site compound will not be accessible to the public during the works.
- At Kilgobbin Road, in the greenfield on the left bank of the river, behind Riverside house. Access will be through an existing gate off Kilgobbin Road.
- At Glenamuck Road North, in the greenfield at the end of Ballyogan Grove. Access to the compound will be from the Leopardstown Racecourse Road.
- At Bray Road, in the greenfield on the right bank of the Loughlinstown River North, adjacent to the Bray Road channel widening works.
- At Commons Road, in the DLRCC-owned greenfield area on the left bank of the Shanganagh River, immediately upstream of Shanganagh Road Bridge and accessed from Shanganagh Road.

The compound locations described above are shown in Figure 1-8, Figure 1-9, and Figure 1-10.

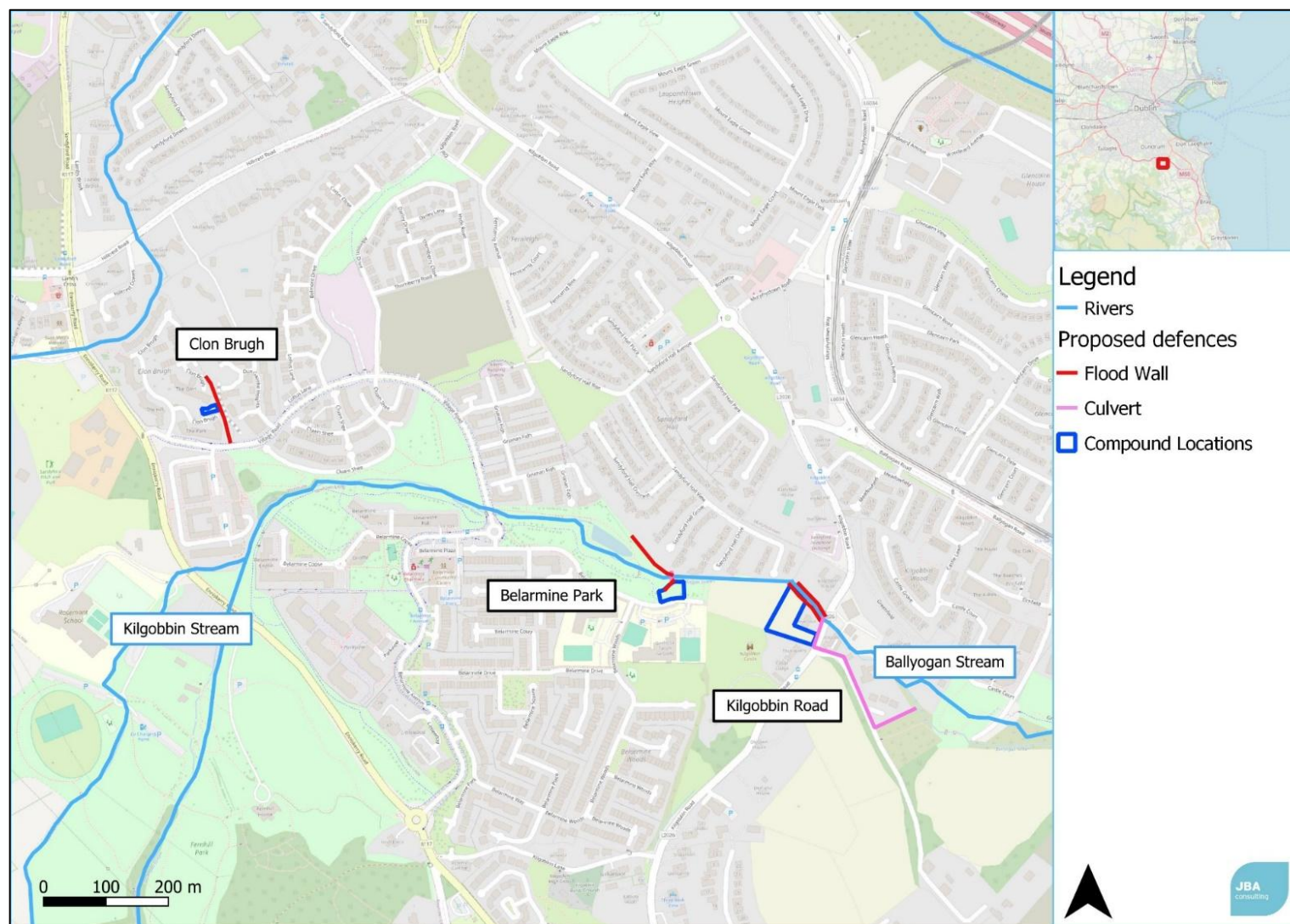


Figure 1-8: Compound locations, Clon Brugh, Belarmine Park, and Kilgobbin Road

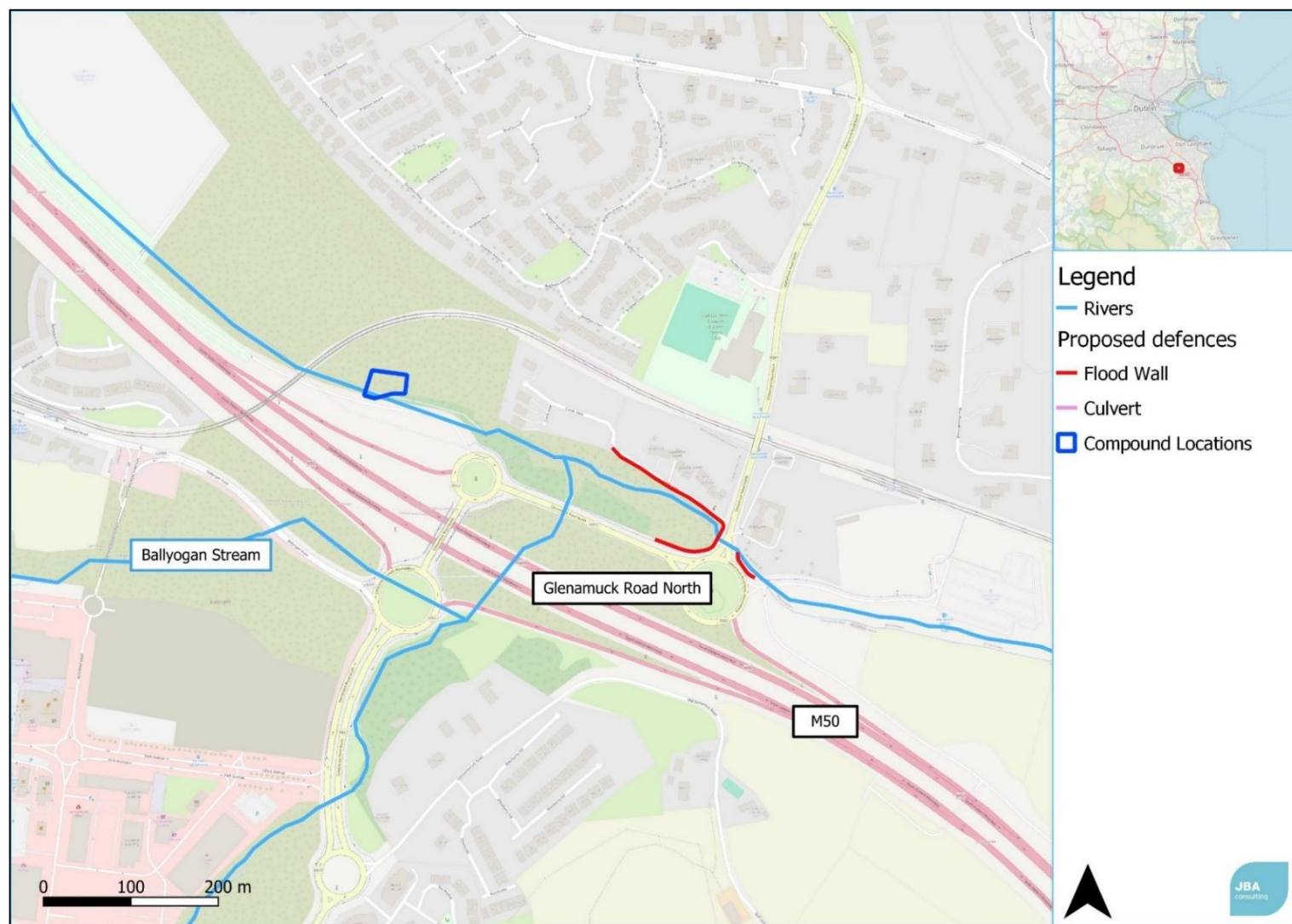


Figure 1-9: Compound location at Glenamuck Road North

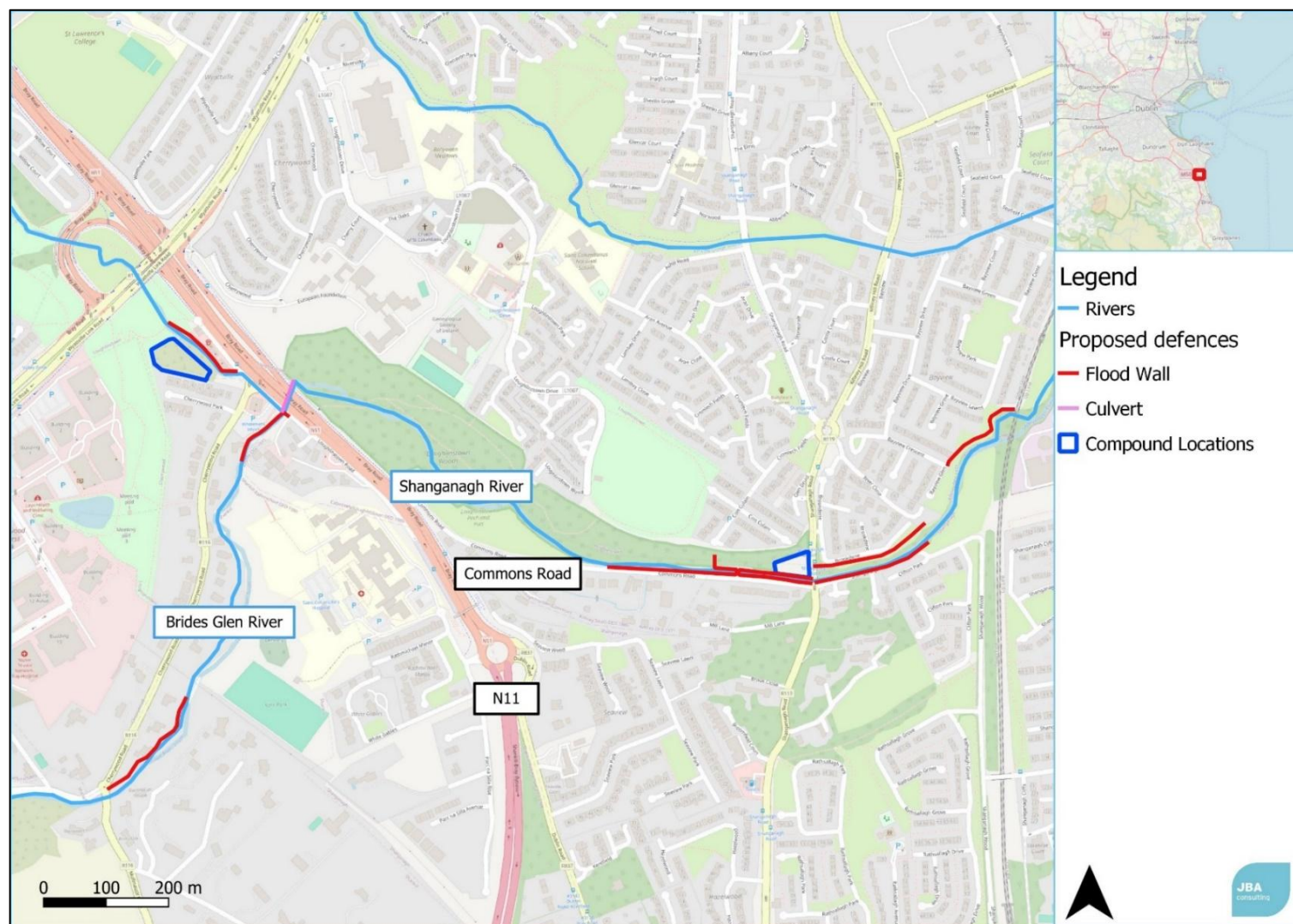


Figure 1-10: Compound locations at Bray Road and Commons Road

1.3.2 Construction Traffic Route

Construction traffic will travel to and from the site via the M50, N11, and local roads.

1.3.3 Excavation and Infilling

Excavation and import of soil and other materials will be required for construction of the walls and foundations. The Design Team has calculated that approx. 12438 m³ of material will be excavated and removed from site. Approx. 6822 m³ of soils will be imported for the backfill, and in addition to this, approx. 1456.5 m³ of other construction materials will be imported to site for roadworks.

1.3.4 Instream Works and Works Near Water

There will be instream works at Belarmine Culvert, Kilgobbin, Bray Road, N11 Culvert, and Shanganagh Road Bridge. Works will take place near water throughout the scheme.

At Belarmine Park, instream works will be necessary for the installation of the culvert upgrade and wall foundations. The instream phase will consist of:

- Installing protections prior to works commencing.
- Regrading the inlet structure and upgrading the existing screen.
- Excavating and installing wall foundations.
- Removing temporary works following construction.

At Kilgobbin Road, instream works will be required for the installation of the new weir structure. The instream phase of the works will consist of:

- Installing protections prior to works commencing
- Installing a reinforced concrete weir structure, including excavation of the river bedding, foundations, superstructure, scour protection and reinstatement of the river bedding.
- Removing temporary works following construction.

At Bray Road, instream works will be required for the installation of wall foundations and for channel widening. The instream phase of the works will consist of:

- Installing protections prior to works commencing.
- Excavating the left bank upstream of the footbridge to foundation level, stabilisation works may be required.
- Installing the flood defence walls, including any joint installation and treatment between the sections.
- Reinstatement the sides of the left bank to the new design level.
- Rearranging protections as may be required to allow for the channel realignment.
- Excavating the realigned section of the stream.
- Planting vegetation along the new riverbank as required.
- Removing temporary works following construction.

At the N11 culvert, instream works will be necessary for the installation of the new weir structure. The instream phase of the works will consist of:

- Installing protections prior to works commencing.

- Installing a reinforced concrete weir structure, including excavation of the river bedding, foundations, superstructure, scour protection and reinstatement of the river bedding.
- Removing temporary works following construction.

At Commons Road, instream works will be necessary for the bridge reinforcement works. The instream phase of the works will consist of:

- Installing protections prior to works commencing.
- Carry out reinforcement works to bridge foundations and masonry.
- Reinstatement soil removed for instream works.
- After the concrete has reached its design strength, remove temporary supports.
- Relocate instream protection elements to the other half of the riverbed.
- Repeat steps above in the other half of the stream.

1.4 Maintenance and Operational Activities

Following construction, each proposed measure will have its own bespoke management plan.

Regular inspections of the proposed structures will take place, together with investigations of their performance after each flood event.

A routine inspection and maintenance plan will be developed whereby Dún Laoghaire Rathdown County Council and/or nominated maintenance contractors will inspect and maintain the proposed structures once per year to examine them for any defects and to ensure that staff are trained and familiar with the operational process for them. It is assumed that this will primarily be a combination of visual inspection for any damage, spot repairs to walls where needed, and removal of materials which could act as blockages, e.g., large tree branches which have fallen into the river or waste. Maintenance will not include removal of natural sediment deposition or in-channel or riparian vegetation.

1.5 Decommissioning

Decommissioning of the proposed development is not expected to occur. Regular maintenance of structures will take place to identify any damage or deterioration. The proposed development has been designed to be adaptable to changing conditions as a result of climate change. This will allow it to remain in use in the future and be adapted when necessary.

2 Legislative Context

The Third Schedule of the Birds and Natural Habitats Regulations 2011 (S.I No. 447/2011) and the First Schedule of the Invasive Alien Species Regulations 2024 (S.I. No. 374/2024) contain specific provisions that govern control of listed invasive species. It is an offence to release or allow to disperse or escape, to breed, propagate, import, transport, sell or advertise species listed on the First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations without a Licence.

The two regulations that deal specifically with this scheduled list of species are:

- Regulation 49: Prohibition of introduction and dispersal of certain species; and
- Regulation 50: Prohibition on dealing in and keeping certain species.

Following on from that, the following are strictly prohibited:

- Dumping invasive species cuttings anywhere other than in facilities licensed to accept them;
- Planting or otherwise causing to grow in the wild - hence the landowner (in respect of the Proposed Scheme, this being DLRCC and the appointed contractor) should be careful not to cause further spread;
- Disposing of invasive species at a landfill site without first informing the landfill site (that is licensed under Number 10 of 1996 - Waste Management Act, 1996 (as amended) (hereafter referred to as the Waste Management Act, as amended) to take such material (plant or soil) that the waste contains invasive species material (this action requires an appropriate licence);
- Moving soil which contains First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations -specific non-native invasive species in the Republic of Ireland, unless under licence from the National Parks and Wildlife Service (NPWS) (this licence is separate from and does not discharge any person being in receipt of other necessary waste permits/ licences etc.); and
- Regulation (EU) No. 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (hereafter referred to as the IAS Regulation) lists specific Species of Union Concern, some of which overlap with the species of the First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations .

The IAS Regulation conveys the rules to prevent, minimise and mitigate the adverse impacts of the introduction and spread (both with and without intention) of IAS on biodiversity and the related ecosystem services, as well as other adverse impacts on human health or the economy.

National Policies, frameworks and plans also govern INNS species in Ireland. One such plan is 'Ireland's 4th National Biodiversity Action Plan 2023-2030' (NPWS, 2023). Specifically in this plan, Objective 2H: "Invasive alien species (IAS) are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity, and measures are undertaken to tackle the introduction and spread of new IAS to the environment". While these targets are at a national level, with such ambition in mind, they may still be relevant to the management of INNS species at Bantry FRS and underline the importance for controlling the species from

a biodiversity protection perspective as well as the legal perspective described above. These targets include:

- By 2030, IAS are controlled, managed and where possible, eradicated (2H1, 2H2, 2H3);
- By 2030, IAS are controlled, managed and where possible, eradicated within Protected Areas and effectively controlled in urban, peri-urban areas, the wider countryside and marine and coastal areas (2H4, 2H5, 2H6, 2H7, 2H8);

Other national policies, frameworks and plans pertinent to INNS include the following:

- The *Biodiversity Climate Change Sectoral Adaptation Plan* (DHLGH, 2025) whereby;

Action 1.2.4: NPWS will establish an Invasive Alien Species unit to expedite implementation of the legislative and policy framework, including specific resources for enforcement.

Action 3.8.4: NPWS and other relevant stakeholders will deliver on the National Invasive Species Management Plan (forthcoming) and continue to cooperate with NI authorities on identifying and delivering on all-island actions to control and manage IAS.

The Water Framework Directive (WFD) (Directive 2000/60/EC) whereby in Ireland, invasive species are considered a significant pressure on waterbodies. INNS species have been identified as a significant issue for water management.

In relation to the invasive species Cherry Laurel which is not listed on either of the schedules, nor included on the European list of invasive species of European Union concern, NPWS is in the process of undertaking a risk assessment for this species. It is of national concern as it can have a detrimental impact on native habitats and species, it will outcompete and shade any flora in woodland habitats. This will result in a loss of the ground flora, shrub layer and recruitment of tree saplings as none of them will be able to grow, this will eventually lead to the loss of woodland habitat. The process of adding any species to the list of invasive alien species of national concern requires a risk assessment of that species to be undertaken to ensure that the scientific evidence demands its inclusion. Once completed, a Statutory Instrument to amend the First Schedule to the European Union (Invasive Alien Species) Regulations 2024 and the Third Schedule to the European Union (Birds and Natural Habitats) Regulations 2011 would also be required.

In the meantime, Regulation 12 of the European Union (Invasive Alien Species) Regulations 2024 provides for emergency measures for species that are not included on the Union list.

The National Parks and Wildlife Service will consider options for the control of Cherry Laurel, including legislative solutions, informed by the ongoing risk assessment.

A new partnership between the National Parks and Wildlife Service (NPWS) and the National Biodiversity Data Centre (NBDC) was established in 2026 as the Invasive Species Bureau (DHLGH, 2026). The bureau will support implementation of EU regulations on invasive species that threatened native species and habitats in Ireland.

It should be noted that any decision on the efficacy of chemical treatments can only be provided by a registered pesticides advisor. A suitably qualified specialist will be engaged by the appointed contractor to monitor the treatment of non-native invasive species. This ISMP shall be updated as necessary by the specialist.

3 Methodology

A desktop study and field surveys were conducted to inform this invasive species management plan.

3.1 Desktop study

A desktop study was carried out prior to conducting the field surveys. A review of available records of invasive species was carried out. Published records of invasive species listed in the First Schedule of the Invasive Alien Species Regulations 2024 S.I. No. 374 or Third Schedule of the Birds and Natural Habitats Regulations S. I. No. 477 at the site location were researched.

The National Biodiversity Data Centre (NBDC) species records were accessed in July 2026, and records from the last 10 years were considered during this report. A customised polygon was produced to extract all the species data from an approximate 2km radius of the watercourse for this scheme (Appendix A).

Other species that are known to be invasive but are not included in First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations include Cherry Laurel *Prunus laurocerasus*, Winter Heliotrope *Petasites pyrenaicus*, Buddleia/ Butterfly Bush *Buddleja davidii* and Himalayan Honeysuckle *Leycesteria formosa*.

Species are detailed in this report as either being invasive species of the First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations, or simply invasive species. All instances of invasive species and their extent were recorded and mapped using QGIS.

Japanese Knotweed (and its hybrids) and Giant Hogweed are considered high impact invasive species. Japanese Knotweed reproduces by vegetative means, either by fragments of rhizome or stem. Leaves are 10-15cm in length, green, shield shaped with pointed tips, a flat base, and arranged in a zig-zag formation. The stem is bamboo-like, and green with a red/purple mottled colour.

Giant Hogweed can grow up to 5-6m in height. The main stem is large, hollow, usually with purple blotches and have hairy bristles. The leaves are serrated and sharply divided and can grow to 3m in length and 1.5m wide. The flowers are white or rarely pink and umbrella shaped. They can produce up to 50 000 seeds which can be viable up to 15 years. The seeds are spread by wind, water, animal and human influence.

3.2 Field surveys

3.2.1 Site surveys

Surveying was completed by a number of experienced JBA ecologists between 2020 and 2026. Table 8-1 contains further details on survey dates and types of surveys undertaken.

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

- Heritage Council (2011). Best Practice Guidance for Habitat Survey and Mapping (Smith *et al.* 2011).
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2008).

Aerial photographs and site maps assisted the surveys. Habitats have been classified and described to level three following Fossitt (2000). Nomenclature for higher plants follows that given in The New Flora of the British Isles 4th Edition. Identification of Irish plants generally follows Webb's An Irish Flora.

Table 3-1: Ecological surveys undertaken in the study area

Surveyors	Date of Visit	Survey Type
Malin Lundberg and Patricia Byrne	20 November 2020	Fossitt Habitat Surveys
Malin Lundberg and Patricia Byrne	10 December 2020	Fossitt Habitat Surveys
Malin Lundberg and Patricia Byrne	06 January 2021	Fossitt Habitat Surveys
Malin Lundberg and Patricia Byrne	20 January 2021	Fossitt Habitat Surveys
Malin Lundberg and Patricia Byrne	25 February 2021	Fossitt Habitat Surveys
Patricia Byrne	11 June 2021	Invasive Non-Native Species Survey
Malin Lundberg and Patricia Byrne	30 June 2021	Invasive Non-Native Species Survey, Fossitt Habitat Surveys
Patricia Byrne	14 July 2021	Invasive Non-Native Species Survey
Mark Desmond	24 October 2022	Invasive Non-Native Species Survey
Mark Desmond	05 September 2023	Fossitt Habitat Surveys and Bat Roost Potential Survey.
William Mulville, Michael Coyle, Mat Hosking and Jai Dolan	02 February 2024	Otter and Fossitt Habitat Surveys
William Mulville, Michael Coyle and Jai Dolan	10 May 2024	Fossitt Habitat Surveys
William Mulville, Michael Coyle Matt Hosking and Jai Dolan	16 May 2024	Fossitt Habitat Surveys
William Mulville, Michael Coyle and Matt Hosking	11 July 2024	Otter and Fossitt Habitat Surveys
William Mulville, Matt Hosking, Abbie Doyle and Tara Sacardo	08 May 2026	Fossitt Habitat Survey, Invasive Non-Native Species Survey and Riparian Bird Survey
William Mulville, Matt Hosking and Jai Dolan	08 June 2026	Fossitt Habitat Surveys, Otter and Bird Surveys

3.2.2 Terrestrial Habitat Surveys

Initial surveys of the terrestrial habitats were conducted on: 20 November and 10 December 2020; 6 January, 20 January, 25 February and 30 June 2021. Following this initial surveying, additional sections were added to the scheme, and these were surveyed on the 05 September 2023, and the 2 February, 10 May, 16 May and 11 July 2024. Further surveys were conducted on the 8 May and 8 June of 2026.

Floral species present that were either representative of a habitat, or considered to be of conservation interest, were recorded. The habitat's extent was mapped onto an aerial photograph within the QField GIS Android application, with GPS points taken where any ecological features of note were observed. Any non-native invasive plant species listed on either the First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations were also recorded during the habitat and protected species surveys. Other known invasive species not on the schedule lists such as Cherry Laurel, Winter Heliotrope, Buddleia/ Butterfly Bush and Himalayan Honeysuckle were also recorded.

3.2.3 Limitations to the baseline data

The habitats and species present in a given area are subject to change over time. As such, the advice and assessments contained within this report is considered valid for a period of 18 months before a review or an updated survey/assessment must be made by an ecologist.

4 Baseline Data

4.1 Baseline conditions

The proposed development area is comprised of a wide range of habitats, including stone structures, earth banks, built artificial surfaces, agricultural and amenity grasslands, ponds, spoil, swamps, rivers, ditches, grassy meadows and verges, bracken, woodlands, hedgerows, treelines and scrub. Descriptions of habitats and associated species, including invasive non-native species (INNS), are provided in Appendix A.

An overview of how the measures of the scheme are split into various areas is shown in Figure 4-1. Following that figure more detail is given on the INNS found throughout the Scheme.

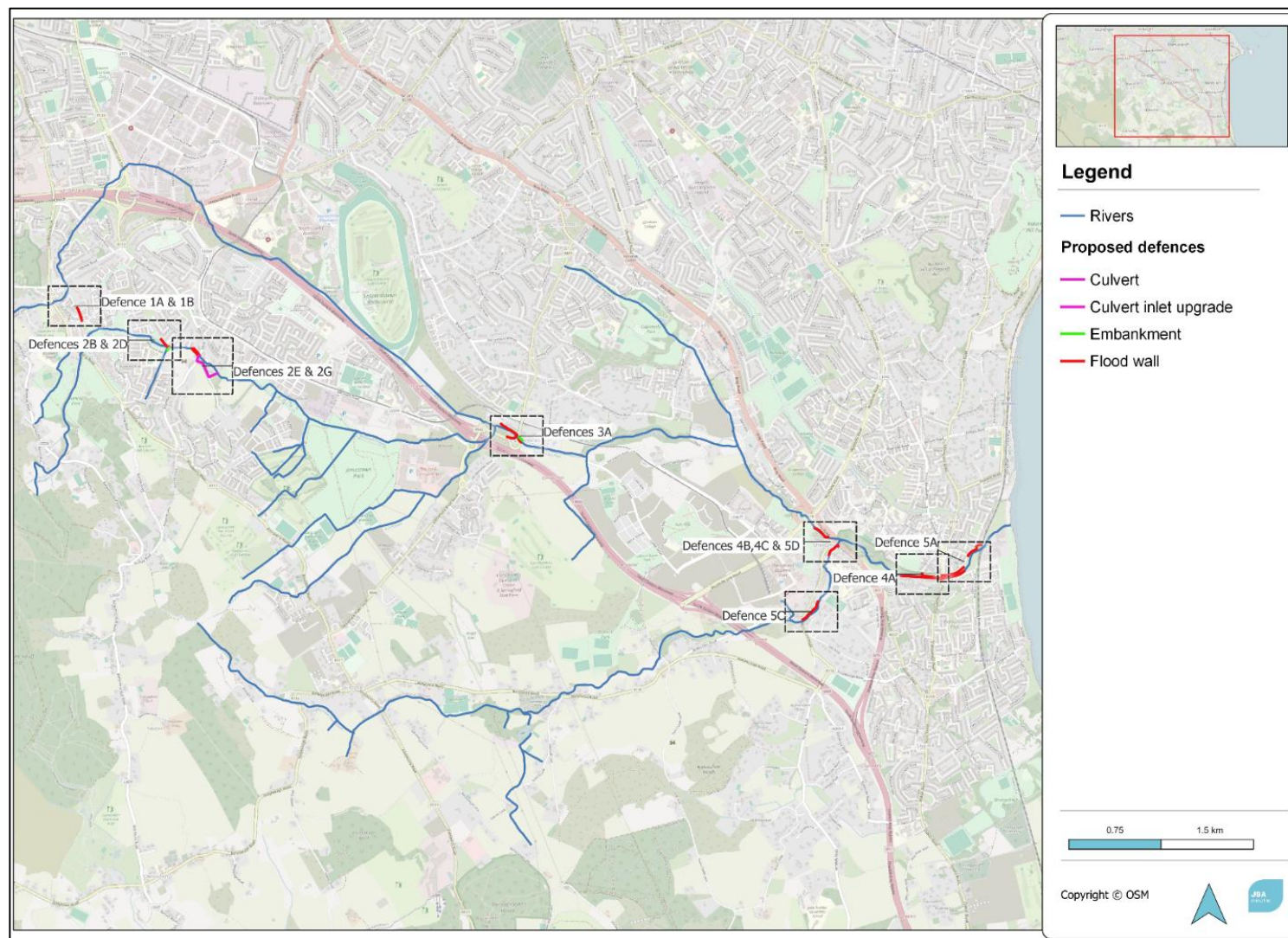


Figure 4-1: Location of the measures throughout the scheme area

4.1.1 Invasive Non-native Species (INNS)

Table 4-1 below provides a list of the 13 non-native species recorded during the ecological surveys. It includes species, their level of impact, and whether they are listed on either First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations. Five species are listed as Third Schedule species: American Skunk Cabbage, Giant Hogweed, Giant Knotweed, Japanese Knotweed and Three-cornered Garlic.

Table 4-1: INNS recorded within or immediately adjacent to study area

Invasive Non-Native Species	Impact	Regulation (S.I. 477/2011 and S.I. 374/2024)
American Skunk Cabbage	Medium	Yes
Butterfly Bush	Medium	No
Cherry Laurel	High	No
Giant Hogweed	High	Yes
Giant Knotweed	High	Yes
Himalayan Honeysuckle	Medium	No
Japanese Knotweed	High	Yes
Old Man's Beard	Medium	No
Snowberry	Low	No
Sycamore	Medium	No
Three-cornered Garlic	Medium	Yes
Wall Cotoneaster	Medium	No
Winter Heliotrope	Low	No

The locations of the recorded invasive non-native species are provided below in the following Figures

- Measures 1.A and 1.B (Figure 4-2)
- Measures 2.B, 2.D, 2.E and 2.G (Figure 4-3)
- Measure 3.A (Figure 4-4)
- Measure 4.B, 4.C and 4.D (Figure 4-5)
- Measure 4.A (Figure 4-6)
- Measure 5.C (Figure 4-7)
- Measure 5.A (Figure 4-8)



Figure 4-2: INNS recorded in in the vicinity of Measures 1.A and 1.B



Figure 4-3: INNS recorded in in the vicinity of Measures 2.B, 2.D, 2.E and 2.G



Figure 4-4: INNS recorded in in the vicinity of Measure 3.A



Figure 4-5: INNS recorded in in the vicinity of Measure 4.B, 4.C and 4.D

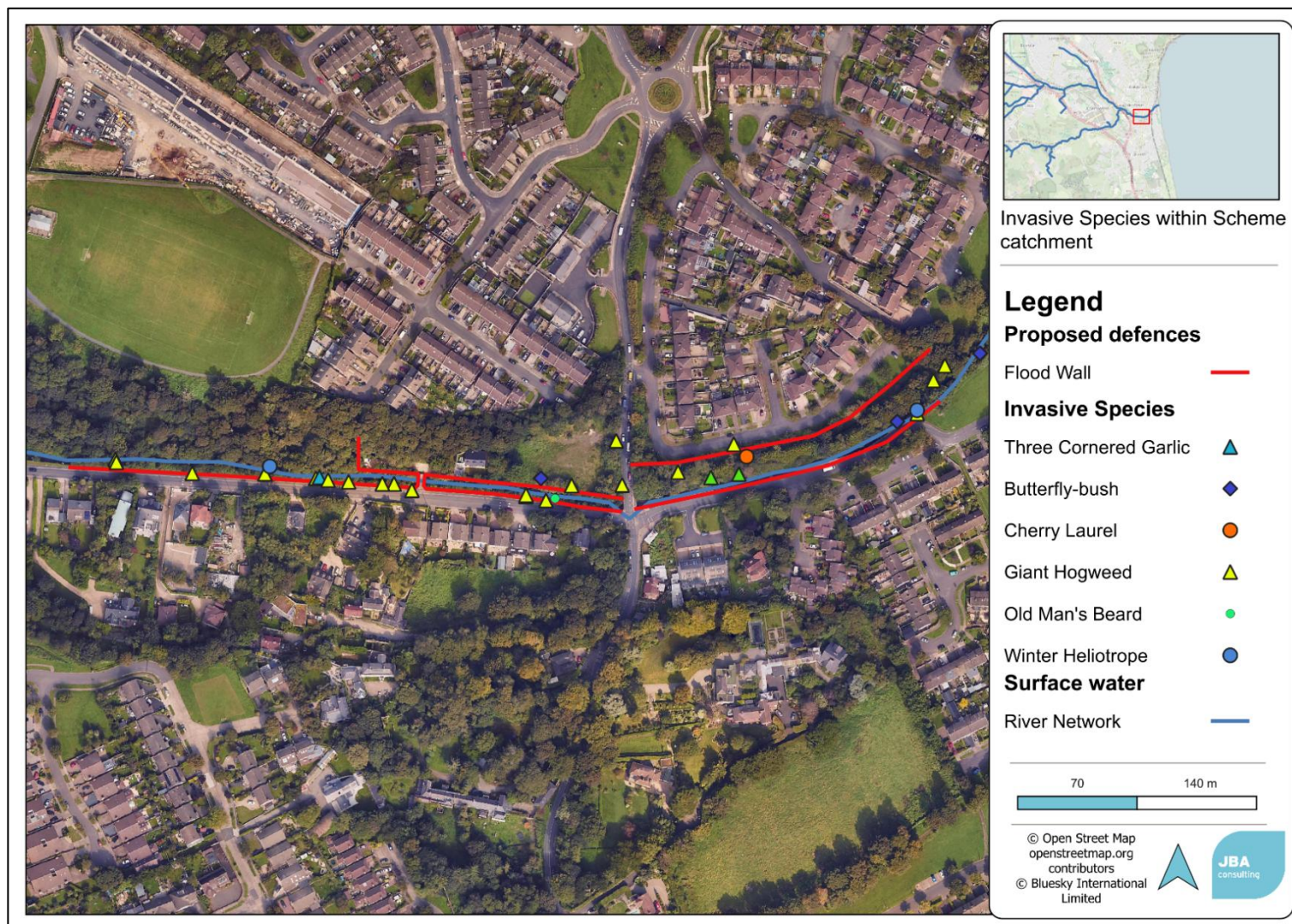


Figure 4-6: INNS recorded in in the vicinity of Measure 4.A

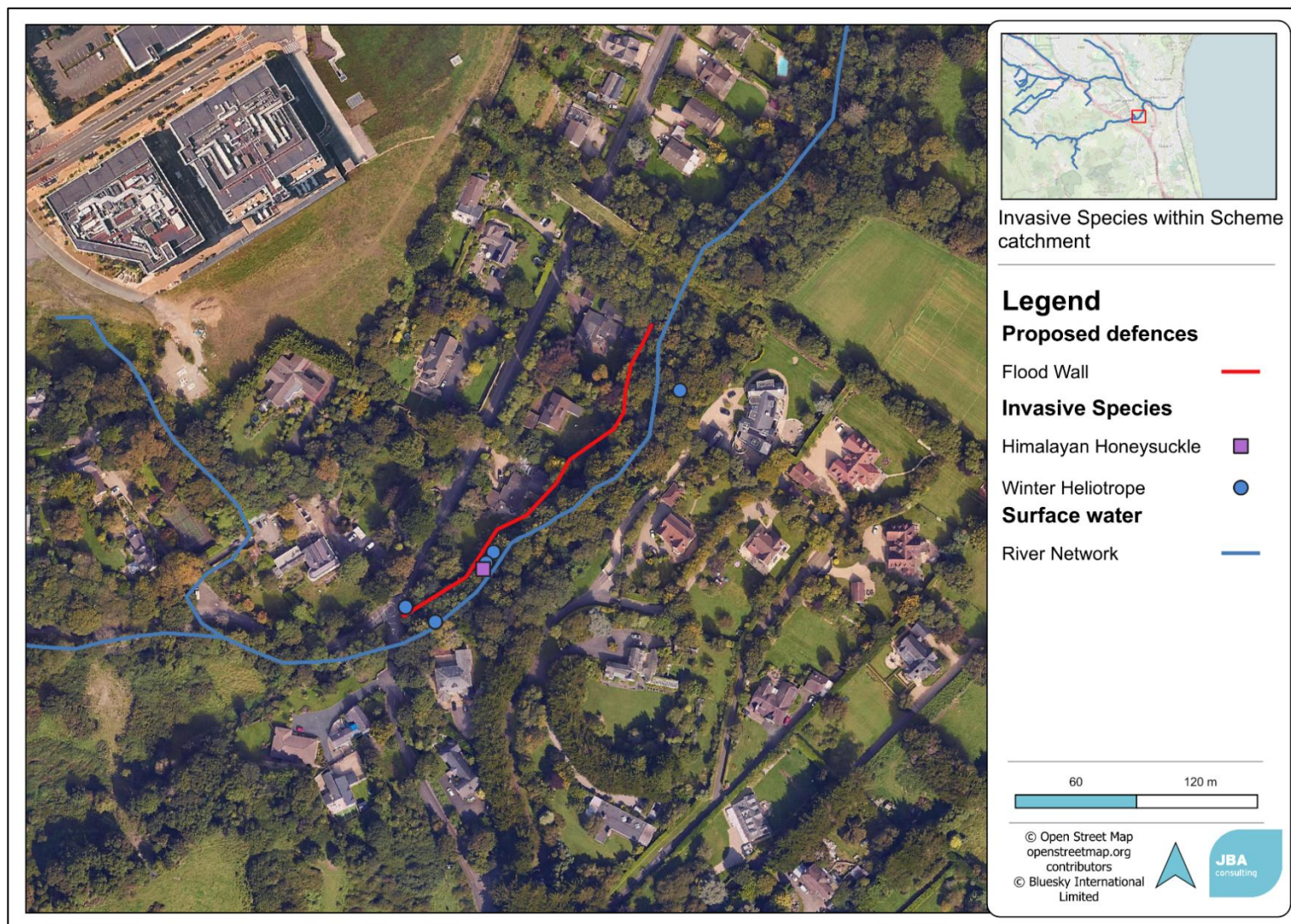


Figure 4-7: INNS recorded in in the vicinity of Measure 5.C



Figure 4-8: INNS recorded in in the vicinity of Measure 5.A

5 Impacts of Invasive Species Identified

5.1 Butterfly-bush

Butterfly-bush is considered a medium risk invasive species (NBDC, 2026a). It is well established in Ireland and planted as an ornamental. It is often used as a “Butterfly Bush”, hence the name. It grows rapidly with extensive networks of fine roots and forms dense thickets that outcompete native vegetation (NRA, 2010). It is often found in waste ground as it is a very successful coloniser and tolerant of heavy metal toxicity.

5.2 Cherry Laurel

Cherry Laurel is considered a high impact invasive species (NBDC, 2026b). It is well established and widespread in Ireland and is an ever-green shrub of gardens, parks and woodlands. It forms dense impenetrable thickets and is likely toxic to mammals due to the presence of cyanide in the tissue of the plant and is avoided by grazing animals. It shades out other shrub or ground layer flora and toxifies the soil due to the cyanide present within its tissue, resulting in soil conditions other flora cannot tolerate.

5.3 Giant Hogweed

Giant Hogweed is considered a high impact invasive species (NBDC, 2026c). This species is widespread and is locally abundant, being found predominately along riverbanks and within waste grounds. Giant Hogweed produces large volumes of seeds and can rapidly spread within an area. It is highly invasive due to its vigorous early-season growth, tolerance of shade and flooding, and its efficient production and dispersal of seeds, (TII, 2020). Giant Hogweed can increase the risk of soil erosion as it dies back in winter leaving the soil bare. The plant produces a phototoxic sap that renders skin sensitive to ultraviolet light, causing blistering of the skin.

5.4 Giant Knotweed

Giant Knotweed is considered a high impact invasive species (NBDC, 2026d). The species is widespread but localised and is crowding out native plants. Riparian habitats invaded by knotweeds have lower invertebrate abundance, species richness and biomass and lower plant species richness compared to uninvaded sites, which is likely to impact on amphibians, reptiles, birds and mammals that use riparian habitats.

5.5 Himalayan Honeysuckle

Himalayan Honeysuckle is considered a medium risk invasive species (NBDC, 2026e). The species is widespread but more common in the southeast and is often used as a hedging plant as well as cover for pheasants. There are no documented impacts recorded; however, it forms dense thickets that can exclude native vegetation.

5.6 Japanese Knotweed

Japanese Knotweed is considered a high impact invasive species (NBDC, 2026f). Japanese Knotweed is a widespread and well-established garden escape or relic of cultivation in Ireland, which spreads vegetatively and forms dense stands which are difficult to eradicate successfully. It spreads very effectively by fragmentation of stem and rhizome, making it very resilient. It is widely distributed in Dublin City and throughout Ireland. It out-competes native species, contributes to soil erosion particularly along riverbanks, and may cause structural damage to buildings and infrastructure.

5.7 Three-Cornered Garlic

Three-Cornered Garlic is considered a medium impact invasive species (NBDC, 2026g). The horticultural trade is the primary route of entry of this plant into Ireland (O'Rourke et al, 2014). It is well established in the south and southeast of Ireland. Transfer of the species in air turbulence from passing vehicles is expected to be its primary form of transfer throughout the country. It forms early season dense monocultural stands which limits floral biodiversity by outcompeting native species.

5.8 Winter Heliotrope

Winter Heliotrope is considered a low-risk invasive species (NBDC, 2026h). It is thought to have entered Ireland through the horticultural trade for use as a low cover ornamental plant. It is well established throughout the country and is common along roadside boundaries and on waste ground. All specimens in Ireland are male, and it spreads by vegetative means. It forms dense stands and outcompetes native vegetation.

5.9 American Skunk-cabbage

American Skunk-cabbage is considered a medium risk invasive species (NBDC, 2026i). It was introduced in Ireland as an ornamental plant and has since spread and established itself in natural habitats. It is well established throughout Ireland, occurring mainly in mires, bogs, fens and stream sides. It reproduces by seeds, and spreads by rhizomes. It outcompetes native species.

5.10 Old Man's Beard (Traveller's joy)

Old Man's Beard is considered a medium risk invasive species (NBDC, 2026j). It was introduced in Ireland as an ornamental plant and has since escaped into natural habitats. It is well established in Ireland and is naturalised in hedgerows and on roadsides, found mainly on alkaline soils. It outcompetes native species.

5.11 Wall Cotoneaster

Wall Cotoneaster is considered a medium risk invasive species (NBDC, 2026k). It was first reported in Ireland in the 1960's introduced as an ornamental plant, which has since spread. It is well established in Ireland; it is popular as a hedging plant. Distribution within Ireland is likely to be human mediated and through birds transporting seeds. It is mainly found on constructed, industrial or other artificial habitats, and inland unvegetated or sparsely vegetated habitats. It outcompetes native species.

6 Management options

This section describes general guidance on management options for the different invasive species.

6.1 Best practice management guidance documents for Invasive Species Management

The following measures utilise the best practice management guidance documents listed below, where relevant:

- The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020a);
- The Management of Invasive Alien Plant Species on National Roads – Standard (TII, 2020b);
- Inland Fisheries Ireland - Biosecurity Protocol for Field Survey Work (IFI, 2010);
- Managing Invasive Non-Native Plants in or near Freshwater (EA, 2010);
- Managing Invasive Alien Plants in Ireland (2016-NC-MS-7) EPA Research Report, 2022
- Invasive Species Ireland (ISI) Best Practice Management Guidelines for Japanese Knotweed (ISI, 2008a);
- Good Practice Management Guide for Japanese knotweed (*Fallopia japonica*), (Rapid Life, 2018a)
- Good Practice Management Guide for American Skunk Cabbage (*Lysichiton americanus*), (Rapid Life, 2018b)
- Best Practice Management Guidelines for Giant Hogweed (ISI, 2008b);
- Good Practice Management Guide for Giant Hogweed (*Heracleum mantegazzianum*), (RAPID, 2018c);
- Best Practice Management Guidelines; Rhododendron (*Rhododendron ponticum*) and Cherry Laurel (*Prunus laurocerasus*) (Maguire et al., 2008).

6.2 Measures to Control and Prevent the Spread of Non-native Invasive Species

6.2.1 Pre-construction Survey

An updated invasive species baseline survey shall be conducted prior to the commencement of each of the proposed Scheme's enabling works. This updated baseline is required as invasive species may have spread within and adjacent to the proposed Scheme since the last invasive species survey, or habitat survey was conducted onsite.

As per TII guidance (TII, 2020a), this additional invasive species survey will include detailed maps of the precise location of each individual invasive species plant, as well as photos of these specific locations.

This updated survey will determine whether the existing stands of non-native invasive species on the First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations may have expanded (if unmanaged); or decreased (if there is an active management regime in place); or that newly established non-native invasive species may have become established within the footprint of the proposed Scheme. A confirmatory pre-construction survey will be undertaken by a suitably qualified specialist, arranged by the contractor(s),

to confirm the absence, presence and / or extent of all non-native invasive species on the First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations within the footprint of the proposed Scheme. Where an infestation is confirmed / identified within the footprint of the proposed Scheme, this will require the implementation of the final invasive species management plan.

6.2.2 General Measures to Avoid the Spread of INNS

The unintentional spread of INNS during construction works (within the proposed Scheme, originating from outside the proposed Scheme, such as through the importation of materials, poor biosecurity practices regarding plant and machinery or natural processes) can be a significant issue, and if not managed properly, can result in the spread of non-native invasive species to non-infested areas (within or adjacent to works areas). This will potentially increase the future cost and effort required to control the species and has the potential to pose further public health and safety risks (Japanese Knotweed can cause damage to weaknesses in built environment, whilst Giant Hogweed is an environmental public health hazard).

Listed below is a brief detailing of necessary measures to be undertaken to ensure biosecurity within the various sections of the proposed Scheme:

- The adherence to a set of biosecurity measures, including:
 - the fencing off / demarcating of the individual invasive species;
 - communicating the location, risk and hazards associated with invasive species to construction personnel (e.g. Giant Hogweed);
 - identifying dedicated access points into and out of fenced-off areas;
 - the installation of designated decontamination facilities (where appropriate);
 - protocols around the removal of contaminated soils; and
 - seed and fragment checks on boot, tyres and tracks entering and leaving the work site.
- Best practice measures for the treatment of soils contaminated with invasive species (including potential seeds and fragments of mature plants) to prevent the accidental spread of INNS;
- As required by law, licences for the disposal of contaminated materials will be obtained, as well as the utilisation of licensed facilities;
- In regard to the importation of soil and other materials, the principal contractor will only utilise traceable topsoil for landscaping that has been cleared of any invasive species material;
- Measures to be implemented during the application of herbicides – Commitment to the appointment of a suitably qualified /registered/ licensed pesticides advisor for any works requiring the use of pesticides, and safety precautions for consideration in the use of pesticides near watercourses; and
- Areas which contained invasives species, where invasives were treated on-site or removed, prior to the enabling and construction works will require an on-going post-construction monitoring programme to ensure that there is no reestablishment of any invasive species within these areas.

6.2.3 Biosecurity Mitigations

Prior to commencement of the enabling works along the Scheme, a series of biosecurity measures will have to be undertaken to prevent spread of invasive species, namely American Skunk Cabbage, Giant Hogweed, Giant Knotweed, Three-cornered Garlic and Japanese Knotweed.

American Skunk Cabbage is found in the upstream sections of the Scheme, Giant Hogweed, Giant Knotweed, Japanese Knotweed and Three-cornered Garlic are largely found in the eastern half of the scheme.

While not listed on Third Schedule list of the First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations, the invasive Butterfly-bush Cherry Laurel, Himalayan Honeysuckle, and Winter Heliotrope present in the areas of works will also be removed in the interest of the site's native floral composition.

Unwashed construction equipment, plant and vehicles, and footwear can provide a vector for the spread of non-native invasive species within the proposed Scheme and from areas outside the scheme where INNS are present or where vector material potentially containing seed / root material is attached to plant or personnel. The following hygiene measures shall be undertaken for the proposed Scheme:

- Known or potentially infested areas within the working area of the proposed Scheme shall be clearly demarcated and fenced off in advance of works and access restricted until such time that treatment has commenced and / or construction works are monitored in accordance with the ISMP in the area. In relation to Japanese Knotweed, the guidance recommends an exclusion buffer of 7m (metres) in all directions (within the works area and 3m vertically underground);
- The implementation of clear signage in accordance with TII standards will be erected at compounds, and at the boundary of the exclusion fencing. These signs will be explained at toolbox talks specific to each INNS to personnel on site and particular attention will be given to INNS that have the potential to cause injuries such as Giant Hogweed;
- Identify and create access points into exclusion areas for INNS. These are only to be used by specialist personnel for the removal of INNS and are not to be used by general site workers until such a time as all contaminated material has been removed from site and it is safe to enter;
- Where it is practicable, a wheel wash and footwear washing facilities will be provided to ensure biosecurity measures are preventing the further potential spread of INNS. These locations are to be provided by the contractor. Where a dedicated / bespoke wheel wash cannot be installed owing to space limitations, the appointed contractor will ensure that no excavated loose material is allowed off site from within an exclusion zone;
- Where plant is used to excavate soils, it shall be visually checked for loose soil before movement to another part of site (where possible, the movements of tracked machinery will be restricted within the non-native invasive species exclusion zone). Loose soil shall be scraped off and disposed of, and a solution of Virkon® (or similar approved disinfectant) applied to machinery to ensure that no obscured seed / root material remains viable. Vehicular movements within the exclusion area shall be minimised as far as is practical;
- Unless in the exceptional circumstance that direction is given from a suitably qualified ecologist, no storage of contaminated soil on site. Instead, being disposed of in a licenced soil waste facility; and

- Where there are small volumes (e.g. volumes capable of being double bagged in quarantine bags such as cut plants, bulbs or loose soil occur), it may be practical to bag the material and bring it to a clearly demarcated and dedicated quarantine area within the Construction Compounds until such time that the material is disposed of to an authorised facility, similar to the process of disposing of bulk excavated contaminated soil.

6.2.4 Soil Excavation

No excavation or removal of soil within areas demarcated as having INNS present is to be permitted unless under strict supervision by a suitably qualified ecologist or INNS specialist. Buffer zones to be installed by the contractor(s) will be advised by a suitably qualified ecologist or INNS specialist and strictly adhered to. Guidance regarding Japanese Knotweed recommends a buffer of 7m from the plant due to its expansive rhizomes while guidance for Giant Hogweed recommends a 4m buffer from the plant.

Where mechanical means of removal are required to dispose of INNS (treated or untreated by chemicals) a suitably qualified ecologist or INNS specialist will be present to supervise and provide support to the contractor(s) for the duration of the operation;

There will be no temporary storage on-site of bulk excavated contaminated material. Where the final ISMP calls for shallow / deep burial, this material shall be removed from the excavated area and transported immediately to approved receptor area on-site. Furthermore, the temporary storage of non-contaminated material will not occur within a European or National designated site nor within 20m of any watercourse / wetland and any land within an identified flood zone;

Plant and machinery used in the control, excavation and transport of contaminated material shall also be subject to the recommendations described in the above Biosecurity Mitigations sub-section;

The installation of industry-rated non-native invasive species-proof membrane before infilling construction of road / paths surface may be required. All waste arising out of this process which has been in contact with the excavated ground shall be treated as contaminated waste and disposed of at a facility that is authorised to accept such waste; and

Where the movement of any non-native invasive species listed on the First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations is required off site, a licence will be required from NPWS in advance of any movement to a site / facility licensed to accept such waste, as per the Birds and Natural Habitats Regulation. This licence is separate to and does not negate the need for licences / permits / authorisations required under waste legislation.

6.2.5 Disposal of Material

- Where any INNS related material is collected and is required to be disposed of, it is essential to dispose of said material in a manner that does not afford it the potential to spread further either within the proposed Scheme or in the nearby vicinity of Site;
- The movement of invasive plant material, off site, requires a licence from the NPWS, as per the Birds and Natural Habitats Regulations. Invasive species (particularly roots, flower heads or seeds) must be disposed of at licensed waste facilities or composting sites, appropriately buried, or incinerated having regard to relevant legislation (e.g. Waste Management Act, as amended, Section 4 of Number 6 of 1987 - Air Pollution Act, 1987,

relevant local authority bylaws and any other relevant legislation). All disposals must be carried out in accordance with the relevant waste management legislation, as per guidance Guidelines for the Management of Waste from National Road Construction Projects (TII, 2017); and

- It is important to note that some invasive species plant material or soil (vector material) containing residual herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the Waste Management Act, as amended, and both categories may require special disposal procedures or permissions. Advice will be sought from a suitably qualified waste expert regarding the classification of waste and the suitability of different disposal measures.

6.2.6 Measures to be Implemented During the Application of Herbicides

- If the application of herbicides is the expert advice given and then implemented during the lifespan of the proposed Scheme then a suitably qualified pesticides advisor, registered with the Department of Agriculture, Food and the Marine must be employed;
- The appointed contractor is required to refer to the appropriate guidance documents, including but not limited to those listed at the beginning of sub-section 5.1, which provide detailed recommendations for the control of invasive species and noxious weeds.
- It is important to note that where a chemical treatment is to be used, there is a risk of contaminating a watercourse. The choice of herbicide is typically limited to formulations of Glyphosate or 2,4-D amine that are approved for use near water. Full details of any chemical used, where required and as advised by a registered pesticides advisor, will be included in the final ISMP prepared in advance of construction of the proposed Scheme.

6.2.7 Post-construction Monitoring

- Following the construction of the proposed Scheme, there may be ongoing treatment programmes which extend for a number of years (length of programme is dependent on the effectiveness of treatment) into the Operational Phase. In the Operational Phase, the management of the infrastructure will be the responsibility of the local authority and the control of invasive species will be as per their plans and procedures, and responsibilities under The Birds and Natural Habitats Regulations;
- The above measures are important for all First or Third Schedule non-native invasive species, and in particular Japanese Knotweed, where it occurs, as maintenance works associated with landscaping, such as mowing and hedge cutting have the potential to spread this plant via the dispersal of very small amounts of shredded plant material;
- If invasive plants are found, then they shall be treated as per the measures outlined in the ISMP and any species-specific guidelines; and
- The appointed INNS contractor will provide a detailed post-construction section within the Monitoring Plan and Programme within the final Invasive Species Management Plan.

6.2.8 Assessment of Management Options for Scheduled Non-native Invasive Species

The general measures included in the sections above are required to ensure good on-site practices in respect of known or potential First Schedule of the Invasive Alien Species Regulations or Third Schedule of the Birds and Natural Habitats Regulations;

The following sections further identify practical management controls. It is acknowledged that more than one potential control measure exists and that a single or combination of measures may be required;

The use of chemical treatments is recognised as a potential treatment option. However, the services of a registered herbicide advisor must be employed in the specifying of named chemicals including those rated for use adjacent to aquatic environments where required, treatment type, dosage, and timing etc., and / or use of pesticides in the management of potential Third Schedule non-native invasive species within the proposed Scheme.

6.2.9 Selected management controls

The selected management control to be defined for each non-native invasive species stand within the proposed Scheme will depend on:

- Results of the pre-construction survey;
- Construction requirements – timing of works at specific locations, level of infestation and practical considerations such as reducing disturbance to road users / homeowners; and
- Feasibility of control measure, where possible the most practicable method (with regards to the environmental impact and human health) will be used e.g.; if mechanical methods of removal are not feasible due to access. Then a step back and assess approach will be employed to remove INNS.

6.3 Japanese Knotweed

Japanese Knotweed is a high impact non-native invasive species that is particularly effective at colonising disturbed ground (e.g. construction sites) and can spread by the re-growth of cut fragments or root material, Therefore, if it is broken up during site clearance or other earthworks, it can readily re-grow in new areas to which contaminated soil is moved. Japanese Knotweed reproduces asexually (in Ireland insofar as only female plants have been recorded) and regrowth can occur from plant material weighing as little as 0.7g (grams) of viable material. It is acknowledged to be very difficult to effectively control and even more difficult to fully eradicate.

Given the nature of Japanese Knotweed, chemical treatments are often preferred over physical methods as they can, if implemented properly, reduce the disturbance of the plant / population, thus reducing the chances of its spread. If herbicide is applied as the treatment option, it will need to be reapplied for up to five years after the first application to ensure the plant control measures have been effective or monitored for a minimum of two years during which no regrowth is recorded. However, physical removal may be necessitated when timely interventions are required.

Table 6-1 assessed the potential management methods for Japanese Knotweed with colour coding of the potential to implement on the proposed Scheme.

Table 6-1: Assessment of Management Methods for Japanese Knotweed

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. In addition to waste permits / authorizations, a wildlife licence issued by NPWS is required for the transport of Scheduled non-native invasive species offsite. Depending on the nature of the excavation the proximity of services etc, the use of root barrier membrane may be required.	Likely – given the nature of the scheme, there may be a need to excavate soil and plant material to enable construction works to go ahead in timely manner.
	Dig and dispose onsite. - Shallow burial - Deep burial	Wildlife licence from NPWS is not ordinarily required if the burial of collected material is proposed for within the consented proposed Scheme. Shallow burial in a constructed pit such as a dedicated sealed cell at a minimum depth of 2m within a constructed berm will allow for periodic monitoring and of easy chemical treatment of any regrowth. The construction of the cell must be monitored and supervised to ensure that there are no punctures, as well as installation of protective layers all around the root barrier membrane. Deep burial entails a dedicated sealed cell within a constructed excavation, that is at least 5m below the surface of the ground. The landscaping regime will specify trees or scrub must not be planted above. Either shallow or deep options will require the use of root barrier membrane. The use of chemical pretreatment of deep / shallow cells may also be required (Knotweed.ie)	Unlikely – given the lack of suitable lands within the largely developed metropolitan area.
	Screen on site – remove fragments offsite and reuse soil.	A control option that can be used to reduce the volume of soil / sediment to be moved elsewhere on-site for burial, this option requires suitable plant, adequate space and volumes of soil to make the operation at a	Possible as an addition to on-site burial, must not be used as a standalone remedial method for

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
		location cost effective. This option requires the use of root barrier membrane due to reuse of screened soil. The use of chemical pre-treatment of deep / shallow cells will also be required (knotweed.ie)	Japanese Knotweed within the site
	Cutting and / or strimming	Not recommended and will not diminish vigour of plants over time. Temporarily cosmetic reduction in plant cover, will result in considerable spread of viable vegetative material that will readily regenerate in most conditions (knotweed.ie)	Not Recommended
Chemical	Stem injections	Spray of Japanese Knotweed is no longer recommended; it will result in chemical drift and impact surrounding vegetation. Stem Injection is considered very effective, if the injection is timed appropriately for growth phase. However, it is labour-intensive (sometimes) requiring specialised equipment, however; it is recommended along waterbodies. Chemical treatments for infestations near water will be rated for use at or near aquatic locations (knotweed.ie)	Due to the proximity to waterbodies inherent with the scheme stem injections is the only recommended chemical treatment. Stem injections can be effective within 2 years if carried out effectively. However, given the nature of the proposed Scheme, the use of chemical treatment alone is unlikely to be adequate unless treatment regime begins a number of years before construction commencement.

6.3.1 Root Barrier Membrane

Following the excavation of Japanese knotweed, there may be a need to install a root barrier membrane. These are specialised products that can provide protection to structures / services etc. from regrowth from within or outside a site, if suitably rated and properly installed. Thereafter, any small adjacent infestation can be more readily treated with chemical treatment for example. This durable material can be used to line spoil pits and prevent rhizome lateral root spread or effective growth in

the plant and can keep it contained to an area where suitable chemical treatment can be undertaken.

6.3.2 Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Japanese knotweed seedlings in the following spring.

6.4 Giant Hogweed

This is a high-risk invasive species, that is also a biohazard in that it can pose a threat to humans. The chemistry of its sap is such that exposure to it on skin can result in prolonged phytophotodermatitis (extreme sensitivity to sunlight) reactions with blistering;

Thus, a clearly demarcated exclusion buffer, in excess of 4m, is recommend for any individual / populations of this species before commencing works;

It spreads via heavy seeds which can easily be transported by water. Hence, it is often found along river corridors. While the plant favours riverbanks, it is known to be found on waste / derelict ground as well as railway lines for instance. Its presence can impact local biodiversity and undermine bankside integrity. The seedling stage is the most vulnerable. Mortality of seedlings is comparable to many other plants, and its seed bank is considered to be persistent for a short number of years only. Since Giant hogweed can only reproduce via seed, control measures applied before flowering and fruit set will limit subsequent generations (and even then, only with favourable conditions). The ideal time to control Giant hogweed via chemical treatment is April, with follow on monthly applications targeting regrowth, although for this treatment options, it can require up to five years before successful eradication;

Table 6-2 assessed the potential management methods for Giant Hogweed with colour coding of the potential to implement on the proposed Scheme. The potential treatment option is to be fully detailed in the contractor's ISMP for the treatment of Giant hogweed.

Table 6-2: Assessment of Management Methods for Giant Hogweed

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. Given the phytotoxic nature of the plant, it will not be buried onsite nor disposed of with general Construction and Demolition waste. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Scheduled non-native invasive species offsite.	Possible and may be required.
	Above ground cutting	Not recommended. Largely cosmetic and prolongs flowering until such time that regular cutting is halted. However, if digging is used, it is recommended that the removal be attempted in April / early May when the plant is usually less than 30cm tall. However, the root must also be captured.	Unlikely - requires specialist equipment to enable working alongside the biohazardous plant
	Root cutting	Individual plants may be killed by	Given the nature of

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
		cutting at a 45-degree angle 15cm below ground level with a spade in April or May. Can be laborious unless small/isolated stands. Can be effective if combined with chemical treatment over 4-5 years repeat treatment.	the proposed Scheme, root cutting may be used to remove biohazard plant and thereafter allow for chemical control against any regrowth. Requires specialist equipment to enable working alongside the biohazardous plant.
	Pulling	Hand pulling is only suitable for small / immature plants (and with suitable PPE to protect exposure of bare skin). Potential remains for tap root to remain underground and regenerate. Recommended in April - May	Unlikely for mature plants. Requires specialist equipment to enable working alongside the biohazardous small / immature plants.
	Strimming / Grazing	Not recommended owing to spread of sap.	Not recommended or practical given the nature of the river and metropolitan landscape and nature of the proposed Scheme.
Chemical	Spot	Used for isolated plants – knapsack or weep sprayers. Chemical treatments for infestations near water will be rated for use near aquatic locations.	Most widely used method, but to be wholly effective, requires total control over ~5 years of treatments within a river catchment or the isolated location. Is weather dependent and can result in chemical drift to adjacent vegetation or watercourses.
	Spray / Stem injections	More suitable for large stands, where machine-mounted blanket sprays are used. Chemical treatments for infestations near water will be rated for use near	Possible in sections of the scheme, but unlikely overall owing to nature and size of

Approach	Treatment Options	Comment	Potential for Implementation on the proposed Scheme
		aquatic locations. Stem Injection can only be carried out on young stems. Due to difficulties with the timing of application and the potential safety risk of contact with the large leaves this method requires specialist safety equipment.	population recorded on proposed Scheme recorded within sensitive features such as in the Loughlinstown pNHA.

6.4.1 Temporary Storage of Collected Material

Given the phytotoxic nature of Giant Hogweed, cut material will not be discarded. It will be disposed of immediately with similar non-native invasive species waste to a facility authorised to accept such waste. However, given the nature and relative sizes of Giant Hogweed infestations, it may be suitable to collect cut biomass (where not disposed of immediately to a facility authorised to accept such waste), and to double bag it for transport to a dedicated quarantine area (location to be approved as part of the ISMP) to decompose before disposal with similar non-native invasive species waste in a facility authorised to accept such waste. The locations of areas for which Giant Hogweed has been eradicated will be notified to the local authority, so that any future public health issue involving similar symptoms can be tracked.

6.4.2 Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Giant Hogweed seedlings in the following spring and retard its establishment.

6.5 American Skunk Cabbage (Rapid Life, 2018a)

American Skunk Cabbage was introduced in Ireland as an ornamental plant and has since spread across Ireland, occurring mainly in mires, bogs, fens and along streams. It reproduces by seeds with a broad range of up 300-650 seeds per spadix, which fall to the ground next to the mother plant. Due to this, the spread of the next generation has limited distance when unaided, but this can be accelerated through watercourses which can increase the seed spread by several kilometres. Seeds can lay dormant and remain viable for at least eight years. The plant also spreads by rhizomes, capable of regeneration from root fragments. These result in a slow establishment, but rapidly will outcompete native species.

Small plants can be controlled by hand-pulling. Digging or pulling can be carried out in early Summer to weaken any rhizomes left in the ground, as these can generate new plants if they receive light. A second digging should be carried out in late Summer or Autumn to deplete the rhizome reserves and kill the plant. This needs repeating for at least two years, and due to the seedbank's longevity, there needs to be continuous monitoring for 10 years until the seedbank is exhausted.

Manual removal is usually the preferred method. However, as most of the plants occurred along watercourses, digging could result in silt entering the streams. The plant can also be controlled by glyphosate at a rate of 6l/ha. However, access can be difficult, and glyphosate can be harmful to water habitats. Treatment during dry

periods is recommended, when access to wet margins and muddy areas becomes easier.

In areas away from watercourses, digging or hand-pulling of American Skunk-cabbage should be used, with additional treatment carried out in early Summer to weaken any rhizomes left in the ground, as these can generate new plants if they receive light. A second digging should be carried out in late Summer or Autumn to deplete the rhizome reserves and kill the plant. The area should then be monitored for 10 years until the seedbank is exhausted.

6.6 Giant Knotweed

Treatment options for Giant Knotweed measures are the same as Japanese Knotweed; these measures are outlined in Table 6-1.

6.7 Three-cornered Garlic

There are no specific management guidelines in Ireland, however, there are recommendations on websites such as www.downgardenservices.org.uk. Three-cornered Garlic may be controlled by excavation or herbicidal application. It may also be controlled by continuous cutting over a number of years to exhaust the bulbs and seedbank. The excavated material may be buried on site or removed off site to a licenced facility to be destroyed.

Until the proposed development is planned for commencement, Three-cornered Garlic should be left in-situ and subjected to an ongoing chemical treatment programme where possible, during this preliminary design stage. Herbicide Treatment by an invasive species specialist contractor with demonstrated experience in treating and managing invasives as follows or subject to their advice:

Where material that contain this species needs to be excavated, this material must be removed to an EPA licenced waste facility by an invasive species specialist contractor with demonstrated experience in treating and managing invasives. Strict biosecurity procedures should be adhered to in order to minimise the risk of spread.

The infestation and an area of up to ca. 2m around and to a depth of 0.5m may contain Three-cornered Garlic seeds and/or bulbs. Soils that are to be removed for the proposed development must be disposed of at an EPA licenced waste facility and not mixed with general spoil.

6.8 Non-First-or-Third-Schedule Species

6.8.1 Butterfly-bush

For physical control, hand-picking of young plants is feasible but should be undertaken with care to avoid soil disturbance which can give rise to a flush of new seedlings (NRA, 2010). For larger stands, mechanical excavation/ cutting may be employed. Deadhead specimens should be handled with great care as seeds can rapidly germinate and grow in different habitats.

6.8.2 Cherry Laurel (Maguire et al., 2008)

Treatment of Cherry Laurel can be divided into three main stages: initial removal, control of stems and roots, and follow-up. Stems shall be cut and removed by hand or chainsaw, cutting as close to the ground as possible. The cut material shall be chipped or removed from the area to prevent regrowth.

After the initial cut, there are four management options; 1) dig out the stumps and remove all viable roots and place upside down to avoid regrowth; 2) Painting of spot spraying of freshly cut stumps with a herbicide (glyphosate, triclopyr or ammonium sulphate) immediately after been cut. If vegetable dye is used it should be painted

on all stumps; 3) Stem injection of glyphosate by drilling a hole into the main stem of the plant; 4) Stump regrowth and seedlings can be effectively killed by spraying with suitable herbicide, e.g., glyphosate. This is generally not as effective as stump spot treatment.

Follow-up seedling removal work may be necessary.

6.8.3 Himalayan Honeysuckle

There are no specific management guidelines in Ireland, however, there are recommendations on websites such as <https://www.weedbusters.org.nz/what-are-weeds/weed-list/himalayan-honeysuckle/>. Himalayan Honeysuckle can be dug out and left on site to rot down.

It can also be cut down and treated with stump paint or herbicidal application (e.g., glyphosate-based). Herbicidal treatment by spraying can be carried out during spring/summer.

6.8.4 Winter Heliotrope

As with other plants that have the potential to spread from small root fragments, disposal of material should be undertaken with due caution to prevent accidental spread of the plant. Winter Heliotrope can be treated using a Glyphosate-based weedkiller or may be excavated and buried on site. Herbicide is best applied in mid to late summer (NRA, 2010) before foliage dies back. Methods of foliar spray, wiper applicator, or spot treatment may be employed. The treated area should be monitored for regrowth in subsequent years.

6.8.5 Old Man's Beard

There are currently no specific management guidelines for Old Man's Beard in Ireland however, recommendations from previous studies suggest that mature plants should be controlled by cutting stems back to basal stump or removing root material, followed by targeted herbicide treatment. Control measures should be undertaken during periods of active growth, with vines cut back in winter or spring to encourage regrowth that can then be treated with a foliar herbicide application. For larger stems, herbicide can be applied directly to freshly cut surfaces to improve effectiveness. Glyphosate has been used successfully for control, although complete eradication typically requires repeated treatment over more than one growing season. Any regrowth should be monitored and retreated as necessary (DixonBrosnan, 2011).

6.8.6 Wall Cotoneaster

There are currently no specific management guidelines for Cotoneaster in Ireland however, recommendations from previous studies suggest that the plant should be cut by hand secateurs or hedge trimmers at ground level and then treated by hand with glyphosate and dye to the cut areas by paint brush. The only herbicide to be used is glyphosate with the most appropriate herbicide currently available for this treatment being Roundup™ Biactive (≡ Roundup™ Probiactive). Stem treatment will be the method used whereby a solution of glyphosate will be applied to the cut or broken stems of the plant. While it may take as long as up to 7 months for the herbicide to take full effect and for the plants to fully die, the treated areas will be inspected by trained personnel to ensure correct methodologies are being applied by visual inspection of treated plants (DHLGH, 2023).

7 Monitoring

DLRCC shall engage a qualified specialist to verify if the invasive species recorded in this report are still present following construction works. This will be carried out for a number of years post-construction and a copy of any records of the plant shall be lodged with the National Biodiversity Data Centre (www.biodiversityireland.ie). If invasive species are found, they shall be treated as per the measures outlined in the ISMP and any species-specific guidelines.

8 Conclusion

Thirteen different invasive species were identified during the field survey, located in numerous separate stands in the scheme area. Five of these species are listed on the First Schedule of the Invasive Alien Species Regulations and Third Schedule of the Birds and Natural Habitats Regulations including Japanese Knotweed, Giant Knotweed, and Giant Hogweed. Several of the species not listed on the Schedules are still considered invasive/problematic including Winter Heliotrope and Butterfly-bush.

Overall, given the presence of invasive alien species within the subsites, specific Invasive Species Management Plans for the various invasive alien species are required and must be completed by a suitably qualified Invasive Species specialist/s with suitable experience in the treatment of the various invasive alien species. Implementation of the plan/s will be carried out under the supervision of a suitably qualified Invasive Species specialist/s.

Chemical treatment should be carried out on Japanese Knotweed, Giant Knotweed and Winter Heliotrope. The general treatment time for all three is approximately May to September or October.

Physical treatment involving excavation, hand-pulling, and digging should be used to remove Three-cornered Garlic.

A combination of physical and chemical control should be carried out on Butterfly-bush, Giant Hogweed, American Skunk-cabbage, Cherry Laurel, Old Man's Beard, Wall Cotoneaster and Himalayan Honeysuckle.

A number of biosecurity measures have been prescribed herein. These measures should strictly be adhered to and further mitigation measures should be outlined by a suitably qualified invasive species specialist prior to commencement of any treatment.

A Invasive species recorded within 2km of the site within the last 10 years

Species name	Date of last record	Designation
Birds		
Greylag Goose <i>Anser anser</i>	19/04/2024	Invasive Species Regulation S.I. 374/2024 (Ireland)
Ring-necked Parakeet <i>Psittacula krameri</i>	25/11/2025	Invasive Species >> High Impact Invasive Species
Flora		
American Skunk-cabbage <i>Lysichiton americanus</i>	11/04/2025	Invasive Species >> High Impact Invasive Species Regulation No. 1143/2014
Butterfly-bush <i>Buddleja davidii</i>	30/01/2025	Invasive Species >> Medium Impact Invasive Species
Canadian Fleabane <i>Conyza canadensis</i>	04/08/2024	Invasive Species >> Medium Impact Invasive Species
Canadian Waterweed <i>Elodea canadensis</i>	30/09/2016	Invasive Species >> High Impact Invasive Species Regulation S.I. 477 (Ireland)
Cherry Laurel <i>Prunus laurocerasus</i>	14/01/2025	Invasive Species >> High Impact Invasive Species
Common Broomrape <i>Orobanche minor</i>	25/06/2021	Invasive Species >> Medium Impact Invasive Species
Evergreen Oak <i>Quercus ilex</i>	14/01/2025	Invasive Species >> Medium Impact Invasive Species
Floating Pennywort <i>Hydrocotyle ranunculoides</i>	18/01/2018	Invasive Species >> High Impact Invasive Species Regulation No. 1143/2014 Regulation S.I. 374/2024 (Ireland)
German-ivy <i>Delairea odorata</i>	13/08/2020	Regulation S.I. 477 (Ireland)

Species name	Date of last record	Designation
Giant Hogweed <i>Heracleum mantegazzianum</i>	14/05/2024	Invasive Species >> High Impact Invasive Species Regulation No. 1143/2014 Regulation S.I. 374/2024 (Ireland)
Giant-rhubarb <i>Gunnera tinctoria</i>	30/05/2020	Invasive Species >> High Impact Invasive Species Regulation No. 1143/2014 Regulation S.I. 374/2024 (Ireland)
Himalayan Balsam <i>Impatiens glandulifera</i>	11/07/2025	Invasive Species >> High Impact Invasive Species Regulation No. 1143/2014 Regulation S.I. 374/2024 (Ireland)
Himalayan Knotweed <i>Persicaria wallichii</i>	25/11/2017	Invasive Species >> Medium Impact Invasive Species Regulation No. 1143/2014 Regulation S.I. 374/2024 (Ireland)
Hottentot-fig <i>Carpobrotus edulis</i>	24/07/2017	Invasive Species >> High Impact Invasive Species Regulation No. 1143/2014 Regulation S.I. 374/2024 (Ireland)
Japanese Knotweed <i>Fallopia japonica</i>	29/10/2025	Invasive Species >> High Impact Invasive Species Regulation No. 1143/2014 Regulation S.I. 374/2024 (Ireland)
Pampas-grass <i>Cortaderia selloana</i>	01/08/2024	Invasive Species >> Medium Impact
<i>Rhododendron ponticum</i>	07/06/2020	Invasive Species >> High Impact Invasive Species Regulation S.I. 374/2024 (Ireland)

Species name	Date of last record	Designation
Russian-vine <i>Fallopia baldschuanica</i>	07/01/2024	Invasive Species >> Medium Impact
Sea-buckthorn <i>Hippophae rhamnoides</i>	22/06/2023	Invasive Species >> Medium Impact Invasive Species Regulation S.I. 374/2024 (Ireland)
Spanish Bluebell <i>Hyacinthoides hispanica</i>	03/05/2025	Regulation S.I. 374/2024 (Ireland)
Sycamore <i>Acer pseudoplatanus</i>	27/02/2025	Invasive Species >> Medium Impact
Three-cornered Garlic <i>Allium triquetrum</i>	05/05/2025	Invasive Species >> Medium Impact Invasive Species Regulation S.I. 374/2024 (Ireland)
Traveller's-joy <i>Clematis vitalba</i>	29/09/2025	Invasive Species >> Medium Impact
Turkey Oak <i>Quercus cerris</i>	16/01/2023	Invasive Species >> Medium Impact
Wall Cotoneaster <i>Cotoneaster horizontalis</i>	28/05/2024	Invasive Species >> Medium Impact
Invertebrates		
Australian flatworm <i>Australoplana sanguinea</i>	06/03/2021	Invasive Species >> Medium Impact
New Zealand Flatworm <i>Arthurdendyus triangulatus</i>	24/03/2026	Invasive Species >> High Impact Regulation No. 1143/2014
Obama Flatworm <i>Obama nungara</i>	01/04/2025	Regulation No. 1143/2014
Harlequin Ladybird <i>Harmonia axyridis</i>	15/12/2025	Invasive Species >> High Impact Invasive Species Regulation S.I. 374/2024 (Ireland)
Oak Processionary <i>Thaumetopoea processionea</i>	30/06/2020	Invasive Species >> High Impact
Mollusc		

Species name	Date of last record	Designation
Jenkins' Spire Snail <i>Potamopyrgus antipodarum</i>	26/07/2018	Invasive Species >> Medium Impact
Zebra Mussel <i>Dreissena polymorpha</i>	19/01/2024	Invasive Species >> High Impact Invasive Species Regulation S.I. 374/2024 (Ireland)
Algae		
Wireweed <i>Sargassum muticum</i>	21/08/2025	Invasive Species >> High Impact Invasive Species Regulation S.I. 374/2024 (Ireland)
Crustacean		
<i>Crangonyx pseudogracilis/floridanus sens. lat.</i>	30/09/2016	Invasive Species
Landhopper <i>Arcitalitrus dorrieni</i>	29/04/2017	Invasive Species >> Medium Impact Invasive Species
Terrestrial Mammal		
American Mink <i>Neovison vison</i>	28/06/2025	Invasive Species >> High Impact Invasive Species Regulation S.I. 374/2024 (Ireland)
Brown Rat <i>Rattus norvegicus</i>	21/12/2022	Invasive Species >> High Impact Invasive Species
Fallow Deer <i>Dama dama</i>	26/06/2018	Invasive Species >> High Impact Invasive Species Regulation S.I. 374/2024 (Ireland)
Feral Goat <i>Capra hircus</i>	26/12/2017	Invasive Species >> Medium Impact Invasive Species
Grey Squirrel <i>Sciurus carolinensis</i>	18/11/2025	Invasive Species >> High Impact Invasive Species Regulation S.I. 374/2024 (Ireland)
House Mouse <i>Mus musculus</i>	31/12/2018	Invasive Species >> High Impact Invasive Species
Rabbit <i>Oryctolagus cuniculus</i>	27/08/2017	Invasive Species >> Medium Impact Invasive Species

Species name	Date of last record	Designation
Sika Deer <i>Cervus nippon</i>	13/10/2018	Invasive Species >> High Impact Invasive Species Regulation S.I. 374/2024 (Ireland)

B Ecology Baseline Data

B.1 Baseline conditions

The proposed development area is comprised of a wide range of habitats, including stone structures, earth banks, built artificial surfaces, agricultural and amenity grasslands, ponds, spoil, swamps, rivers, ditches, grassy meadows and verges, bracken, woodlands, hedgerows, treelines, scrub.

B.2 Habitats

A list of habitats recorded during the ecological habitat survey is listed in Table 3-1 below and are presented in detail in the following sub-sections. These sections include text on where INNS occurs within the various habitats. Individual habitat maps of the sections are found at the beginning of each sub-section. The sub sections include the following:

- Area A: Measures 1.A and 1.B (Clon Brugh)
- Area B: Measures 2.B and 2.D (Belarmine Park)
- Area C: Measures 2.E and 2.G (Kilgobbin Road)
- Area D: Measure 3.A (Glenamuck Road)
- Area E: Measures 4.A, 4.B, 4.C and 5.D (Bride's Glen River and Bray Road)
- Area F: Measures 5.A and 5.C (Commons Road, Brookdene and Bayview)

Table B-1: Habitats recorded during the site visits

Habitat	Fossitt Code
Stone walls and other stonework	BL1
Earth banks	BL2
Mosaic: Earth banks / Scrub	BL2 / WS1
Buildings and artificial surfaces	BL3
Recolonising Bare Ground	ED3
Other artificial lakes and ponds	FL8
Eroding/upland rivers	FW1
Mosaic: Eroding/upland rivers / Depositing/lowland rivers	FW1 / FW2
Drainage ditches	FW4
Improved agricultural grassland	GA1
Amenity grassland (improved)	GA2
Dry meadows and grassy verges	GS2
Wet grassland	GS4
Marsh	GM1
Dense Bracken	HD1
Mosaic: Dense Bracken / Scrub	HD1 / WS1
(Mixed) broadleaved woodland	WD1
Mosaic: (Mixed) broadleaved woodland / Scrub	WD1 / WS1
Mixed broadleaved/conifer woodland	WD2
Mosaic: Mixed broadleaved/conifer / Scrub	WD2 / WS1
Scattered trees and parkland	WD5
Hedgerow	WL1
Treelines	WL2
Scrub	WS1
Mosaic: Scrub / Dry meadows and grassy verges	WS1 / GS2

B.2.1 Habitat map Area A: Measures 1.A and 1.B (Clon Brugh)

Habitat map of section A near Defence 1A & 1B area is found in Figure B-1 below.



Figure B-1: Clon Brugh habitats

The habitats for Area A are described below:

Stone walls and other stonework (BL1)

There are stone walls present within the housing estate at Clon Brugh. There were neither floral nor faunal species present on this stone wall.

Buildings and artificial surfaces (BL3)

A large portion of the site is dedicated to roadways, houses, footpaths or adjacent housing. These areas that have few species present or associated with them.

Drainage ditches / Dry meadows and grassy verges (FW4, GS2)

Located through Clon Brugh is a ditch that has a distinct grassy verge located along its course. At the time of the survey on the 16th of May 2024. This ditch was wet at the very northern tip of this section, and dry for the remainder. The flora located along the ditch's course include: Willowherb *Epilobium* sp; Hogweed *Heracleum sphondylium*; Perennial Rye-grass *Lolium perenne*; Cuckooflower *Cardamine pratensis*; Dandelion *Taraxacum* spp.; Red Clover *Trifolium pratense*; Bramble *Rubus fruticosus* agg.; Hedge Crane's-bill *Geranium pyrenaicum*; Ragwort *Jacobaea vulgaris*; Lesser Stitchwort *Stellaria graminea*; Creeping Cinquefoil *Potentilla reptans*; Ribwort Plantain *Plantago lanceolata*; Black Medick *Medicago lupulina*; Wild Carrot *Daucus carota*; Red Fescue *Festuca rubra*; Cock's-foot *Dactylis glomerata*; Oxeye Daisy *Leucanthemum vulgare*; Herb Robert *Geranium robertianum*; Smooth Sow-thistle *Sonchus oleraceus*; Common Vetch *Vicia sativa*; Meadow Buttercup *Ranunculus acris*; Creeping Buttercup *Ranunculus repens*; and Broad-leaved Dock *Rumex obtusifolius*. Some garden Marigolds were also located within this area.

Amenity grassland (improved) (GA2)

On either side of the ditch in this area, is a section of amenity grass. While some of the plants from the ditch and its verges have spread into these amenity areas, it is managed moderately, and so it consists mainly of Ragwort, Perennial Rye-grass, Dandelion and Daisy *Bella perennis*.

(Mixed) broadleaved woodland (WD1)

East of Defences 1A and 1B is a woodland which consists of a mixture of trees, native and non-native. This woodland is dominated by Sycamore *Acer pseudoplatanus*, while also containing other tree species such as: Ash *Fraxinus excelsior*; Silver Birch *Betula pendula*; Scots Pine *Pinus sylvestris*; Hawthorn *Crataegus monogyna*; Blackthorn *Prunus spinosa*; Elder *Sambucus nigra*; Holly *Ilex aquifolium*; Alder *Alnus glutinosa*; Pedunculate Oak *Quercus robur*; Horse Chestnut *Aesculus hippocastanum*; and Barberry *Barberis* sp., while also having a light layer of English Ivy *Hedera helix* on some of the trees.

The understory of this woodland section includes Cleavers *Gallium aparine*, Bramble, Lords-and-ladies *Arum maculatum*; Burdock *Arctium minus*; Hedge Mustard *Sisymbrium officinale*; Dandelion; Creeping Buttercup; Perennial Rye-grass; Cleavers; Ragwort; Sunspurge *Euphorbia peplus*; Scaly Male Fern *Dryopteris affinis*, Shepherd's-purse *Capsella bursa-pastoris*, Creeping Thistle *Cirsium vulgare*; Broad-leaved Dock; Garlic Mustard *Alliaria petiolata*, Green Alkanet *Pentaglottis sempervirens*; Common Vetch; Nettle *Urtica dioica*; Wood Sorrel *Oxalis acetosella*; White Clover *Trifolium repens* and Common Fumitory *Fumaria officinalis*.

This woodland was also inspected for bat roosting features, and was deemed to have low potential for roosting, given the lack of dense Ivy growth of cracks within trees and limbs.

Hedgerows WL1

There is a small hedgerow located to the north of this location, made entirely of Cherry Laurel *Prunus laurocerasus*, before beginning to merge with the woodland section.

B.2.2 Habitat Map Area B: Measures 2.B and 2.D (Belarmine Park)

Habitat map for Area B: Measures 2.B and 2.D is seen below in Figure B-2.



Figure B-2: Belarmine habitats

Habitats for Area B are described below

Other artificial lakes and ponds (FL8)

West of the Belarmine culvert inlet, lies an acting water storage and flood relief pond with an island. In the area of this pond and along the bank are, both mature and immature Willow *Salix* spp., Willowherb, Broadleaved Dock, Creeping Buttercup; Bulrush *Typha latifolia*, Pendulous Sedge *Carex pendula*, Soft Rush *Juncus effusus*; Hard Rush *Juncus inflexus*; Common Vetch; Creeping Buttercup; Meadow Buttercup; Lesser Stitchwort; Dandelion; Broad-leaved Dock; Yorkshire Fog *Holcus lanatus*; Bent *Agrostis* sp., Yarrow *Achillea millefolium*; White Clover; Hogweed; Sweet Vernal-grass *Anthoxanthum odoratum*; Ragwort; Creeping Thistle; Red Clover and Common Daisy.

Amenity grassland (improved) (GA2)

There are large areas of amenity grassland located within the vicinity of Defences 2 A-E. These areas are predominantly Perennial Rye-grass with some small sections of Ragwort, Dandelion and Daisy.

Marsh (GM1)

There is a small section of marshland within the Belarmine Park. This area exhibits little management and this has allowed for stands of Yellow Iris, Bramble, Willowherb and some singular stands of Grey Willow *Salix cinerea* and Alder to develop.

Dry meadows and grassy verges (GS2)

There are patches of unmown grassy verges and small meadow patches in the south of Belarmine Park. These verges include Annual Meadow-grass *Poa annua*; Yorkshire Fog; Bent *Agrostis* sp.; Dandelion; Perennial Rye-grass; Cuckooflower; Dandelion; Red Clover; Ragwort; Lesser Stitchwort; Creeping Cinquefoil; Cock's-foot; Herb Robert; Meadow Buttercup and Creeping Buttercup.

In the south-east of this section, near to the bridge on Kilgobbin Road, is a small patch of grassy verge that contains the species: Red Valerian *Centranthus ruber*; Curled Dock *Rumex crispus*; Meadow Buttercup; Ivy; Creeping Buttercup; Nettle; Creeping Thistle; Tutsan *Hypericum androsaemum*; Willowherb; Cow Parsley *Anthriscus sylvestris*; Dandelion; Mouse-ear *Cerastium fontanum*; Yorkshire Fog, Hart's-tongue Fern *Asplenium scolopendrum*; Pendulous Sedge and Cleavers.

Wet grassland (GS4)

A section of wet grassland is present in the center of the Belarmine Park, in a clearing of the Wet willow-alder-ash woodland and grading from the Marsh. Within this wet grassland are varied management sections. While there were sections of lower growth height that contained lots of Cuckooflower, along with Creeping Buttercup; Daisy; Dandelion; Chickweed *Stellaria media*; Soft Rush *Juncus effusus* and Willowherb there were additional sections in this area that had undergone some mowing, while still retaining the soft and waterlogged ground.

(Mixed) broadleaved woodland (WD1)

There is a small stretch of Mixed Broadleaved woodland in the east of Belarmine Park, which consists of two interlocking treelines. These treelines contain Beech *Fagus sylvatica* and Ash *Fraxinus excelsior* with a minimal ground layer of Perennial Rye-grass and some Ground Ivy *Glechoma hederacea*.

Scattered trees and parkland (WD5)

In the west of Belarmine Park is a small section of scattered trees in an amenity grass area. These trees consisted of Pedunculate Oak *Quercus robur*.

Treelines (WL2)

In and the west and east of this section, are rows of trees bordering the roadways or the grassland areas, which contain the species Ash, Hawthorn *Crataegus monogyna*, Beech, Sycamore, Elder *Sambucus nigra* and Holly with a low cover of Bramble.

Wet willow-alder-ash woodland (WN6)

Throughout Belarmine Park is a woodland that consists of high content of Ash and White Willow, while also containing other tree species Elder *Sambucus nigra*, Sycamore, Dogwood *Cornus sanguinea*, Silver Birch, Hazel *Corylus avellana* and Beech. The understory of this woodland consisted of a variation of Bramble; Cleavers; Cow Parsley; Creeping Buttercup; Ivy; Gorse *Ulex europaeus*; Ribwort Plantain *Plantago lanceolata*; Nettle; Hogweed; Bush Vetch *Vicia sepium*; Annual Meadow-grass; Lords-and-ladies; Male Fern *Dryopteris filix-mas*; Tutsan; Harts-tongue Fern; Pendulous Sedge; Hedge Bindweed *Calystegia sepium*; Field Horsetail *Equisetum arvense*; Greater Stitchwort *Stellaria holostea*; Brooklime *Veronica beccabunga*, Lesser Celandine *Ficaria verna*; Herb Robert; Nipplewort *Lapsana communis*, Gorse, and Ground Ivy.

The Carrickmines Stream ran directly through this woodland, whilst there were sections of the woodland that were off from the main water body, but still had pools of standing water present.

Scrub (WS1)

West of the Belarmine culvert, and north-east of the attenuation pond, is an area that widens into a dense scrub. This scrub section was largely a section of Bramble at the time of surveying. Additional species present include Beech; Ash; Broad-leaved Dock; Cow Parsley; Creeping Buttercup; Nettle; Sycamore; Ash; Crab Apple *Malus sylvestris* and Cleavers.

Invasive Species

There is widespread Skunk Cabbage *Lysichiton americanus* and Three-cornered Garlic (also known as Three-cornered Leek) *Allium triquetrum* present along the stretch of the Carrickmines Stream.

B.2.3 Habitat Map Area C: Measures 2.E and 2.G (Kilgobbin Road)

Habitat map for Area C: Measures 2.E and 2.G is seen below in Figure B-3.

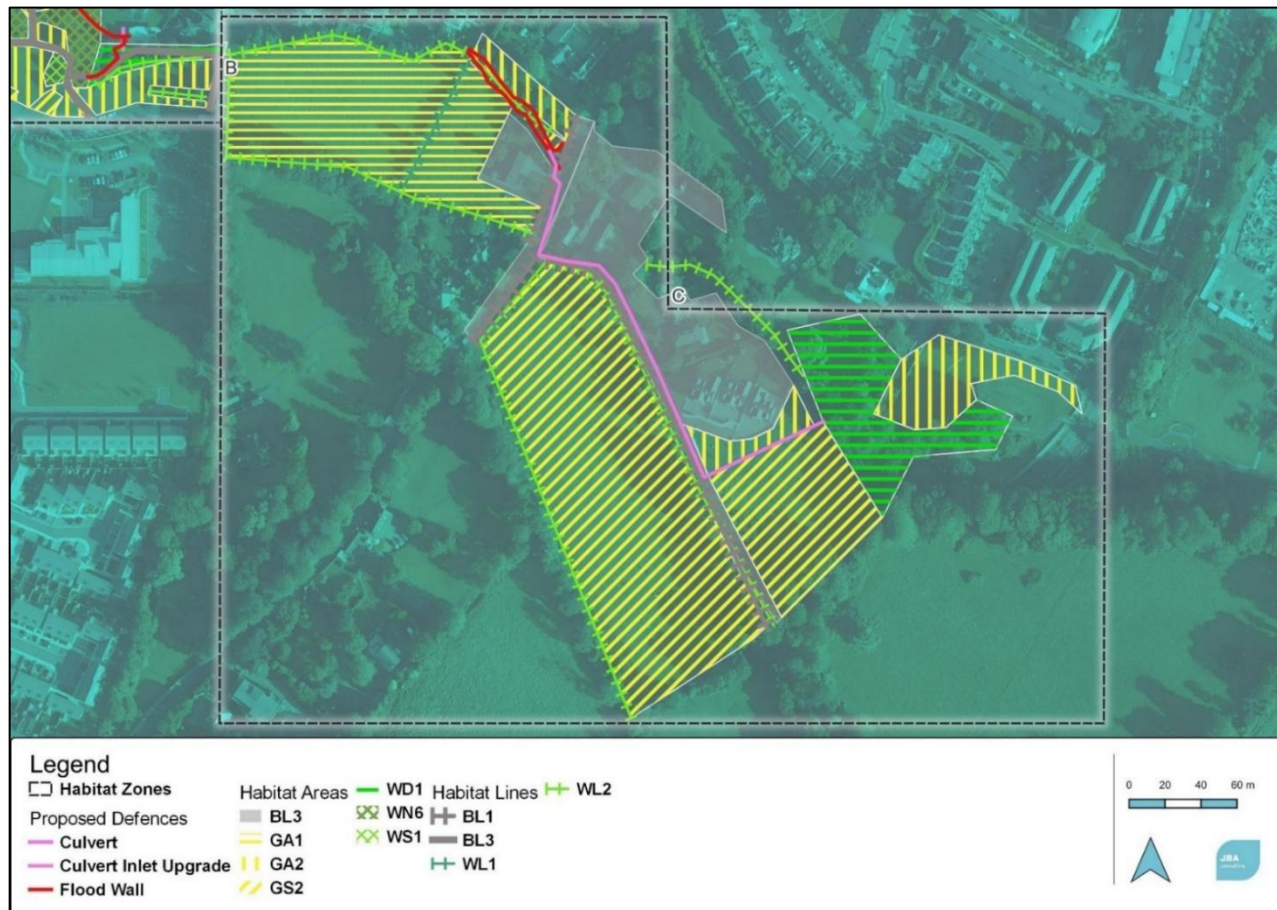


Figure B-3: Kilgobbin Road habitats

Habitats for Area C are described below:

Stone walls and other stonework (BL1)

There is a stone wall that lines either side of Kilgobbin Road. This wall was species poor, including Ivy-leaved Toadflax *Cymbalaria muralis*; Ivy; Herb Robert; Stonecrop *Sedum* sp and Dandelion.

Buildings and artificial surfaces (BL3)

There are houses, roads and driveways located within the area of this section of the Scheme. These areas do not have any species associated with them.

Improved agricultural grassland (GA1)

There is a field to the west of Kilgobbin Road, that at the time of surveying had a horse present in it. Due to the grazing of the horse, the field was not entered, however, from the roadside it was apparent that the grassland was species-poor, likely due to over-grazing.

Amenity grassland (improved) (GA2)

Areas of amenity grass within this section of the Scheme include the gardens of local residents that were not surveyed due to their maintenance and low ecological value.

Dry meadows and grassy verges (GS2)

There are two large field areas that are located within this section of the Scheme, which had previously been utilised as agricultural land. At the time of the survey, these areas have been allowed to diversify and develop into meadow areas with species including Cow Parsley; Meadow Buttercup; Cock's-foot; Yorkshire Fog; Cuckooflower; Cleavers; Nettle and have begun to be encroached by Bramble, in particular along the edges of the field boundary.

Scattered trees and parkland (WD5)

In the east of this section of the Scheme is a housing estate that has a planted woodland present. Trees in this area include Sycamore; Ash; Horse Chestnut and Scots Pine. The ground flora in this area is amenity grassland that is tightly mown and managed.

Hedgerows (WL1)

There is one hedgerow within this section of the scheme that is located within the centre of the grazed field. As with the rest of this field, the area was not surveyed due to the presence of the horse, however, from a distance it was apparent that the hedge was heavily fragmented.

Treelines (WL2)

There are treelines located throughout this section of the Scheme, with one treeline consisting of Horse Chestnut; Bramble; Ivy, Sycamore and Hawthorn with Nettles and Creeping Buttercup present at its base.

The treelines that are present within the rest of this section include Ash; Sycamore and Beech.

B.2.4 Habitat Map Area D: Measure 3.A (Glenamuck Road)

Habitat map for Area D: Measure 3.A is seen below in Figure B-4.

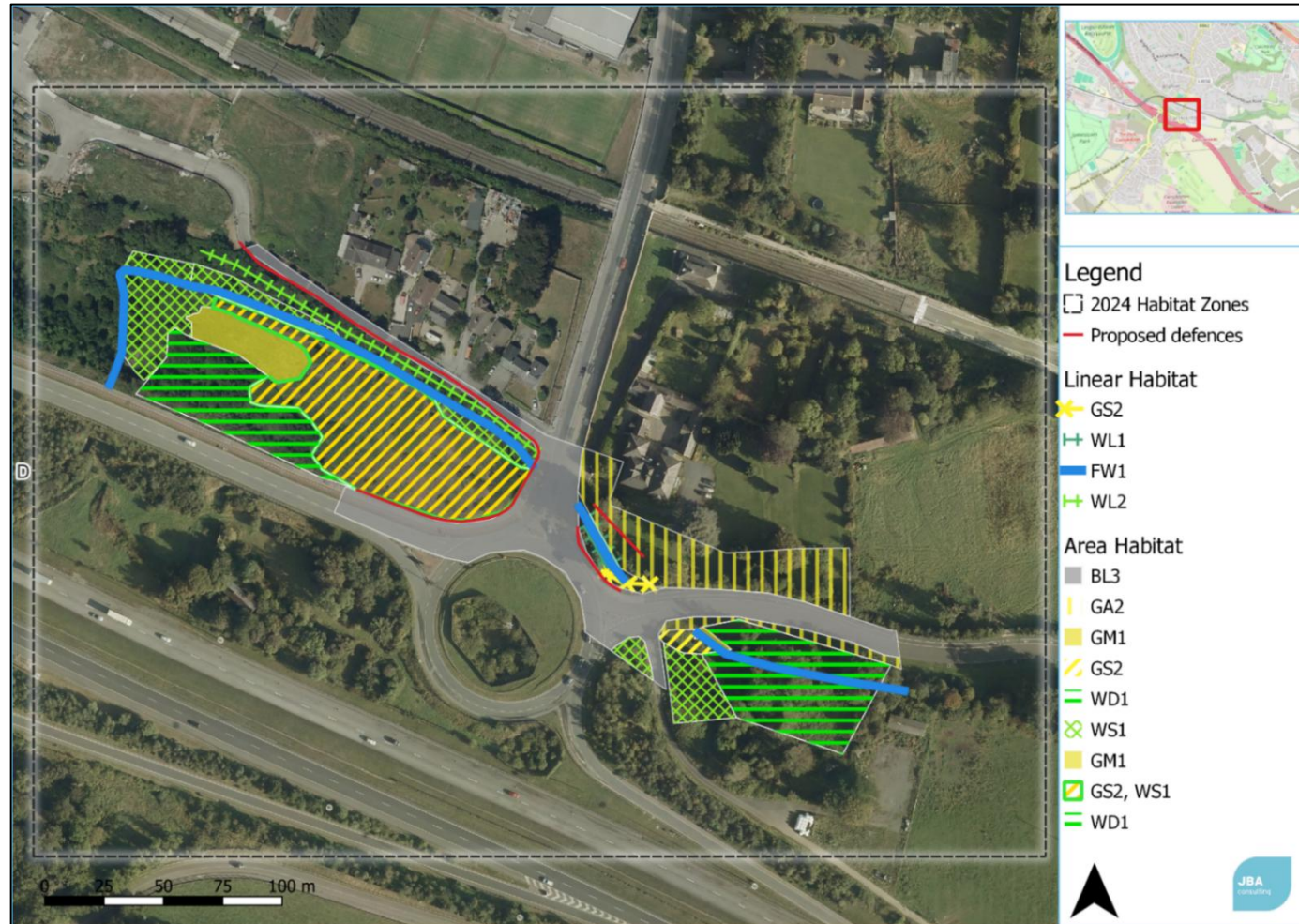


Figure B-4: Glenamuck Road habitats

Habitats for Area D are described below

Recolonising Bare Ground (ED3)

There is a narrow, linear section of recolonising bare ground in the north-east of the roundabout section. This linear feature includes Field Mustard *Brassica rapa*; Ragwort; Field Speedwell *Veronica persica*; Wavy Bittercress *Cardamine impatiens*; American Willowherb *Epilobium Ciliatum*; Groundsel *Senecio vulgaris*; Alder; Ivy; Nettle and Bilbao Fleabane *Conyza floribunda*. This habitat was less than 0.5m in width so not mapped, due to its small scale.

Marsh (GM1)

There is a section of marsh located in the patch east of the roundabout. This marshland contains Green Alkanet, Nettle, Pendulous Sedge; Cleavers; Water Figwort *Scrophularia nodosa*; Cow Parsley, Great Willowherb *Epilobium hirsutum*; Hogweed, Curled Dock; Bramble and Marsh Marigold *Caltha palustris*.

A patch of marsh also exists north-west of the roundabout section. This marsh area also contains Cleavers; Hogweed; Bramble; Great Willowherb; Pendulous Sedge, Nettle; while it contained the additional species Yellow Iris, Field Scabious *Knautia arvensis*, False Oat-grass; Meadowsweet *Filipendula ulmaria*; Meadow Buttercup; Greater Stitchwort; Red Clover; White Clover; Yarrow and Cock's-foot with occasional sapling Alder and Goat Willow, and the invasive non-native species Butterfly Bush *Buddleja davidii*.

Dry meadows and grassy verges (GS2)

A small section of meadow is located to the east of the roundabout which contains Cow parsley; Dandelion; Bramble; Common Vetch; Meadow Buttercup; Bush Vetch; Cleavers; Downy Oat-grass *Avenula pubescens*; Hedge Bindweed; Cock's Foot; Creeping Buttercup; Creeping Thistle; Yorkshire Fog; Ragwort; Curled Dock; Broad-leaved Dock; Meadow Foxtail *Alopecurus geniculatus*; Hogweed; English Cinquefoil *Potentilla anglica*; Horsetail; Dandelion; Ragwort; Rough Hawk's-beard *Crepis biennis*; Red Fescue; Butterfly Bush; Yorkshire Fog; Wood Avens *Geum urbanum*; Ribwort Plantain; Spear Thistle *Cirsium vulgare*; Fleabane spp.; Herb Robert; Yarrow; Cock's-foot; Smooth Sow-thistle and American Willowherb.

(Mixed) broadleaved woodland (WD1)

A stretch of woodland is located east of this roundabout section. This woodland contains Sycamore; Ash; Hawthorn; Cypress Cupressus sp; Nettle; Alexanders *Smyrniolus olusatrum*; Bramble; Ivy; Hogweed; Cleavers; Lords-and-ladies; Pendulous Sedge; Soft Shield-fern *Polystichum setiferum*; Harts-tongue Fern; Giant Knotweed *Reynoutria sachalinensis*; Wych Elm *Ulmus glabra*; Winter Heliotrope *Petasites pyrenaicus*; Palm Tree, Holly; Irish Yew, Cherry Laurel and Beech.

Treelines (WL1)

There are two small treelines located north of the roundabout. These treelines contain a mixture of tree species Alder; Ash; Wych Elm; Sycamore and Beech, with an understory of Bramble; Alexanders, Nettle; Water Figwort and Pendulous Sedge.

Scrub (WS1)

A patch of scrub exists to the east of the roundabout, adjacent to the local woodland. This scrub consists mainly of Bramble, while also containing occasional Cow Parsley; Tutsan; Hawthorn; Sycamore; Alder; Elder, Butterfly Bush; Pendulous Sedge; Dogwood and Rowan *Sorbus aucuparia*.

An additional patch of scrub is located in the west of this section, containing the same species as in the east.

Scrub / Dry meadows and grassy verges (WS1 / GS2)

There is one small section of meadow grassland, east of the roundabout, that is transitioning into a patch of scrub. The species in this area include False Oat-grass, a dense growth of Bramble, Hogweed, Meadow Buttercup, ferns, Great Wood-rush *Luzula sylvatica*, Ivy, Ribwort Plantain, Hedge Bindweed *Calystegia* spp., Fairy Flax *Linum catharticum*, Tufted Vetch *Vicia cracca*, Hawthorn, Creeping Thistle, Meadow Foxtail and Creeping Cinquefoil.

In the western part of this section, is a larger patch of meadow grassland / scrub. This western section also contains Bramble; Hogweed; Hawthorn; False Oat-grass; Meadow Buttercup; Creeping Cinquefoil; Creeping Thistle; Ribwort Plantain and Ivy.

In the east of this area of scrub/grassland, were the invasive non-native species Japanese Knotweed *Reynoutria japonica*, Winter Heliotrope and Giant Knotweed *Heracleum mantegazzianum*.

This western section also included additional species Yorkshire Fog; Meadowsweet; Cock's-foot; Common Vetch; Bush Vetch; Gorse; Ash; Nettle; Herb Robert; Silverweed; Great Willowherb; Sweet Vernal-grass; Pedunculate Oak; Ragwort; Alder; Smooth Sow-thistle; Smooth Meadow-grass *Poa pratensis sens lat*; Curled Dock; Dandelion; Cleavers; Perennial Rye-grass; Soft Rush; Hedge Woundwort; Common Couch *Elymus repens*; Perforate St John's Wort *Hypericum perforatum*; Pendulous Sedge; Colt's-foot *Tussilago farfara*; Smooth Hawkbit; Elm; Italian Alder *Alnus cordata*; Cow Parsley; Cluster Dock; Soft Rush; Sycamore; Horsetail; Meadow Vetchling *Lathyrus pratensis*; Black Medick; Common Bent *Agrostis capillaris*; Creeping Bent *Agrostis stolonifera* and Oxeye Daisy.

B.2.5 Habitat Map Area E: Measures 4.A, 4.B, 4.C and 5.D (Bride's Glen River and Bray Road)

Habitats for the western section are mapped in Figure B-5 overleaf. Given the widespread nature of measures 4 and 5, these areas are addressed east and west of the pitch and putt.

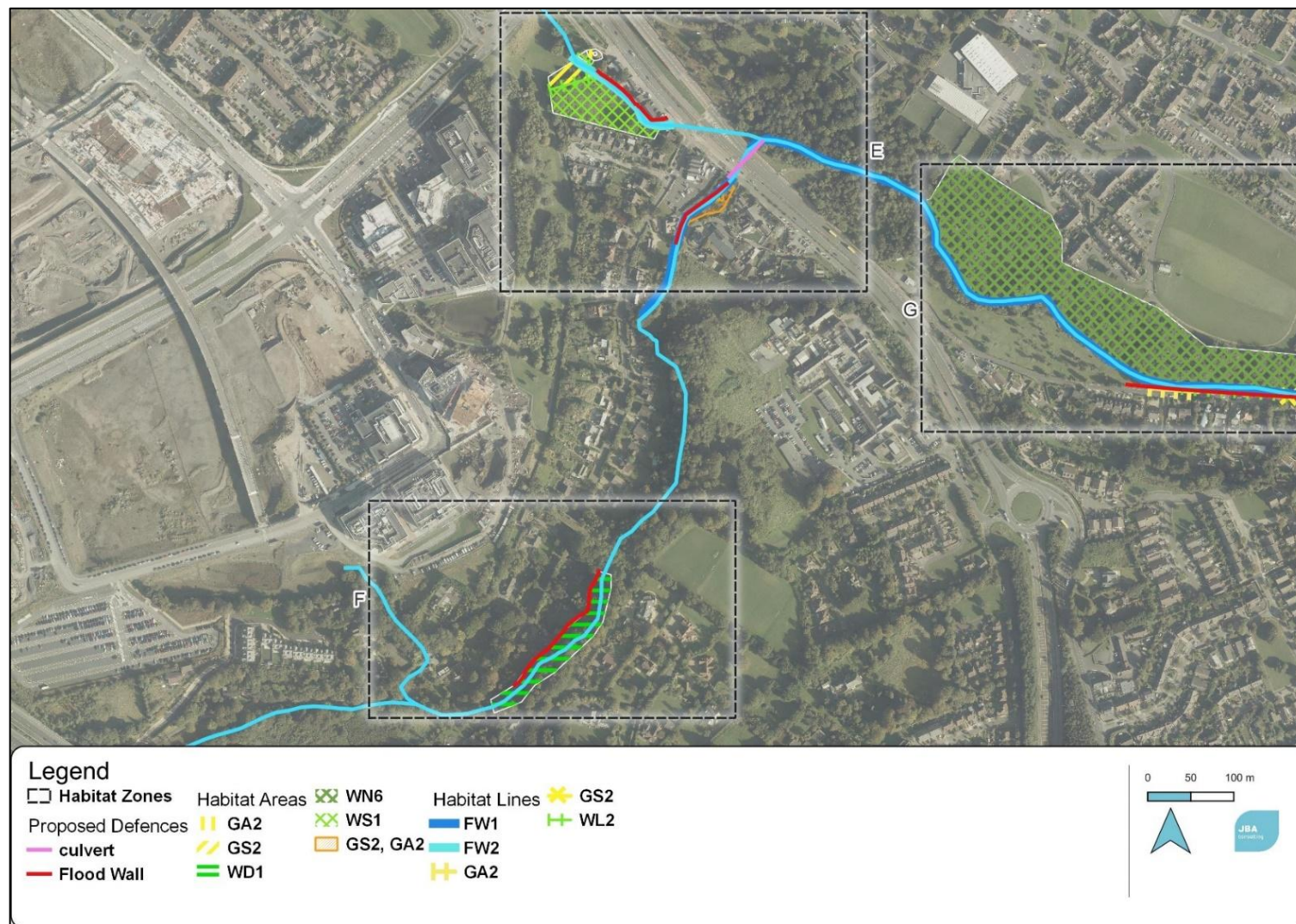


Figure B-5: Brides Glen River and Bray Road habitats

Habitats for Area E are described below:

Eroding/upland rivers (FW1)

Throughout this section of the scheme is a continuation of the Shanganagh River. Where it flows under the railway line, there is no access to the north between houses and railway line. In this area, the watercourse is approximately 5.5 m wide, containing boulders cobbles, gravel. At the time of the survey it was approximately 0.5m deep and fast flowing. The channel banks are vegetated with Bramble, Alexanders, Hart's Tongue Fern, Pendulous Sedge and Reed Canary-grass *Phalaris arundinacea*. The banks also support the non-native species Winter Heliotrope and Butterfly Bush.

Mosaic: Eroding/upland rivers / Depositing/lowland rivers (FW1 / FW2)

There is a section where the river transitions between an eroding and a depositing river. The river varies in depth from 10cm to 50cm deep, and is fast flowing, having a cobble base with sections of a sandy gravel substrate and stone walled edges. The banks of the river include Pendulous Sedge, Bramble, Ferns, Alder and Ash Saplings.

Dry meadows and grassy verges (GS2)

There are sections of meadow located throughout the northern parts of this section of the site which include unmown grassy areas within the local parkland and in the vicinity of some local businesses. These areas include Dandelion, White Clover, Red Clover, Hogweed, Creeping Buttercup, Ragwort, Common Bird's-foot-trefoil, Cuckooflower, Ribwort Plantain, Common Bent, Mouse-ear, Common Sorrel *Rumex acetosa* and Meadow Buttercup.

Dry meadows and grassy verges / Amenity grassland (improved (GS2 / GA2)

This habitat comprises Perennial Rye-grass, Dandelion, White Clover, Creeping Buttercup, Ribwort Plantain, Colts-foot, Cow Parsley, Hogweed, Broad-leaved Dock, Winter Heliotrope, Bush Vetch, Curled Dock, Rough Hawk's-beard, Common Vetch, Cleavers, False Oat-grass, Herb Robert, Common Bent, Nettle, *Brome Bromus* spp. and Three corner garlic. Common Carder Bee was also recorded in this area.

(Mixed) broadleaved woodland (WD1)

There are stretches of mixed broadleaved woodland along the banks of the river in the west of this section, one at the back of the local Pitch and Putt, which includes Alder, Sycamore and Ash, with an understory of Bramble and the invasive species Butterfly Bush and Fuchsia *Fuchsia magellanica*.

In the south of this section is another stretch of woodland, which contains the species Elm, Beech, Willow, Ash, Alder, Pine, Holly and an understory of Bramble and Fern (Soft Shield-fern *Polystichum setiferum* and Male-fern *Dryopteris filix-mas*, while continuing further south there are areas of Elder and Elm, with an understory of Nettle, Ivy, Lords-and-Ladies, Ramsons *Allium ursinum*, Sweet Violet *Viola odorata*, Speedwell Veronica spp., Lesser Celandine and Primrose *Primula vulgaris*.

There is a small section of broadleaved woodland in the west of the site adjacent to the river, which comprises Willow, Alder, Ash and a ground flora of Ivy, Pendulous Sedge, Cow Parsley and Lesser Celandine.

Scrub (WS1)

There is an area of scrub which comprises: Elder; Bramble; Rowan, Wych Elm; Dog rose; Willow; and Hawthorn. This area has a ground flora of Cow Parsley, Cleavers, Colt's-foot, Spurge, Broad-leaved Dock, Common Vetch, Germander speedwell, Teasel *Dipsacus fullonum*, Water Figwort, Pendulous Sedge and Hedge Bindweed. There are a number of non-native species including Leillandii, Buddleja, an ornamental Holly and Giant Hogweed.

Giant Hogweed was recorded within the scrubland located behind the local businesses.

B.2.6 Habitat Map Area F: Measures 5.A and 5.C (Commons Road, Brookdene and Bayview)

Habitat map for Area F: Measures 5.A and 5.C is seen below in Figure B-6.



Figure B-6: Commons Road, Brookdene and Bayview habitats

Habitats for Area F are described below:

Stone walls and other stonework (BL1)

There are stone walls in the east and the west of this section, these walls have no notable ecological characteristics, and no species present. The stone wall along the back of the houses had Bramble, Ivy and Willowherb.

Amenity grassland (Improved) – GA2

A small stretch of mown amenity grassland occurs along the footpath of Commons Road. This grassland patch contains Ragwort, Daisy, Perennial Rye-grass, Dandelion, Meadow Buttercup, Yarrow, Red Clover, Meadow Vetchling and Ribwort Plantain. Giant Hogweed was also present.

Dry meadows and grassy verges – GS2

Linear sections of grassy verge occur near to the banks of the River Shanganagh along Commons Road. These verges include Curled Dock, Nettle, Cleavers, Dandelion, Smooth Sow-thistle, Creeping Buttercup, Cut-leaved Crane's-bill *Geranium dissectum*, Wood Avens *Geum urbanum*, White Clover, Hogweed, Common Bent, Daisy, Tufted Hair-grass *Deschampsia cespitosa*, Herb Robert, Ribwort Plantain, False Oat-grass, Roughs Hawk's-beard, Black Medick, Nightshade, Bramble, Cow Parsley, French Crane's-bill *Geranium endressii*, Field bindweed, Ash, Cock's-foot, Lesser Trefoil *Trifolium dubium*, Perennial Rye-grass, Hedgerow Crane's-bill *Geranium pyrenaicum*, Field forget-me-not *Myosotis arvensis*, Field Marigold *Calendula arvensis*, Common Vetch, Field Mustard and the non-native species *Montbretia Crocosmia x crocosmiiflora*, Winter Heliotrope, Giant Hogweed, *Cotoneaster* spp. and Sycamore.

There is a large meadow section in the east of this stretch of the project, near to the coastline. This meadow is divided by a footpath and contains Creeping Buttercup; Meadow Buttercup; Ribwort Plantain; Cuckooflower; Brome; Meadow -grass; Dandelion; Cock's-foot; Red Clover; Curled Dock; Hedge Mustard; Hogweed; Cow Parsley, Alexanders; Daisy; Red Fescue; Lesser Trefoil; Ragwort, Common Couch; Yorkshire Fog, Meadow Foxtail; Sweet Vernal-grass; Cleavers; Lesser Celandine; Rough Hawk's-beard and False Oat-grass.

Dry meadows and grassy verges / Scrub – GS2/WS1

The meadow near to the coastline begins to grade into an area of showing characteristics of scrub, gradually transitioning into a section more dominated by Common Reed *Phragmites australis* while also containing Horsetail; False Oat-grass; Creeping Thistle; Bramble; Bush Vetch; willowherb; Hogweed; Brome.; Ribwort Plantain; Alexanders and a single standing Hawthorn.

(Mixed) broadleaved woodland - WD1

There are stretches of broadleaved woodland located throughout the Hacket Island housing estate. These include a main woodland stretch along the river bank, and a series of isolated woodland pockets among the housing estate's amenity grass areas.

The woodland stretches include a ground layer of Fumitory; Alexanders; Broad-leaved Dock; Cow Parsley; Dandelion; Creeping Buttercup; Nettle; Ivy; Hedge Bindweed; Bramble; Cleavers; dock; Creeping Thistle; Daisy; Shepherd's Purse; Germander Speedwell *Veronica chamaedrys*; Green Alkanet; Wood Speedwell *Veronica montana*, Spear Thistle; Herb Robert; Hogweed; Pendulous Sedge; Ribwort Plantain; Field Forget-me-not; Yarrow; Garlic Mustard; Wood Sorrell; Nettle; Wood Dock *Rumex sanguineus*; Wood Avens; Meadow Buttercup; Creeping Buttercup; Lords-and-ladies; willowherb; Cuckooflower; Ribwort Plantain; Cowslip *Primula veris*; and Cock's-foot.

The tree cover of this woodland stretch includes Sycamore; Alder; Pedunculate Oak; Ash; Crack Willow *Salix fragilis*; Turkey Oak *Quercus cerris*; Field Maple *Acer campestre*; Elm; Cherry; Crab Apple; Leaf Little Box Wood, Leylandi; Chestnut Saplings; Hawthorn, Cypress, White Willow, Japan Chestnut; Silver Birch; Linden; Privet; Sessile Oak, Cherry Laurel; Eucalyptus. This woodland stretch also contains some Three-cornered Garlic, Winter Heliotrope, Giant Hogweed; and Snowberry *Symphoricarpos albus*.

The pockets of woodland within these areas include Italian Alder; Yarrow; Beech; Wood Avens; Herb Robert; Nettle; Dandelion; Meadow Buttercup; *Fringecups* *Tellima grandiflora*; Common Vetch; Field Maple; Cottonwood; Ivy; Nipplewort, Firethorn *Pyracantha coccinea*, Hedge Periwinkle *Vinca* sp., Common Vetch, Ragwort, Creeping Thistle, Bent, Nettle, Burdock *Arctium minus*, Cleavers, Dock, Creeping Buttercup, Hogweed; Spear Thistle; Bramble; Field Maple; and Elm.

(Mixed) broadleaved woodland / Scrub – WD1 / WS1

There is a patch in the far east of the site, near to the grassy meadows and the coastline, that contains a mixture of mature trees and a scrub layer. This area contains Holly, Sycamore, Elm, Hart's-tongue Fern; Bramble; Cow Parsley; Soft Shield-fern *Polystichum setiferum*; Buckler Fern *Dryopteris* sp.; Hedge Bindweed; Nettle; Cleavers; Alder; Butterfly Bush; Bluebell *Hyacinthoides non-scripta*; Green Alkanet; and Bush Vetch. There was also widespread Three-cornered Garlic and Giant Hogweed in this area.

Treeline – WL2

There is a small treeline at the entrance to the estate at Hacket Island. This treeline contained Elder; Beech; Bramble; Cleavers; Cherry Laurel; Creeping Buttercup; Dandelion; Nettle; Wild Cherry Sycamore; Hedge Bindweed; Broadleaf Dock, Alexanders, Daisy and Herb Robert.

Additional treelines include those along the Shanganagh Stream parallel to Commons Road. These treelines contain Wavy Bitter-cress *Cardamine flexuosa*; Lesser Celandine; Bush Vetch; Red Clover; Wood Spurge *Euphorbia amygdaloides*; Daffodil *Narcissus pseudonarcissus*; Dog Rose *Rosa canina*; willow; Alder; Pendulous Sedge; Butterfly Bush; Ivy; Tutsan, Water Figwort; Elder; Sycamore; Herb Robert; Birch; Horsetail; buttercup; *Vetch* *Vicia* spp.; White Willow and Gorse. These treelines also contained the garden escapee Cyclamen spp. and the invasive non-native Giant Hogweed. These treelines connect to the grassy verge located within this area.

Wet willow-alder-ash woodland – WN6

There is a section of the Loughlinstown Wood pNHA that is classified as a Wet willow-alder-ash woodland and runs along the Shanganagh River that is in close proximity to some of the works. This downstream section of the pNHA includes Ash; Willow; Alder; Sycamore; Tutsan; Nettle; Herb Robert; Ivy; Bramble; Creeping Buttercup; Pendulous Sedge; Common Vetch; Cow Parsley; Soft Shield-fern; Hart's-tongue Fern; Elder; and Hawthorn. This woodland also had widespread Giant Hogweed along the woodland both through the main body of the woods, and along the river bank.

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