WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME

Ecological Impact Assessment Report

MDW0825

Ecological Impact Assessment Report
F02

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Contents

Tables

Figures

Appendices

1 INTRODUCTION

The Office of Public Works (OPW) in partnership with South Dublin County Council (SDCC) and Dublin City Council (DCC) carried out a Catchment Flood Risk Assessment and Management (CFRAM) Study for the River Dodder Catchment[1]. Whitechurch Stream was included as part of the study as it is a sub catchment of the Dodder Catchment. The River Dodder Catchment Flood Risk Management Plan (CFRMP) which was published in November 2014 identified a preferred flood risk management option for the Area of Potential Significant Risk (APSR) named as Tara Hill and St. Enda's, now referred to as Whitechurch Stream.

The OPW and SDCC have initiated the development of a Flood Relief Scheme for Whitechurch Stream to alleviate fluvial flooding for the Tara Hill and St. Enda's APSR. The proposed Whitechurch Stream Flood Alleviation Scheme (FAS) (hereafter referred to as the proposed development), which is being designed and funded by the Office of Public Works consists of a number of measures to improve the flood defences and improve conveyancing of flood water.

RPS was commissioned by South Dublin County Council to carry out an Ecological Impact Assessment (EcIA) of the proposed development. The purpose of this report is to:

- Establish the ecological baseline conditions at the proposed development location;
- Determine the ecological value of ecological features identified;
- Identify and describe all potentially significant negative ecological impacts that may arise from the proposed development; and
- Recommend mitigation measures for any identified potential significant negative ecological impacts and recommend enhancement measures where possible.

1.1 Proposed Development

The objective of the project is to provide security from flood events and improve conveyance of flood waters.

A Preliminary Design Report has been prepared by the OPW (OPW 2019a) which identified viable options for the proposed work and identified a preferred option which is described below. The proposed development comprises a series of flood alleviation measures including debris management and the introduction of direct defences at various locations along Whitechurch Stream between St Enda's park and the tie-in of the Whitechurch Stream to the Owendoher River.

The proposed development is located in South County Dublin and extends from the south-western corner of St. Enda's Park downstream under Sarah Curran Road where it continues for approximately 700 m alongside the Whitechurch Road, flowing under a number of variously sized culverts before its tie-in with the Owendoher River at Ballyboden Road. With the exception of St. Enda's Park, the remainder of the proposed development is located in a largely urbanised environment. The extent of the proposed project development is illustrated in **Figure 1-4** and the drawings showing the proposed works are included in **Appendix A,** which have been developed from the preliminary design report issued by the OPW.

1.1.1 Advance Works

Advance works for the proposed development will entail a temporary works compound, to be located in a corner of the existing car park at the front of St. Enda's Park, off Sarah Curran Road. This facility will be secured from unauthorised access for the duration of the works and will include offices, welfare facilities, parking for site vehicles and plant at night, storage of equipment materials used in the construction phase and also temporary storage of material to be re-used or awaiting removal by licenced waste contractor.

[1] RPS (2014). Dodder Catchment-based Flood Risk Assessment and Management Study – Flood Risk Management Plan

Contaminated wastes e.g. spoil containing third schedule Invasive Alien Plant species material will be removed under appropriate waste permit and NPWS licence to a facility licenced to accept such waste therefore no quarantine area is required. Advance clearance of vegetation along and adjacent to the Whitechurch Stream in preparation for construction phase may also be required and material could be temporarily stored here until disposal.

1.1.2 Construction Phase

The estimated time frame for construction works is approximately 12 months. The works are likely to be phased in sections due to accessibility and seasonal constraints with regard to instream works (where needed). There is likely to be a requirement for traffic management measures to be implemented for sections of the proposed works, particularly where the Whitechurch Stream runs alongside the narrow Whitechurch Road. Alignment section references described below can be found on accompanying drawings.

1.1.2.1 Area 1 - Area downstream of Taylor's Lane and within St Enda's Park (Ch.: 0+000- 0+510.10),

- No flood alleviation measures proposed for this area.

1.1.2.2 Area 2 - Area between St Enda's Park and Sarah Curran Bridge Inlet(Ch.: 0+510.10- 0+572.25),

- Localised bank raising with rip rap erosion protection on the left bank to the design Level of 65.1m OD for approx. 50m length,
- Woodland planting on the left bank of Whitechurch Stream in St Enda's Park;
- Removal of trees and bankside vegetation to accommodate the proposed Works,
- Debris Trap and slipway at a suitable location upstream of Sarah Curran Bridge.

Area 3 - Area downstream of Sarah Curran Bridge outlet to Whitechurch Road Bridge Inlet (weir) (Ch.: 0+578.80- 0+688.70),

- Tree removal along the left bank to reduce blockage risk at Whitechurch Rd. Bridge,
- Bank protection measures on the left bank,
- Replacement of the wooden foot bridge approximately at Ch. 620. The replacement bridge will be a timber bridge of similar size and in the same location as the existing.

Areas 1,2 and 3 are outlined in **Figure 1-1**.

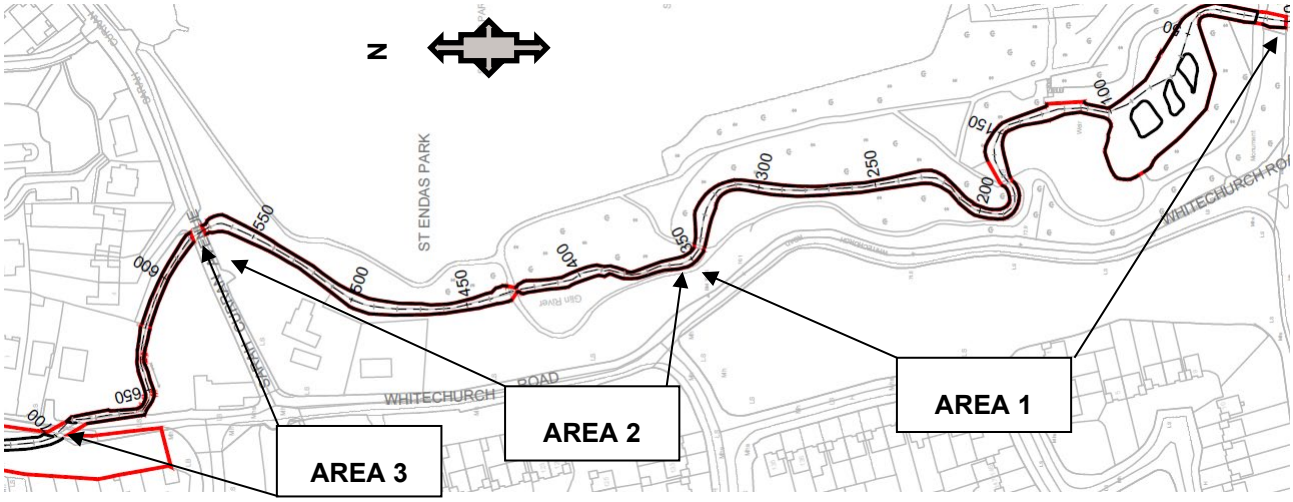


Figure 1-1: Areas 1, 2 and 3

1.1.2.3 Area 4 – Area from Whitechurch Road Bridge Outlet to St Gatiens Culvert inlet (Ch.: 0+700- 0+803.03),

- Tree clearing and vegetation removal on the right bank will be required to reduce blockage risk and to accommodate new flood defence walls.
- Bank protection will be required on the left bank.
- Underpinning will be required on the left bank.
- Proposed tree planting, bulb planting and grass seeding on Whitechurch Road – south of St Gatiens Court.
- New flood wall on the right bank side tying to existing stone wall (Level 62.95mOD) approximately 27m downstream of Whitechurch Rd. Bridge Outlet.
- New head wall at culvert inlet at level 62mOD with return wall on left bank which will replace existing railing.
- New right bank flood wall replacing existing fence. Design level at 62mOD. Wall height 1.1m-1.3m.
- Permanent sheet piling underneath new walls at St. Gatiens culvert inlet, extended upstream for approximately 30m.

1.1.2.4 Area 5 - Area from St Gatiens Court Culvert outlet to the inlet of the Garage Culvert at Rathfarnham Ford (Ch.: 0+828.07- 0+918.61)

- Removal of existing trees and vegetation from the right bank of Whitechurch Stream will be required to facilitate the works
- New head wall at St. Gatiens Court culvert outlet at level 61.8mOD with return wall left bank replacing railing and tying into existing wall
- New right bank flood wall replacing existing low wall and fence. Wall height generally 1.2m but raising to 1.9m at the Garage culvert
- Permanent sheet piling underneath new walls at St. Gatiens culvert outlet, extended downstream for 30m
- New head wall at culvert inlet level 60.4 mOD with return wall left bank tying into existing left bank wall. Wall height 1.9m
- New right bank flood wall tying into new head wall at Garage Culvert inlet at level 60.4mOD
- Permanent sheet piling underneath new wall at Garage Culvert inlet, extended upstream for 30m
- Proposed tree planting, bulb planting and grass seeding on Whitechurch Road – North of St Gatiens Court.
- Staged Trash screen with water level gauge to be provided at Garage Culvert inlet

1.1.2.5 Area 6 - Area from Garage Culvert at Rathfarnham Ford to Willbrook Lawn Twin Culvert Inlet (Ch.: 0+983.91- 1+132.91)

- Removal of existing trees and vegetation from both sides of Whitechurch Stream will be required to facilitate the works;
- Increase concrete plinth around culvert opening to 600mm above ground level and install new railing,
- New head wall to culvert outlet level 58.25mOD. Flood wall left and right bank tying into head wall to design level 58.25mOD. Wall height 1.2m above path level. Right bank wall to tie into existing wall downstream of existing bridge.

- Permanent sheet piling underneath new walls left and right bank, at Garage Culvert outlet, extended downstream for approximately 30m
- Retention of existing right bank walls downstream of existing bridge at Capri Site. Wall to be cladded with stone.
- Proposed beech hedgerow within existing open space upstream of Willbrook Lawn twin culvert
- Replace metal railing at parking area off Whitechurch Stream Bridge with low level 400mm defence wall and railing to tie into bridge parapet and railing.
- Replace left bank existing metal railing with low level defence wall with railing on the left bank, upstream of the inlet of Whitechurch Stream Bridge with wall height 600mm above existing ground levels. Wall and railing to tie into bridge parapet and railing.

Areas 4,5 and 6 are outlined in **Figure 1-2** below.

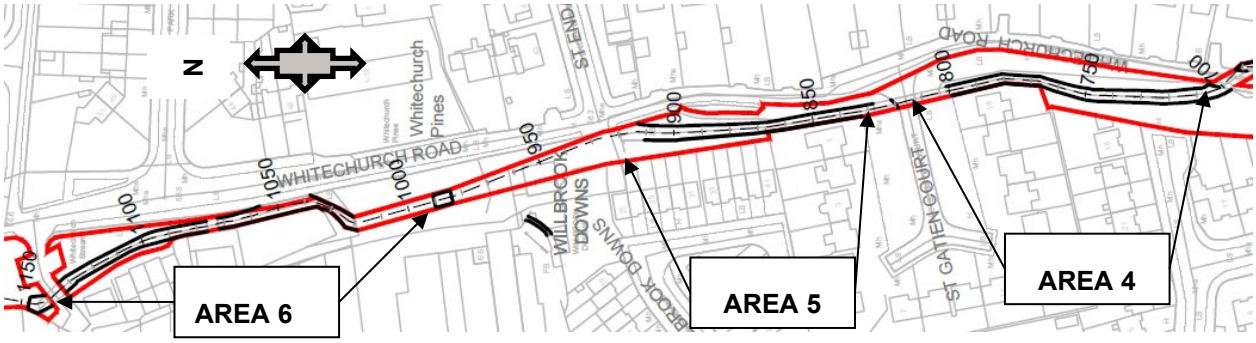


Figure-1-2: Areas 4, 5, and 6

1.1.2.6 Area 7 - Area from the outlet of the Twin Culvert at Willbrook Lawn to the Inlet of Bridge crossing Whitechurch Road (Ch.: 1+140.41- 1+410.43).

- Return wall around dual culvert inlet to tie into bridge parapet and existing boundary wall.
- Proposed tree planting on Whitechurch Road within existing open space immediately south of the junction between Whitechurch Road and Willbrook Lawn
- Localised left bank raising with rip rap erosion protection and permanent supports to be provided to decked structures along the bank.
- Left bank wire mesh fence panels at 1.2 m height above the footpath
- Proposed beech hedgerow along left bank fence.
- Right bank railing to be placed above existing wall. Top of railing at 1.2 m height above the footpath.
- Removal of existing trees and vegetation from both sides of Whitechurch Stream will be required. Existing walls right bank to be maintained at current level, however remedial works will be required.
- Suitably designed staged trash screen with water level gauge to be provided upstream of bridge/culvert face with access from the funeral home.
- Proposed planting at the open spaces immediately adjacent to the car park, upstream and downstream of the pedestrian bridge in Willbrook Lawn.

1.1.2.7 Area 8 - Bridge crossing Whitechurch Road outlet to Willbrook Road Culvert inlet (confluence with Owendoher) (Ch.: 1+420.20- 1+455)

- Tree and bankside vegetation management to reduce blockage risk to the culvert discharging to Owendoher.

Areas 7 and 8 are outlined in **Figure 1-3** below.

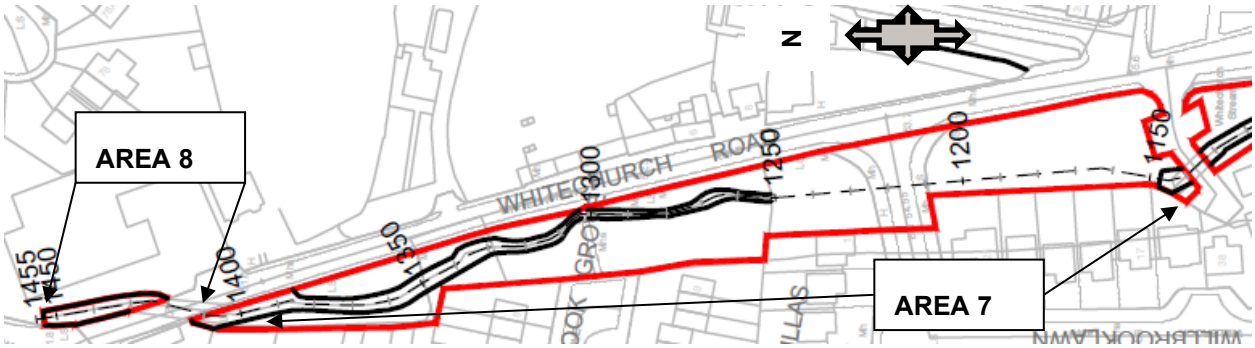


Figure 1-3: Areas 7 & 8

1.1.2.8 Landscape Works

New planting and seeding is proposed in St Enda's Park and at five locations along Whitechurch Road to mitigate adverse landscape and visual effects. These measures include the following:

- Woodland planting on the left bank of Whitechurch Stream in St Enda's Park;
- Tree planting, bulb planting and grass seeding on Whitechurch Road, south of St Gatien Court;
- Tree planting, bulb planting and grass seeding on Whitechurch Road, north of St Gatien Court;
- Hedgerow planting within existing open space south of the Willbrook Lawn twin Culvert;
- Tree planting within the existing open space on Whitechurch Road, in the vicinity of Willbrook Lawn; and
- A mixed species hedgerow along the left bank of Whitechurch Stream near Willbrook Grove.

1.1.3 Operation Phase

The maintenance of the proposed flood alleviation scheme will be the responsibility of South Dublin County Council although in terms of emergency repairs, the Local Authority would revert to the OPW. The following general measures will be required as part of the routine monitoring and maintenance. They include:

- Flood walls - Annual inspection and Sealant replacement (every 5 years);
- Flap Valves (if any) Inspection once every 5 years and replacement (every 25 years);
- Bank protection - Inspection once every 5 years and maintenance (as required);
- Tree Management – Annual inspection and maintenance (as required);
- Trash Screens – Twice Weekly inspections and maintenance (as required); and
- Debris Traps – Bi-annual inspections and maintenance (as required).

1.2 Preliminary Construction Environmental Management Plan (OPW)

A preliminary Construction Environmental Management Plan (CEMP) has been prepared by the OPW as part of the proposed design (**Appendix G).** The preliminary CEMP is designed to cover the potential environmental risks and the proposed environmental construction strategies that are to be carried out before and during the proposed works. It includes standard design and construction measures in relation to scheduling of works, preventing impacts to ground and surface waters, invasive species and scheduling of works within close proximity of the sensitive watercourse. The preliminary CEMP will be updated according to changing circumstances on the project and to reflect current activities on site. It is intended that the

preliminary CEMP will be finalised by the OPW, as the likely contractor, to include all mitigation measures identified in both the EcIA and NIS into a detailed CEMP should the works progress to the construction stage.

1.2.1 Best Practice Design and Construction Methodology

Prior to commencement of construction works the OPW will draw up detailed method statements which will be informed by the Guidance documents and Best Practice measures listed below. These will be submitted to South Dublin County Council, and any other relevant authorities including but not limited to, Inland Fisheries Ireland (IFI) identified by the Planning Authority, for review and agreement prior to the commencement of construction. This method statement will be adhered to by the contractors and will be overseen by the Employers Representative.

The following documents, which are not exhaustive, have contributed to the development of the preliminary CEMP and could contribute to the development of method statement as necessary:

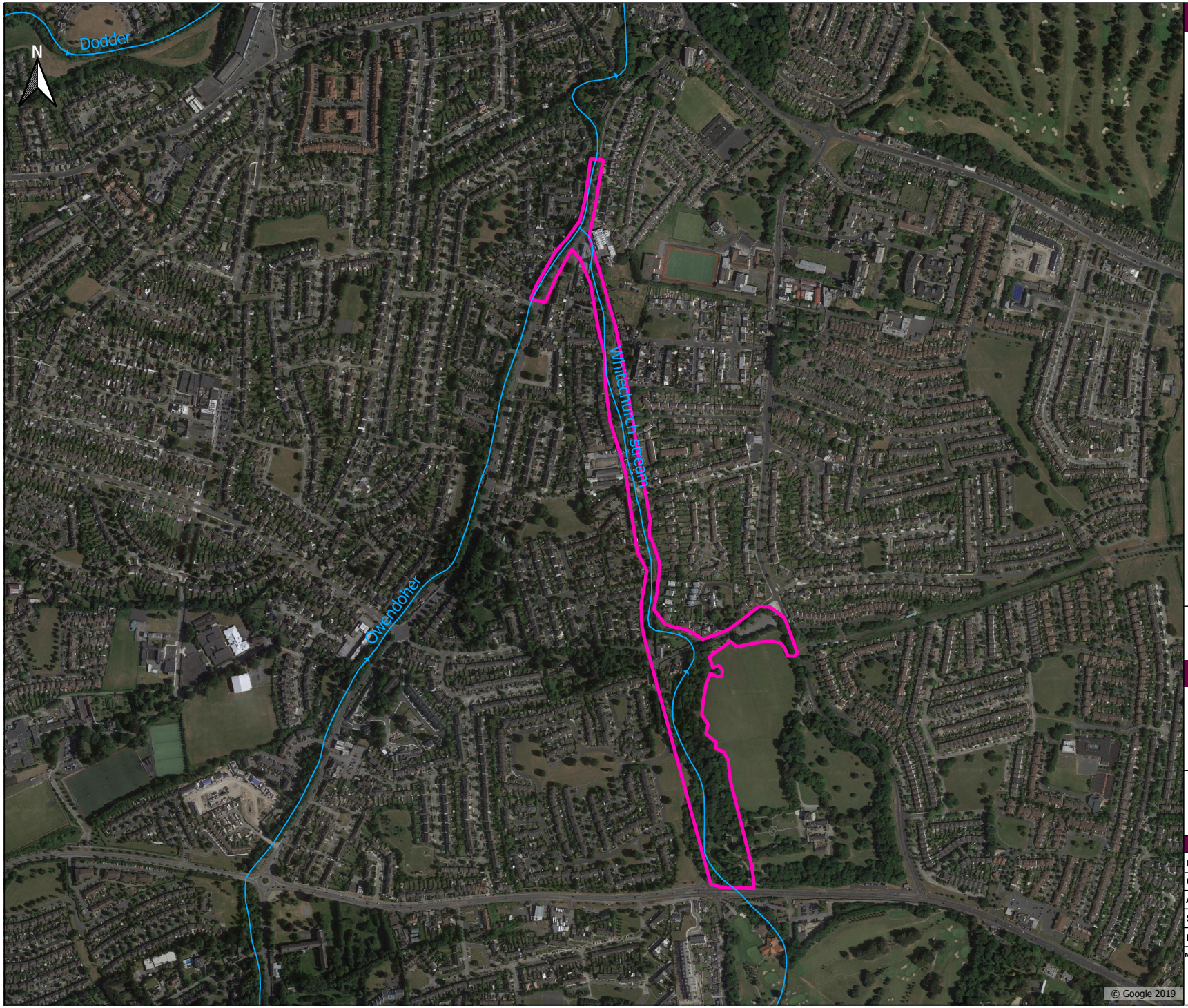
- IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters. Inland Fisheries Ireland, Dublin.
- Environment Agency (2013). The Knotweed Code of Practice. Managing Japanese knotweed on development sites (Version 3).
- NRA (2010). Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority, Dublin.
- NRA (2008a) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority, Dublin.
- NRA (2008b) Guidelines for the Treatment of Otters during the Construction of National Road Schemes.
- E. Murnane, A. Heap and A. Swain. (2006) Control of water pollution from linear construction projects. Technical guidance (C648). CIRIA.
- E. Murnane *et al*., (2006) Control of water pollution from linear construction projects. Site guide (C649). CIRIA.
- Murphy, D. (2004) Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Eastern Regional Fisheries Board, Dublin.
- Masters-Williams, H. *et al*., (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532).
- DOMNR (1998). Fishery guidelines for Local Authority works. Department of the Marine and Natural Resources, Dublin.
- Enterprise Ireland (Anon). Best Practice Guide (BPGCS005) Oil storage guidelines.

The proposed development will be carried out in accordance with the standard construction measures that are outlined in the preliminary CEMP (as well as all mitigation measures detailed in this EcIA and separate NIS as appropriate):

- The Contractor (in this case the OPW) will appoint a suitably qualified person, or persons, to the role of Environmental Clerk of Works (EnCoW) to monitor the construction works. The EnCoW will work closely with the contractor's site supervisors to monitor activities and ensure that all relevant environmental legislation is complied with and that the requirements of the finalised CEMP are implemented. The EnCoW will have the authority to review method statements, oversee works and instruct action, as appropriate, including the authority to require the temporary cessation of works, where necessary.
- All site contractors' should be briefed regarding the biodiversity value of the Whitechurch Stream (as a constituent tributary of the Dodder catchment) and its direct connectivity to the surrounding landscape

including downstream European Sites e.g. Dublin Bay; hedgerows and trees to ensure that there are no accidental or unintentional actions conducted during the project construction that could lead to a reduction in water quality/damage to same. Such matters often arise accidentally through lack of awareness rather than as a result of an intentional action.

- A suitably qualified ecologist may be engaged to supervise any ecologically sensitive elements of construction works, as advised by the EnCoW. This should include a review of any ecological mitigation and supervisory requirement arising from the Ecological Impact Assessment.
- If very wet ground is encountered and needs to be accessed during the construction works, bog mats will be used to enable access to these areas by plant and machinery.
- The contractor shall ensure that all personnel working on site are trained in pollution incident control response. A regular review of weather forecasts of heavy rainfall is required, and the Contractor is required to prepare a contingency plan for before and after such events.
- Excavations, where required, will be left open for minimal periods to avoid acting as a conduit for surface water flows.
- Any diesel or fuel oils stored on site will be bunded to 110% of the capacity of the storage tank. Re-fuelling of plant will not occur within 50m of any watercourse or surface water feature. Drip trays and spill kits will be kept available on site.
- Only emergency breakdown maintenance will be carried out on site. Emergency procedures and spillage kits will be readily available at strategic site locations and construction staff will be familiar with emergency procedures.
- Where dust suppression is considered to be required by the Contractor, such requirements and methodology shall be subject to the agreement with the EnCoW, and water will not be abstracted from or discharged to local watercourses or ditches.
- Fuels, lubricants and hydraulic fluids for equipment used on the site, as well as any solvents, oils, and paints will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to codes of practice.
- Any spillage of fuels, lubricants of hydraulic oils will be immediately contained, and the contaminated material removed from the site and properly disposed of.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Bituminous materials and contaminated spoil (including spoil contaminated with invasive species (defined as those species listed on Schedule three of the Birds and Natural Habitats Regulations)) shall only be disposed of at an appropriately licenced facility. The necessary licences, permits and permissions will be required for this activity.
- All water used in the cleansing, testing or disinfection of structures shall be rendered safe prior to discharge to the environment.
- The contractor shall ensure that no harmful materials shall be deposited into nearby watercourses, including drainage ditches/pipes, on or adjacent to the site.
- The contractor shall comply with the requirements of the Fisheries Act 2010.



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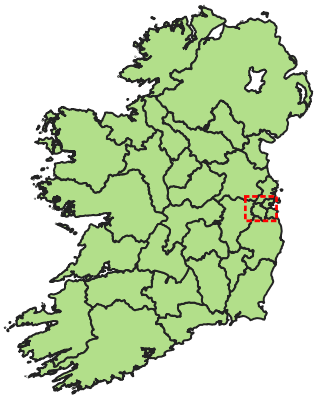

Hydrological Connectivity Pathway

Indicative Extent of Survey Territory

Client

Comhairle Contae
Átha Cliath Theas
South Dublin County Council

Project **Whitechurch stream Flood Alleviation Scheme**

Title

Figure 1-4 Site Location and Survey Area

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Issue Details

Drawn:	JMM	**Project:** MDW0825	
Checked:	TR	**File Ref:**	MDW0825QG0001F01
Approved:	MD		
Scale:	1:10,000 @ A4	**Projection:**	IRENET95 / ITM
Date:	24/04/2019		

1.2.2 Invasive Species Best Practice Measures

A number of third schedule Invasive Alien Plant Species (IAPS) have been recorded from a number of locations along, or in close proximity to the Whitechurch Stream including St Enda ‘s Park and at a small number of discrete locations towards the tie-in with the Owendoher River. They are also known to occur upstream of the proposed development area (*SDCC, pers. comm.*) and are currently subject to treatment by the Local Authority personnel by means of stem injection.

IAPS can also be introduced into a location or spread from a location by contaminated vehicles and equipment, in particular tracked vehicles which have been used previously in locations that contained invasive species.

Prior to commencement of the proposed works the contractor will be required to update the outline Invasive Species Management Plan (ISMP) (**Appendix H**), which has been informed by the outcome of ecological surveys of the proposed route. This will be submitted to South Dublin County Council for review and agreement prior to the proposed works commencing. The Invasive Species Management Plan will be strictly adhered to by the contractor involved in the works. It will include Best Practice measures, including those adapted from all relevant guidance documents, which will help to treat, contain and/or prevent the introduction/spread of invasive species on the site. Best practice measures must include but not be limited to the following:

- A detailed methodology of how identified IAPS stands located alongside the proposed development will be treated/managed during construction works must be provided in the Invasive Species Management Plan. This will include detailing the treatment and disposal procedures, requirement for supervision by a suitably qualified invasive species specialist and bio-security measures to be employed in this area during construction works, both on and off-site.
- There is potential for invasive species to be introduced into the area or spread within the area in the intervening period between ecological site survey and commencement of construction works. Therefore, a suitably qualified ecologist will be required to undertake a preconstruction invasive species survey, within the appropriate botanical survey season (April to September), prior to construction works commencing. Particular attention should be given to identifying those invasive plant species listed on Schedule Three of the Birds and Natural Habitats Regulations 2011 (as amended). If any Invasive Alien Plant Species are identified, then the appropriate course of action regarding treatment or prevention of spread should also be included in the Invasive Species Management Plan.
- All plant and equipment employed on the proposed development (e.g. diggers, tracked machines, footwear etc.) must be thoroughly cleaned down using a power washer unit, and washed into a dedicated and contained area prior to arrival on site and on leaving site to prevent the spread of invasive aquatic / riparian species. A sign off sheet must be maintained by the contractor to confirm cleaning.
- For any soil material entering the site, the supplier must provide an assurance that it is free of non-native invasive species.
- Should any invasive plant species be encountered, the infested areas will be clearly demarcated accounting for potential underground rhizome spread, creating an exclusion zone (generally exclusion zones for Japanese Knotweed extend for 7 metres from the stand of invasive species).
- Dedicated exclusion zone entry and exit points will be created for operators on foot and for small mobile equipment. A delineated access track to be maintained free of invasive species should be established through the site to minimise the spread of invasive species by permitted vehicles accessing the site.
- Dedicated footwear and vehicular clean down facility should be installed in the exclusion zone.
- Vehicles leaving the site should be inspected for any plant material and cleaned down in a secure and contained area.

- Spoil or other material contaminated or potentially contaminated with invasive species shall only be disposed of at an appropriately licenced waste facility. The necessary licences permits and permissions for this activity will be required to be put in place by the contractor.
- Vehicles used in the transport of contaminated material will need to be visually checked and cleaned down into a contained area before being used for any other work, either on the same site or at a different site.
- Material gathered in the dedicated and contained clean down area will need to be appropriately treated as contaminated material.
- The contractor must ensure all site users are aware of the invasive species management plan and treatment methodologies. This can be achieved through “toolbox talks” before works begin on the site.
- Adequate site hygiene signage should be erected in relation to the management of non-native invasive material.

2 METHODOLOGY

In addition to this EcIA, the reader is advised there are other supporting documents (including stand-alone reports) not included herein but available for consideration to ensure a robust review of the proposed development on the selected site:

- Planning Report (RPS, 2020a);
- Screening for Appropriate Assessment (RPS, 2019a);
- Natura Impact Statement (RPS, 2020b);
- Landscape and Visual Assessment Report (RPS 2020c)
- EIA Screening (RPS 2020d);

Other reports / ecological surveys are also included as appendices to the EcIA and/or the Appropriate Assessment (as necessary)

- Aquatic Ecology Survey (RPS 2019b); and
- Preliminary Construction Environmental Management Plan (OPW)Preliminary Construction Environmental Management Plan (OPW 2019b); and
- Outline Invasive Species Management Plan (RPS 2020e).

The assessment of the likely significant impacts of the proposed development on ecological features has taken account of the following policy documents and legislation, where relevant:

- EU Birds Directive 2009/147/EEC;
- EU Habitats Directive 92/43/EEC (as amended);
- EU Water Framework Directive (WFD) 2000/60/EC;
- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (as amended);
- Planning and Development Act 2010 (as amended);
- Wildlife Acts 1976 and Wildlife (Amendment) Act (2000) (as amended); and
- Flora (Protection) Order, 2015.

The survey has been carried out in accordance with the following guidelines:

- Best Practice Guidance for Habitat Survey and Mapping (Smith *et al*., 2011);
- A Guide to Habitats in Ireland (Fossitt, 2000);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009a);
- Guidelines for the Assessment of Ecological Impacts of National Road Schemes Rev. 2. (NRA, 2009b);
- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018);
- Bat Mitigation Guidelines for Ireland (Kelleher & Marnell, 2006);
- Bat Surveys: Good Practice Guidelines (Hundt, 2012. Bat Conservation Trust);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.) (BCT, 2016);
- BCT (2018). Bats and artificial lighting in the UK. Guidance Note 08/18 Bats and the Built environment series. https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/;
- Environmental Planning and Construction Guidelines Series (National Roads Authority, 2005 – 2011);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016).

The assessment was carried out in two stages, initially through a desktop study, followed by field survey work (over the course of a number of visits to accommodate seasonal requirements) in order to identify, describe and map areas of known or potential ecological value.

2.1 Consultation

The following organisations with relevance to ecology were consulted in relation to the proposed development:

- Department of Culture, Heritage and the Gaeltacht (Development Applications Unit (DAU)), no response received at this time;
- Inland Fisheries Ireland (IFI), RPS summary notes of March 2019 meeting and March 2020 communication included in **Appendix C**;
- South Dublin County Council – Heritage Officer and Public Realm staff, Meetings and site visit to confirm ongoing IAPS management and potential requirements for replanting followed by supply local area ecological reports made available to RPS.
- Office of Public Works (OPW) – St. Enda's Park staff – Site meeting and discussion on biodiversity potential.

2.2 Desk Study

Sources of information that were used to inform the assessment were:

- Environmental Protection Agency (EPA) EnVision Mapping gis.epa.ie/EPAMaps;
- EPA Catchments Website – for the 2nd cycle River Basin Management Planning www.catchments.ie;
- Geological Survey of Ireland online mapping www.gsi.ie;
- Information on the conservation status of birds in Ireland (Colhoun & Cummins, 2013);
- NPWS online maps and data, site synopsis and conservation objectives www.npws.ie (December 2019 dataset);
- National Biodiversity Data Centre (NBDC) online maps and data www.biodiversityireland.ie, (March 2020);
- OSI Map Viewer www.osi.ie;
- South Dublin County Council Development Plan 2016-2022;
- South Dublin County Council Heritage Plan 2010-2015 (currently under review);
- South Dublin County Council Biodiversity and the Planning Process – Guidance for Developers on the Management of Biodiversity Issues in the Planning Process (Version 1.0, March 2017); and
- South Dublin County Council Living with Trees: South Dublin County Council's Tree Management Policy 2015-2020.

2.3 Zone of Influence

Following the guidance set out by the NRA (2009), the proposed development has been evaluated based on an identified zone of influence (ZoI) with regard to the potential impact pathways to ecological features (habitats, flora and fauna).

The ZoI for terrestrial habitats is limited to the footprint of the proposed development, with groundwater movement and levels considered in relation to groundwater dependent terrestrial habitats outside of the footprint of the development.

Hydrological linkages between a proposed development and aquatic habitats/species can occur over significant distances; however, the significance of the impact will be site specific depending on the receiving water environment and nature of the potential impact. Adopting a precautionary approach, the distance over which surface water discharges could have a significant impact on receiving watercourses is considered to extend downstream of each proposed development site to the Irish Sea.

The ZoI for significant impacts to breeding birds is considered to extend no more than 100m from the proposed development to take account of disturbance during construction.

The ZoI for mammals such as bats, badgers and otters may extend over larger distances due to the fact that they can commute and forage many kilometers from their breeding sites.

2.4 Field Survey

The South Dublin Biodiversity Plan has not been published yet, although public consultation has been completed. It is, however, a policy of the current South Dubin Development Plan 2016-2022 to implement the provisions of the plan when it is adopted. A 2017 guidance document[2] recommends that consideration of required ecological surveys and the habitats and species that should be assessed, the expertise of the person(s) undertaking the surveys (in the appropriate season) and evaluating the potential impacts, be submitted in support of a planning application.

The principal aim of the field survey was to identify and map the habitats present within the proposed development boundary, to note the occurrence/potential occurrence of protected species and to identify any potential impacts of the proposed development.

The proposed study area was visited on various dates between November 2018 and April 2019 to carry out ecological surveys. A further resurvey for otter (and badger) activity was undertaken in March 2020 as per guidance (NRA 2005, 2006). The dates, along with a summary description of the work are included in **Table 2-1**.

The preliminary site walkovers included habitat characterisation mapping, an assessment of the presence, or likely presence, of a range of rare or protected fauna and bird species. Habitats were assessed for field signs and/or usage by fauna, such as well-used pathways, droppings, places of shelter and features or areas likely to be of particular value as foraging resources. Invasive species listed on Schedule 3 of the Birds and Natural Habitats Regulations 2011 (as amended) were also recorded. Additional surveys were undertaken to update specific features e.g. Otter and Badger and to reinforce earlier findings including IAPS and habitats and bird presence in the appropriate season.

Targeted surveys focussed on sensitive species and habitats and were carried out by specialists or licenced ecologists. These included an assessment of the Watercourse and aquatic survey and a dedicated Otter survey along the watercourse.

2.4.1 Flora

Habitats on site were classified using *A Guide to Habitats in Ireland* (Fossitt, 2000) and mapped in accordance with the '*Best Practice Guidance for Habitat Survey and Mapping*' (Smith *et al.*, 2011). The classification is a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. The classification is hierarchical and operates at three levels, using codes to differentiate habitats based on the plant species present. Species recorded in this report are given both their Latin and common names, following the nomenclature as given in the '*New flora of the British Isles'* (Stace, 2010).

[2] SDCC (2017). Biodiversity and the Planning Process. Guidance for Developers on the management of biodiversity issues in the planning process.

2.4.2 Invasive Alien Plant Species

A number of Invasive Alien Plant Species (IAPS) were recorded during site visits. Some of the earlier visits were focussed on understanding the proposed development, or at specific locations depending on the survey task. All areas have been covered at least twice, with the entire route having been covered at least once within the appropriate botanical season.

All IAPS were noted, with particular focus on species listed on Schedule 3 of the Birds and Natural Habitats Regulations 2011 (as amended), as the desktop research and early walkover surveys revealed the presence of a number of high impact species.

Table 2-1: Ecological Surveys & Dates

Survey	Dates	Summary Description
Walkover	5th November 2018	Site walkover with Client and Designers
Survey	17th December 2018	Site meeting with OPW St. Enda's Park staff Instream Otter Survey Badger survey & mapping of overwintering Japanese Knotweed
Walkover	30th January 2019	Site walkover to discuss IAPS management with SDCC & identify potential areas for replanting.
Aquatic Assessment Terrestrial Ecology	9th April 2019	Aquatic survey Multidisciplinary ecology survey
Protected Species	24th April 2019	Bat Survey #1
Protected Species	2nd May 2019	Bat Survey #2
Protected Species	4th March 2020	Otter and Badger resurvey

2.4.3 Fauna

The site walkovers included an assessment of the presence, or likely presence, of a range of rare or protected fauna and bird species. Habitats were assessed for field signs and/or usage by fauna, such as well-used pathways, droppings, places of shelter and features or areas likely to be of particular value as foraging resources. Some areas could not be accessed and searched for evidence of mammals due to dense scrub. In these instances, the assessment relied on observations of secondary evidence e.g. mammal runs into scrub.

Badger, Otter, Red Squirrel and Pine Marten surveys was carried out in accordance with the National Roads Authority publication '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes'.* An assessment of features in the study area that were of potential value to bats was also made in accordance with the Bat Conservation Trust Publication '*Bat Surveys - Good Practice Guidelines*' (Bat Conservation Trust (2012). A visual assessment of potential bat roosts features (PBRs) was carried out by identifying features of most value to bats, for example, crevices, splits, holes, loose bark, hollows or cavities and thick ivy. Potential areas of value to bats for foraging or commuting were also noted, as was the presence of old or derelict buildings. No caves were noted.

2.4.4 Bats

Observations recorded during the terrestrial mammal survey aided the identification of trees and structures with bat roost suitability; however, a dedicated bat roost suitability walkover was also carried out before the first activity survey. The bat roost survey identified trees and structures as *Low*, *Moderate, or High* suitability, in accordance with Collins (2016).

Two bat activity surveys were carried out in accordance with Collins (2016) guidance; one commencing at sunset and finishing two hours after (dusk); and one commencing two hours before sunrise and finishing at sunrise. Two ecologists used handheld heterodyne (Petterson D200) and heterodyne/frequency division (Bat Box Duo connected to a Tascar DR05 recorder) detectors. The surveyors walked a fixed transect with six

Listening Points (LPs) (see **Appendix I**), where the surveyors recorded statically for a five-minute interval. Direct observation of bat activity was also recorded during the transect surveys. The transect was walked end-to-end and return on each survey and was started at opposite ends for each survey.

Bat calls detected during field surveys was identified using the species descriptions provided in British Bat Calls: A Guide to Species Identification (Russ, 2012).

2.4.5 Otters

Urban riverine corridors are important for otter. The River Dodder and the Owendoher River are well documented as supporting otter, both in terms of commuting and habitation (the translation from the Irish for the Owendoher River is the River of the otter). There is also documented evidence of as well as anecdotal evidence of otter sightings from the Whitechurch Stream (*SDCC pers. comm*.).

In accordance with NRA (2006) guidance, the December 2018 survey comprised examining all visual evidence of otter habitation or use, both within stream and a 10-metre riparian zone which was extended in suitable areas such as St Enda's Park. Limitations encountered included the deeper water under Whitechurch Road near Sarah Curran Bridge and the culverted section at the tie-in to the Owendoher River, both of which were impassable owing to hydrological flows [see **section 2.4.7** for further details]. The culvert leading to the tie-in with the Owendoher River was later revisited during the aquatic survey, and again in March 2020. The survey included walking accessible sections upstream of St. Enda's Park in a culvert towards Grange Golf Course, as well as downstream into the Owendoher River, where a search was undertaken 150 metre up- and downstream of the tie-in of the Whitechurch Stream to the Owendoher River.

2.4.6 Aquatic Ecology

A survey of the Whitechurch Stream was undertaken on 9th April 2019 with four (4) locations sampled. The surveys incorporated a Q-value survey (macroinvertebrates) following EPA standard protocol adhering to ISO 10870:2012, and a habitat assessment for crayfish, salmonids and lamprey following the standard protocols of Holdich (2003), Peay (2002) and Peay (2003) for crayfish, Hendry & Cragg-Hine (2003) and Bjorn & Reiser (1991) for salmon and Maitland (2003 for lamprey. Further information on the methodologies employed for the aquatic survey is available in **Appendix F**.

2.4.7 Survey Constraints

Some of the preliminary surveys were undertaken outside of the optimal season e.g. botanical or IAPS surveys. However, this was overcome by repeating the surveys in the appropriate season.

Otter surveys were undertaken in the winter season. Some areas, albeit limited in extent, could not safely be accessed during the first visit, however, owing to the extent of culverted sections of the watercourse or the flow under road-bridges. This did not inhibit the survey and follow on surveys covered all sections of the Whitechurch Stream, with the exception of the deeper water under Whitechurch Road near Sarah Curran Bridge, to ascertain activity at previously identified potential habitation features – holt and adjacent couché.

A preliminary search for badger was undertaken, primarily within St. Enda's Park. Their presence in the park is documented, but there was limited evidence of badger activity along the river. A search of likely territory along either side of the watercourse was undertaken, but it must be recognised that the absence of widespread evidence does not discount their presence. The survey data was updated with additional surveys in 2019 and again in 2020, which was still within the appropriate season for carrying out badger surveys.

A preliminary assessment of mature trees and structures (follies) alongside the Whitechurch Stream in St. Enda's Park suggested a number of mature trees had suitability to support bat roost. There was a decrease in potential roosting features downstream along the river, particularly along the urban setting, by virtue of the tree species present and their condition with a general lack of potential features. Notwithstanding the largely urban setting for much of the proposed development and the presence of considerable artificial lighting, the presence and maturity of trees in the wider landscape is nonetheless considered ideal for both roost and

foraging by bats. all additional trees and treelines/hedgerows present potential forage/commuting routes for bats and trees with moderate to high potential to support roosts were identified.

Detailed breeding bird surveys were not undertaken and therefore actual occurrence of breeding birds and their nesting sites was not identified. Records of birds observed or heard were made. As a precautionary measure, it is assumed that all significant woody vegetation cover, rank grassland and buildings within the proposed development areas have the potential to support breeding birds during the breeding bird season.

The macroinvertebrate survey was conducted in April. The Q-value is usually applied in summer/autumn when anthropogenic pressures are greatest on macroinvertebrates due to lower flows and higher temperature. The number of sensitive species expected in winter is higher due to a combination of flow and species life cycles and therefore the Q-value may be higher in winter compared to summer/autumn samples. This seasonal difference was taken into account when calculating the Q-value.

2.5 Impact Assessment Criteria

The methodology for the assessment of impacts is derived from CIEEM guidance (2018) and *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009b).

When describing changes/activities and impacts on ecosystem structure and function, reference was made to the parameters as discussed below.

- ***Positive or Negative***: Is the impact likely to be positive or negative? Positive impacts merit just as much consideration as negative ones, as international, national and local policies increasingly press for projects to deliver positive biodiversity outcomes.
- ***Extent:*** 'Extent' should also be predicted in a quantified manner and relates to the area over which the impact occurs. Where the receptor is in an area of a particular plant community for example, Extent = Magnitude.
- ***Magnitude:*** 'Magnitude' should be predicted in a quantified manner wherever possible and relates to the quantum of an impact, for example the number of individuals of a species affected by an activity or amount of habitat loss.
- ***Duration:*** 'Duration' is intended to refer to the time during which the impact is predicted to continue, until recovery or re-instatement (which may be longer than the impact-causing activity). This should be quantified wherever possible and interpreted in relation to the ecological processes involved rather than on a human timescale.
- ***Timing and frequency:*** The timing of impacts in relation to important seasonal and/or life-cycle constraints should be evaluated. Similarly, the frequency with which activities take place can be an important determinant of the impact on receptors and should also be assessed and described.
- ***Reversibility:*** 'Reversibility' should be addressed by identifying whether an impact is ecologically reversible (either spontaneously or through specific action) and whether such an outcome is likely.

2.5.1 Integration of Impact Characteristics

An informed integration of each of these impact characteristics, for each potentially significant impact, is necessary in order to underpin the determination of impact significance. A significant effect can be a positive or negative ecological effect and is "an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general" as defined in CIEEM (2018). In each case, it is important to assess the likelihood that the change will occur as anticipated and that the impact on ecological structure and function will manifest as predicted.

In accordance with NRA guidelines (2009), ecological features valued as "Local Importance (Higher Value)" or higher as per the NRA evaluation criteria (see **Appendix B**) were considered in the impact assessment. Features of lower ecological value are largely excluded from the impact assessment, except where they are an integral part of the mosaic or territory.

3 DESKTOP STUDY RESULTS

3.1 Designated Sites

3.1.1 European Sites

The proposed development is not located within any European site of conservation importance. There are seven (7) Special Areas of Conservation (SACs) and four (4) Special Protection Areas (SPAs), collectively referred to as European sites, located within 15km of the proposed development. Their location relative to the proposed development site is illustrated in **Figure 3-1**, while details of the European sites are listed in **Table 3-1**. The spatial boundary data for the European sites shown in **Figure 3-1** was the most recent available online from NPWS (December 2019).

SACs are sites of international importance due to the presence of Annex I habitats and/or Annex II species listed under the EU Habitats Directive (92/43/EEC). SPAs are designated for the protection of bird species listed on Annex I of the Bird Directive (2009/147/EC), regularly occurring populations of migratory species and areas of international importance for migratory birds.

A separate Natura Impact Statement in support of the Appropriate Assessment process has been prepared for the proposed development (RPS 2020b), which considered the European sites (SACs and SPAs) within the catchment of the proposed development and/or with hydrological connectivity to the proposed development, and concluded that there is no likelihood of the project either alone or in combination with other plans or projects adversely affecting the integrity of any European sites.

3.1.2 Nationally Designated Sites

The proposed development is not located within any nationally designated site. There are twenty-three (23) proposed Natural Heritage Areas (pNHAs) and no Natural Heritage Areas (NHAs) located within 15km of the proposed development sites. This is illustrated in **Figure 3-2** and listed in **Table 3-2**.

NHAs are sites deemed to be of national ecological importance and are afforded protection under the Wildlife (Amendment) Act 2000, with many NHA boundaries overlapping with European sites. The pNHAs have not been statutorily proposed or designated under the Wildlife Act (as amended), however they are afforded some protection under County Development Plans, and objectives are included specifically aimed at protecting pNHA's or providing complimentary protective measures that enhance the network of pNHAs.

The South Dublin County Council Development Plan 2016-2022 contains a considerable number of biodiversity protective measures, two of which specifically relate to the protection of pNHAs, namely:

- **HCL13 Objective 1:** To ensure that any proposal for development within or adjacent to a proposed Natural Heritage Area (pNHA) is designed and sited to minimise its impact on the biodiversity, ecological, geological and landscape value of the pNHA particularly plant and animal species listed under the Wildlife Acts and the Habitats and Birds Directive including their habitats).
- **HCL13 Objective 2:** To restrict development within a proposed Natural Heritage Area to development that is directly related to area's amenity potential subject to the protection and enhancement of natural heritage and visual amenities including biodiversity and landscapes.

The current development will not directly impact any nationally designated site.

3.1.3 Non-Designated Sites

The Whitechurch Stream, despite its highly modified nature provides an important ecological corridor or stepping stone within a highly urbanised area. No specific conservation designation pertaining to Local

Authority designations were identified, although a 2012 community biodiversity project report[3] noted the local importance of the watercourse (referred to in that report as the River Glynn) as it flowed through St. Enda's Park and connected to the Owendoher and Dodder Rivers. Inland Fisheries Ireland also confirmed during a consultative meeting (see **Appendix C**) the aquatic sensitivity of the Whitechurch Stream owing to the fact that it supports brown trout and it has direct connectivity to the Owendoher River and Dodder River.

A search of the Wetlands Surveys Ireland database[4] ranked the artificial pond (WMI_DU146) at St. Enda's Park of local conservation value (moderate value).

The Office of Public Works maintain this Heritage Park, primarily in respect of its connection to Patrick Pearse. However, St. Enda's Park also has an education centre and staff have in tandem with environmental non-governmental organisations e.g. Dublin Bat Group, begun documenting the parks biodiversity. Discussions with Park staff have informed the reporting and the Bat report[5] has been utilised in the preparation of this EclA.

3.1.4 Biodiversity Protection

South Dublin County Council is characterised by a range of sites across its administrative area that support a range of plant, animal and bird species that are deemed to be rare and threatened under European and Irish legislation and which are known to exist outside of designated sites identified above. The Local Authority emphasises the importance of biodiversity and retaining or incorporating biodiversity enhancement measures into the landscape.

Specific policies within the County Development Plan (2016-2022) afford protection to biodiversity outside of designated areas such as:

- HCL1 Objective 1 – To protect, conserve and enhance natural, built and cultural heritage features and restrict development that would have s significant negative impact on these assets.
- HCL15 Objective 1 - To ensure that development does not have a significant adverse impact on rare and threatened species, including those protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992.
- HCL15 Objective 2 - To ensure that, where evidence of species that are protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992 exists, appropriate avoidance and mitigation measures are incorporated into development proposals as part of any ecological impact assessment.
- HCL15 Objective 3 - To protect existing trees, hedgerows, and woodlands which are of amenity or biodiversity value and/ or contribute to landscape character and ensure that proper provision is made for their protection and management in accordance with Living with Trees: South Dublin County Council's Tree Management Policy 2015-2020.
- G2 Objective 4 – To repair habitat fragmentation and provide for regeneration of flora and fauna where weaknesses are identified in the network
- G2 Objective 9 – To preserve, protect and augment trees, groups of trees, woodlands and hedgerows within the County by increasing tree canopy coverage using locally native species and by incorporating them within design proposals and supporting their integration into the Green Infrastructure network
- G6 Objective 1 – To protect and enhance existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design process.
- G1 Objective - To establish a coherent, integrated and evolving Green Infrastructure network across South Dublin County with parks, open spaces, hedgerows, grasslands, protected areas and rivers and

[3] Tubridy & Associates (2012). The Owendoher and River Glynn Community Biodiversity Project: Progress Report. Report E03166 prepared for Glendoher & District Residents Association.

[4] http://www.wetlandsurveysireland.com/

[5] DBG (2018). Survey and Bat Walk Report for St. Enda's Park, Rathfarnham. Report prepared for OPW

streams forming the strategic links and to integrate the objectives of the Green infrastructure strategy throughout all relevant council plans such as LAPs and other approved plans.

- G2 Objective 11 – To incorporate appropriate elements of Green Infrastructure e.g. new tree planting, grass verges, planters etc. into existing areas of hard infrastructure wherever possible, thereby integrating these areas of existing urban environment into the overall Green Infrastructure network.
- G2 Objective 12 – To seek to control and manage non-native invasive species and to develop strategies with relevant stakeholders to assist in the control of these species throughout the County.
- G2 Objective 13 – To seek to prevent the loss of woodlands, hedgerows, aquatic habitats and wetlands wherever possible including requiring a programme to monitor and restrict the spread of invasive species such as those located along the River Dodder.
- G4 Objective 5 – To promote the planting of woodlands, forestry. Community gardens, allotments and parkland meadows within the County's open spaces and parks.
- G6 Objective 1 – To protect and enhance existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design process.
- HCL12 Objective 1 – To prevent development that would adversely affect the integrity of any Natura 2000 site located within and immediately adjacent to the County and promote favourable conservation status of habitats and protected species including those listed under the Birds Directives, the Wildlife Acts and the Habitats Directive.
- HCL12 Objective 2 – To ensure that project that give rise to significant direct, indirect or secondary impacts on Natura 2000 sites, either individually or in combination with other plans or projects, will not be permitted unless the following is robustly demonstrated in accordance with Article 6(4) of the Habitats Directive and S177AA of the Planning and Development Act (2000-2010) or any superseding legislation:
  - There are no less damaging alternative solutions available; and
  - There are imperative reasons of overriding public interest (as defined in the Habitats Directive) requiring the project to proceed; and
  - Adequate compensatory measures have been identified that can be put in place.

The Impact assessment and recommendations for mitigation have been cognisant of these objectives.

3.2 Biodiversity Records

The different elements of the proposed development lie within a 5km search area surrounding the Whitechurch Stream. Records of rare, protected and invasive species of flora and fauna from this search area were obtained from the National Biodiversity Data Centre (NBDC) online database[6], see **Table 3-3**.

Other datasets available on the NBDC, such as ancient woodland etc. were also interrogated. There was no specific ecological issue identified other than characterisation of the park and watercourse corridor as suitable for bat species.

The NPWS online database[7] was searched for rare and protected species. These are reproduced in **Table 3-4**.

The roadkill database[8] was also interrogated for records of protected species up to March 2020. Mammal roadkill records from the general vicinity of the project that had been submitted to the roadkill database are

[6] http://www.biodiversityireland.ie/ Accessed March 2020.
[7] http://webgis.npws.ie/npwsviewer/ Accessed March 2020.
[8] http://www.biology.ie/home.php?m=npws Accessed March 2020

shown in **Table 3-5**. There are two separate record for badger fatalities noted, both in the general area towards the downstream section of the proposed development.

Table 3-1: European Sites

Site Names & Code	Qualifying Interest Habitats and Species (*= Priority Habitat)/Special conservation Interests	Conservation Objective	Approximate Distance from the Proposed Scheme	Connectivity
Special Area of Conservation				
Ballyman Glen SAC (000713)	**Generic Conservation Objectives Version 6.0 21/02/18** **Annex I Habitats** Petrifying springs with tufa formation (*Cratoneurion*) [7220] * Alkaline fens [7230]	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	*ca.* 11km	No. There is no connectivity between the proposed works and the European site due to the distance between the two sites and the lack of hydrological connection between them.
Knocksink Woods SAC (000725)	**Generic Conservation Objectives Version 6.0 21/02/18** **Annex I Habitats** Petrifying springs with tufa formation (*Cratoneurion*) [7220]* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] *	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	*ca.* 9km	No. There is no connectivity between the proposed works and the European site due to the distance between the two sites and the lack of hydrological connection between them.
Wicklow Mountains SAC (002122)	**Site Specific Conservation Objectives Version 1.0 31/07/17** **Annex I Habitats** Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with *Erica tetralix* [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Calaminarian grasslands of the Violetalia calaminariae [6130] Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] Blanket bogs (* if active bog) [7130] Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110] Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220]	To maintain the favourable conservation condition of the following Annex I habitats in Wicklow Mountains SAC (3130, 3160, 6130 for which are defined by a list of attributes and targets. To restore the favourable conservation condition of Annex I habitats in Wicklow Mountains SAC (4010, 4030, 4060, 6230, 7130, 8110, 8210, 8220, 91A0which are defined by a list of attributes and targets. To maintain the favourable conservation condition of Otter in Wicklow Mountains SAC which is defined by a list of attributes and targets.	*ca.* 7 km	Yes. There is no direct connectivity between the proposed works and the European site (which is upstream of the proposed development). However, Otter is a qualifying interest for the SAC and is known to occur within the Dodder system which is hydrological downstream to the SAC. While Otters are territorial, females typically roam within 7.5 +/-1.5km range and males 13.2+-5.3km for males (Reid et al. 2013). Thus, it cannot be conclusively ruled out the disturbance to otter territory will be impacted during the works.

Site Names & Code	Qualifying Interest Habitats and Species (*= Priority Habitat)/Special conservation Interests	Conservation Objective	Approximate Distance from the Proposed Scheme	Connectivity
	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] **Annex II Species** *Lutra lutra* (Otter) [1355]			
Glenasmole Valley SAC (001209)	**Generic Conservation Objectives Version 6.0 21/02/18** **Annex I Habitats** Semi-natural dry grasslands an scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites) * [6210] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caerulae) [6410] Petrifying springs with tufa formation (C*ratoneurion*) [7220] *	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	*ca.* 7km	No. There is no connectivity between the proposed works and the European site due to the distance between the two sites and the lack of hydrological connection between them.
South Dublin Bay SAC (000210)	**Site Specific Conservation Objectives Version 1.0 22/08/13** **Annex I Habitats** Mudflats and sandflats not covered by seawater at low tide [1140]	To maintain the favourable conservation condition of the Annex I habitat in South Dublin Bay SAC (1140) for which are defined by a list of attributes and targets.	ca. 12km	Yes. There is hydrological connection between the proposed works, via the watercourse network discharging into Dublin bay.
North Dublin Bay SAC (000206)	**Site Specific Conservation Objectives Version 1.0 06/11/13** **Annex I Habitats** Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietila maritimae) [1330] Mediterranean salt meadows (Juncetalia maritima) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes)* [2130] Humid dune slacks [2190] **Annex II Species**	To maintain the favourable conservation condition of the following Annex I habitats in North Dublin Bay SAC (1140, 1330, 1410) for which are defined by a list of attributes and targets. To restore the favourable conservation condition of Annex I habitats in North Dublin Bay SAC (1210, 1310, 2110, 2120, 2130, 2190) which are defined by a list of attributes and targets. To maintain the favourable conservation condition of Petalwort in North Dublin Bay SAC which is defined by a list of attributes and targets.	ca. 13km	Yes. There is hydrological connection between the proposed works, via the watercourse network discharging into Dublin bay.

Site Names & Code	Qualifying Interest Habitats and Species (*= Priority Habitat)/Special conservation Interests	Conservation Objective	Approximate Distance from the Proposed Scheme	Connectivity
	Petalwort (*Petalophyllum ralfsii*) [1395]			
Rockabill to Dalkey Island SAC (003000)	**Site Specific Conservation Objectives Version 1.0 07/05/13** **Annex I Habitats** Reefs [1170] **Annex II Species** Harbour porpoise (*Phocoena phocoena*) [1351]	To maintain the favourable conservation condition of reefs in Rockabill to Dalkey Island SAC (1170) for which are defined by a list of attributes and targets. To maintain the favourable conservation condition of harbour porpoise in Rockabill to Dalkey Island SAC (11351) for which are defined by a list of attributes and targets.	ca. 18km	No. While there is connectivity between the proposed works and the European site, the distance between the two sites and the marine dilution effects between the proposed development and the European site and the nature of the Qualifying Features are such that no appreciable impact can be attributed.
Special Protection Area				
Wicklow Mountains SPA (004040)	**Generic Conservation Objectives Version 6.0 21/02/18** **Special Conservation Interests** • Merlin (*Falco columbarius*) [A098] • Peregrine (*Falco peregrinus*) [A103]	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.	*ca.* 9km	No. There is no connectivity between the proposed works and the European site due to the distance between the two sites and the lack of hydrological connection between them.
Dalkey Island SPA (004172)	**Generic Conservation Objectives Version 6.0 21/02/18** **Special Conservation Interests** • Roseate Tern (*Sterna dougallii*) [A192] • Common Tern (*Sterna hirunda*) [A193] • Arctic Tern (*Sterna paradisaea*) [A194]	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA	*ca.* 12km	No. There is no connectivity between the proposed works and the European site due to the distance between the two sites and the lack of hydrological connection between them.
North Bull Island SPA (004006)	**Site Specific Conservation Objectives Version 1.0 09/03/15** **Special Conservation Interests** • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Teal (*Anas crecca*) [A052] • Pintail (*Anas acuta*) [A054] • Shoveler (*Anas clypeata*) [A056] • Oystercatcher (*Haematopus ostralegus*) [A130]	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA (A046, A048, A052, A054, A056, A130, A140, A141, A143, A144, A149, A156, A157, A160, A162, A169, A179). To maintain the favourable conservation condition of the wetland habitat in North Bull	ca. 12km	Yes. There is hydrological connection between the proposed works, via the watercourse network discharging into Dublin bay.

Site Names & Code	Qualifying Interest Habitats and Species (*= Priority Habitat)/Special conservation Interests	Conservation Objective	Approximate Distance from the Proposed Scheme	Connectivity
	• Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Turnstone (*Arenaria interpres*) [A169] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Wetland and Waterbirds [A999]	Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:		
South Dublin Bay and River Tolka Estuary SPA (004024)	**Site Specific Conservation Objectives Version 1.0 09/03/15** **Special Conservation Interests** • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Redshank (*Tringa totanus*) [A162] • Roseate Tern (*Sterna dougallii*) [A192] • Common Tern (*Sterna hirundo*) [A193] • Artic Tern (*Sterna paradisaea*) [A194] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Dunlin (*Calidris alpina*) [A149] • Black-headed Gull (*Chroicocephalus ridibundus)* [A179] • Wetland & waterbirds [A999]	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA (A046, A130, A137, A141, A143, A144, A149, A157, A162, A179, A192, A193, A194). To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:	ca. 13km	Yes. There is hydrological connection between the proposed works, via the watercourse network discharging into Dublin bay.

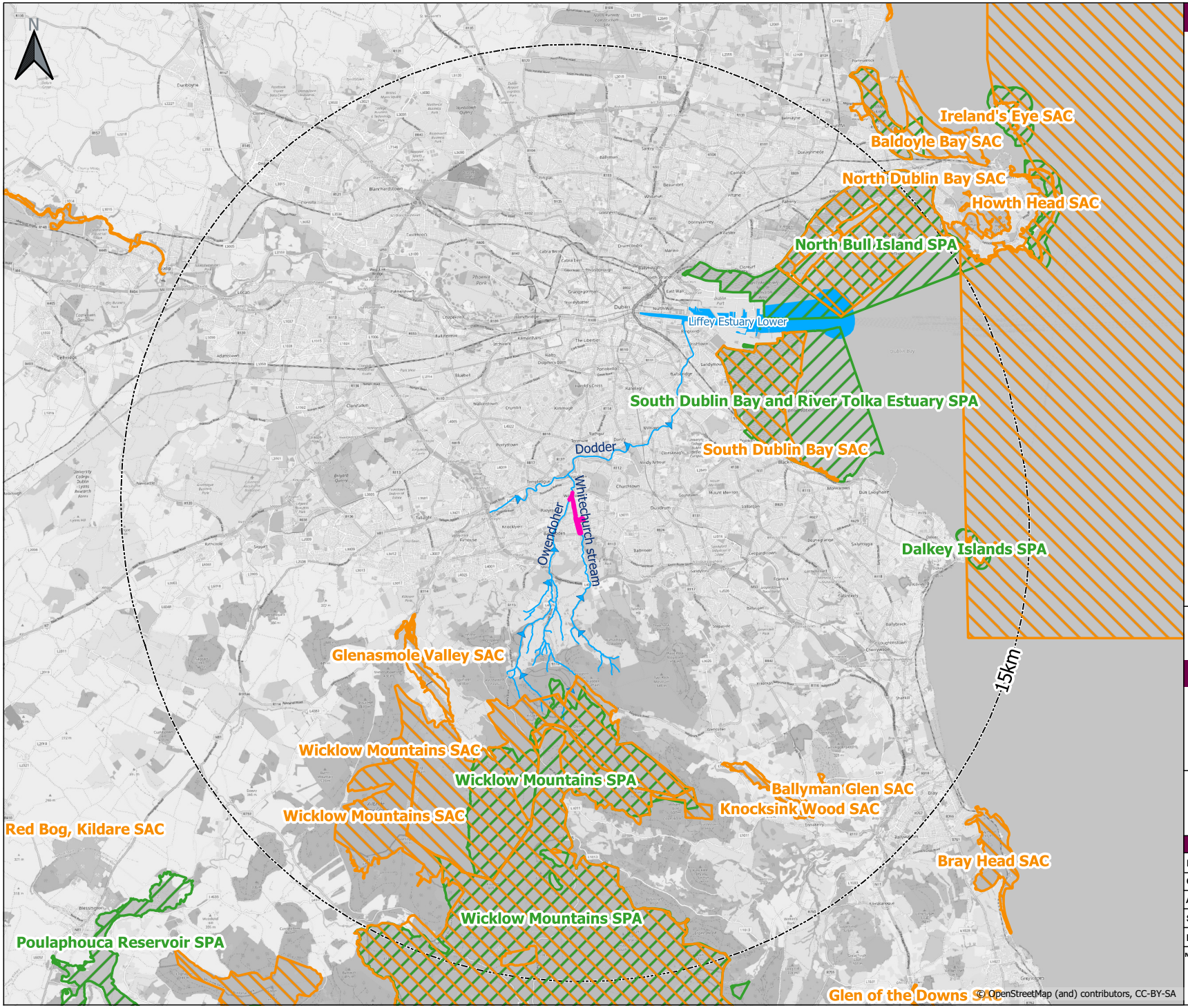
Table 3-2: Nationally Designated Sites

Site Names & Code*	Qualifying Feature	Approximate Distance from the Proposed Scheme	Connectivity
Ballyman Glen pNHA (000713)	Wooded glacial valley supporting groundwater dependant fen and spring habitats.	*ca. 12*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Knocksink Wood pNHA (000725)	Oak Woodland glacial valley supporting groundwater dependant fen and spring habitats.	*ca. 10*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Ballybetagh Bog pNHA (001202)	Small, narrow site of ecological value supporting three distinct fen or marsh areas. Also, of geological importance owing to historical finds of extinct Giant Irish Deer.	*ca. 9*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Loughlinstown Woods pNHA (001211)	Wet native woodland site alongside the Shanganagh River.	*ca. 11*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Fitzsimons Wood pNHA (001753)	Birch *Betula* spp. woodland.	*ca.* 4km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Glencree Valley pNHA (001755)	Glacial valley designated for woodland, boggy flushes and river habitats.	*ca. 11*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Glenasmole Valley pNHA (001209)	Woodland, herb and orchid rich grasslands, calcareous fens and flushes, rare and protected plant species.	*ca. 6.5*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Dodder Valley pNHA (000991)	River habitat and associated bank side vegetation.	*ca. 3*km	No.There is no connectivity between the proposed development site and the pNHA owing to fact that the pNHA is upstream of the connection with the Whitechurch Stream.
Dargle River Valley pNHA (001754)	Wooded river valley with mature oak woodland and rare species.	*ca. 14.5km*	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Powerscourt Woodland pNHA (001768)	Mixed woodland and river habitats with some rare species and is particularly conducive to macro-fungi.	*ca.* 12.5km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.

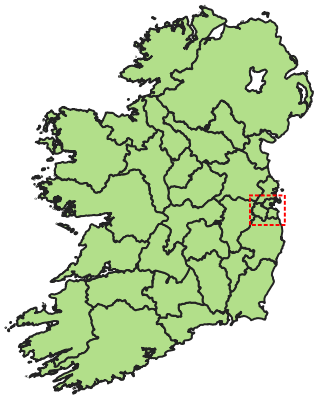
Site Names & Code*	Qualifying Feature	Approximate Distance from the Proposed Scheme	Connectivity
Great Sugar Loaf (001769)	Upland heath & grassland site with scree. Gorse and bracken spreading, while scree is being colonised by a range of moss and lichen communities	*ca. 15*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Dalkey Coastal Zone and Killiney Hill pNHA (001206)	Coastal habitats and breeding water birds and terns	*ca. 7.5*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Booterstown Marsh pNHA (001205)	Landlocked fresh and salt-marsh with breeding water birds and rare plant species	*ca. 6.5*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
South Dublin Bay pNHA (000210)	Estuarine habitats and wintering waterbirds	*ca. 6*km	**Yes.** There is a direct hydrogeological linkage between the proposed works and the pNHA via the surface water movement that eventually discharge into the River Liffey and Dublin Bay.
Dolphins, Dublin Docks pNHA (000201)	Tern nesting site in Dublin Docks	*ca. 8.5*km	**Yes.** There is a direct hydrogeological linkage between the proposed works and the pNHA via the surface water movement that eventually discharge into the River Liffey and Dublin Bay.
North Dublin Bay pNHA (000206)	Coastal and estuarine habitats and wintering water birds	*ca. 9*km	**Yes.** There is a direct hydrogeological linkage between the proposed works and the pNHA via the surface water movement that eventually discharge into the River Liffey and Dublin Bay.
Grand Canal pNHA (002104)	Man-made waterway. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. Presence of rare species.	*ca. 4.5*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them. The pNHA is upstream of the confluence of the Dodder with the River Liffey.
Lugmore Glen pNHA (001212)	Small wooded glen with stream cutting through glacial drift. Presence of red-listed plant *Lamiastrum galeobdon*.	*ca. 8*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Slade of Saggart and Crooksling Glen pNHA (000211)	Wooded river valley with associated wetland that is home to wildfowl and some rare plant and invertebrate species.	*ca. 11*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Liffey Valley pNHA (000128)	Section Liffey characterised by a number of habitats and species including a number of rare and legally protected plant species.	*ca. 8.5*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.

Site Names & Code*	Qualifying Feature	Approximate Distance from the Proposed Scheme	Connectivity
Royal Canal pNHA (002103)	Man-made waterway supporting a range of habitats with considerable diversity of species including the FPO species *Groenlandia densica*.	*ca. 10*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Santry Demense pNHA (00178)	Former Demesne woodland where an FPO species *Hypericum hirsutum* has previously been recorded.	*ca. 12.5*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.
Dingle Glen pNHA (001207)	Dry glacial isolated woodland valley	*ca. 9*km	No. There is no connectivity between the proposed development site and the pNHA due to the distance and the lack of hydrological connectivity between them.

*No natural Heritage Areas (NHAs) occur within 15km of the proposed development.



Legend



- Hydrological Connectivity Pathway
- Indicative Extent of Survey Territory
- Zone of Influence
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

Source: NPWS (December 2019)

Client: Comhairle Contae Átha Cliath Theas, South Dublin County Council

Project: Whitechurch Stream Flood Alleviation Scheme

Title

Figure 3-1 European Sites within 15km of the Proposed Development

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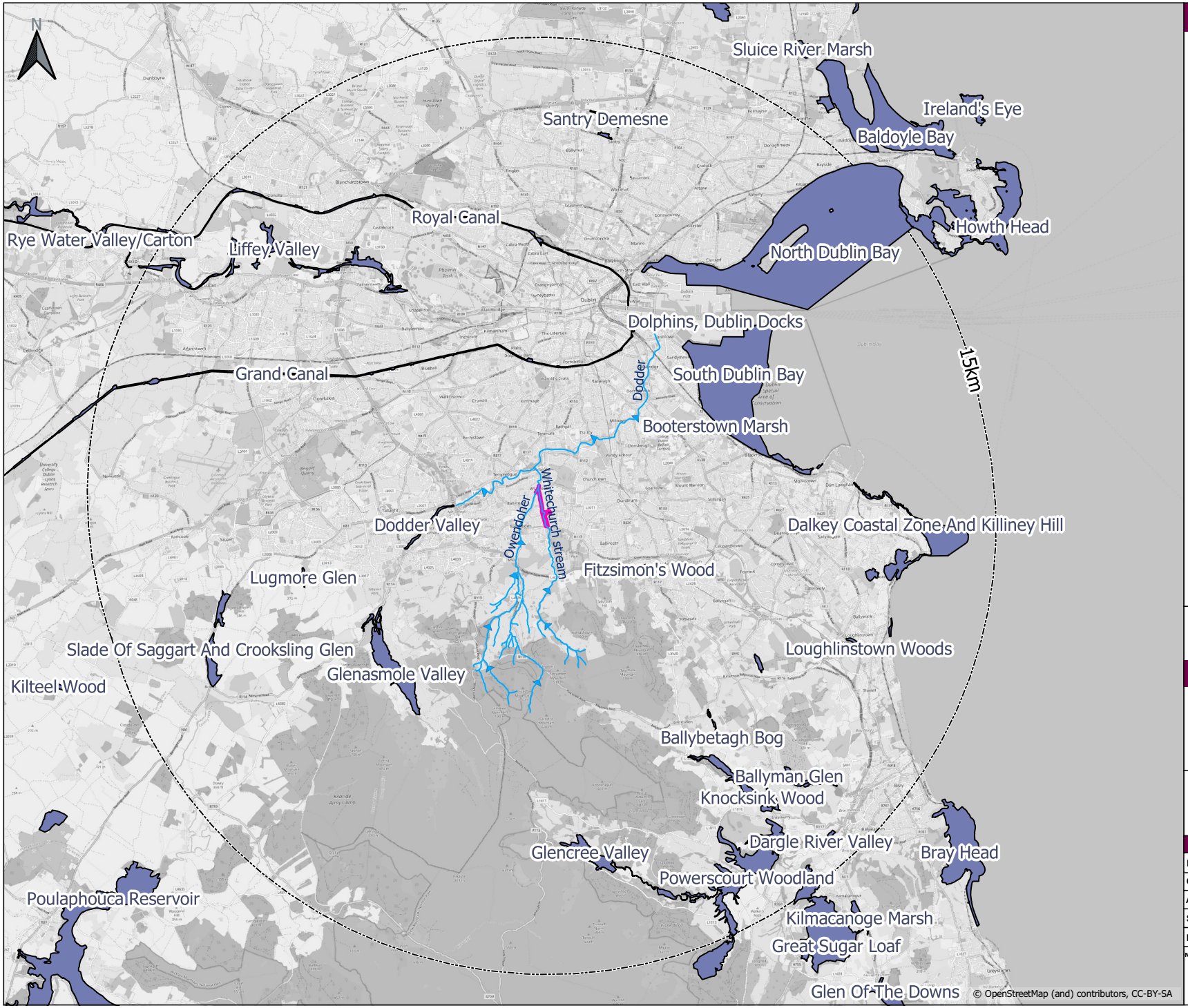
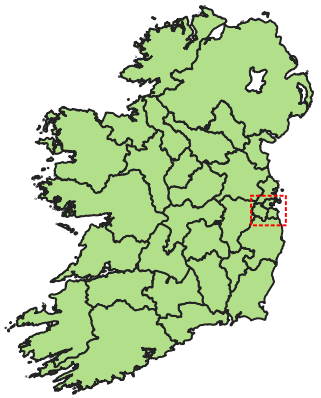
Issue Details		
Drawn:	HF	Project: MDW0825
Checked:	TR	File Ref:
Approved:	MD	MDW0825QG1002F01
Scale:	1:175,000 @ A4	Projection:
Date:	27/03/2020	IRENET95 / ITM



Legend



- Hydrological Connectivity Pathway
- Indicative Extent of Survey Territory
- Zone of Influence
- National Heritage Area (NHA)
- proposed National Heritage Area (pNHA)

Source: NPWS (June 2019)

Client: Comhairle Contae Átha Cliath Theas, South Dublin County Council

Project: Whitechurch Stream Flood Alleviation Scheme

Title

Figure 3-2 Nationally Designated Sites within 15km of the Proposed Development

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Issue Details		
Drawn:	HF	Project: MDW0825
Checked:	TR	File Ref:
Approved:	MD	MDW0825QG1003F01
Scale:	1:175,000 @ A4	Projection:
Date:	27/03/2020	IRENET95 / ITM

Table 3-3: Records of Rare, Protected and Invasive Species of Flora and Fauna

Scientific Name	Common Name	Number of Records	Date of Last Record	Designation
Birds				
Anas platyrhnchos	Mallard	57	28/08/16	EU Birds Directive Annex II
Calidris alpina	Dunlin	3	31/12/11	EU Birds Directive Annex I BOCCI Amber List
Columba palumbus	Common Wood pigeon	86	05/08/17	EU Birds Directive Annex II
Egretta garzetta	Little Egret	11	03/12/17	EU Birds Directive Annex I
Fulica atra	Common Coot	21	22/04/16	EU Birds Directive Annex II BOCCI Amber List
Hirundo rustica	Barn Swallow	30	29/04/16	BOCCI Amber List
Larus argentatus	Herring Gull	43	12/06/16	BOCCI Red List
Larus marinus	Great Black-Backed Gull	6	12/03/16	BOCCI Amber List
Passer domesticus	House Sparrow	60	23/07/16	BOCCI Amber List
Sturna vulgaris	Common Starling	67	10/11/17	BOCCI Amber List
Sterna paradisaea	Arctic Tern	2	31/12/2011	EU Birds Directive Annex I BOCCI Amber List
Tyto alba	Barn Owl	5	31/12/2011	EU Birds Directive Annex I BOCCI Red List
Limosa lapponica	Bar-tailed Godwit	2	31/12/2011	EU Birds Directive Annex I BOCCI Red List
Cepphus grille	Black Guillemot	3	31/12/2011	BOCCI Amber List
Chroicocephalus (Larus) ridibundus	Black-headed Gull	33	03/12/2017	BOCCI Red List
Limosa limosa	Black-tailed Godwit	1	31/12/2011	BOCCI Amber List
Branta bernicla subsp. hrota	Light Bellied Brent Goose	7	06/12/15	BOCCI Amber List
Somateria mollissima	Common Eider	1	18/05/2015	EU Birds Directive Annex II BOCCI Amber List
Bucephala clangula	Common Goldeneye	3	18/05/2015	BOCCI Amber List
Tringa nebularia	Common Greenshank	3	31/12/2011	BOCCI Amber List
Falco tinnunculus	Common Kestrel	23	31/12/2011	BOCCI Amber List
Alcedo atthis	Common Kingfisher	35	31/12/2011	EU Birds Directive Annex I BOCCI Amber List
Carduelis cannabina	Common Linnet	27	18/05/15	BOCCI Amber List
Aythya farina	Common Pochard	4	31/12/2011	EU Birds Directive Annex II & III BOCCI Amber List
Phasianus colchicus	Common Pheasant	15	10/03/2016	EU Birds Directive Annex II & III
Tringa tetanus	Common Redshank	8	31/12/2011	BOCCI Red List
Actitis hypoleucos	Common Sandpiper	2	31/12/2011	BOCCI Amber List
Gallinago gallinago	Common Snipe	9	31/12/2011	EU Birds Directive Annex II & III BOCCI Amber List
Tadorna tadorna	Common Shelduck	4	31/12/11	BOCCI Amber List
Apus apus	Common Swift	24	26/05/16	BOCCI Amber List
Sterna hirundo	Common Tern	3	31/12/11	EU Birds Directive Annex I BOCCI Amber List
Numenius arquata	Eurasian Curlew	10	04/12/17	EU Birds Directive Annex II BOCCI Amber List
Anas crecca	Eurasian Teal	5	31/12/2011	EU Birds Directive Annex II & III BOCCI Amber List
Haematopus ostralegus	Eurasian Oystercatcher	13	10/11/16	BOCCI Amber List
Passer montanus	Eurasian Tree Sparrow	2	31/12/2011	BOCCI Amber List
Anas penelope	Eurasian Wigeon	2	31/12/11	EU Birds Directive Annex II & III BOCCI Amber List

Scientific Name	Common Name	Number of Records	Date of Last Record	Designation
Scolopax rusticola	Eurasian Woodcock	8	31/12/2011	EU Birds Directive Annex II & III BOCCI Amber List
Pluvialis apricaria	European Golden Plover	4	31/12/11	EU Birds Directive Annex II & III BOCCI Red List
Anas Strepera	Gadwall	1	31/12/11	BOCCI Amber List
Phalacrocorax carbo	Great Cormorant	22	03/12/17	BOCCI Red List
Podiceps cristatus	Great Crested Greebe	3	31/12/11	BOCCI Amber List
Gavia immer	Great Northern Diver	1	31/12/11	EU Birds Directive Annex I BOCCI Amber List
Athrya marila	Greater Scaup	1	31/12/11	EU Birds Directive Annex II & III BOCCI Amber List
Pluvialis squatarola	Grey Plover	2	31/12/11	BOCCI Amber List
Circus cyaneus	Hen Harrier	2	31/12/11	EU Birds Directive Annex I BOCCI Amber List
Gavia stellata	Red-throated Diver	1	31/12/11	EU Birds Directive Annex I BOCCI Amber List
Delichon urbicum	House Martin	18	22/04/16	BOCCI Amber List
Larus fuscus	Lesser Black-backed Gull	19	30/09/2016	BOCCI Amber List
Tachybaptus ruficollis	Little Grebe	24	22/04/2016	BOCCI Amber List
Larus canus	Common /Mew Gull	14	31/12/2011	BOCCI Amber List
Cygnus olor	Mute Swan	30	26/08/16	BOCCI Amber List
Mergus serrator	Red-breasted Merganser	1	31/12/2011	EU Birds Directive Annex II
Vanellus vanellus	Northern Lapwing	7	31/12/2011	EU Birds Directive Annex II BOCCI Red List
Falco peregrinus	Peregrine Falcon	9	31/12/2011	EU Birds Directive Annex I
Lagopus lagopus	Red Grouse	6	31/12/2011	EU Birds Directive Annex II & III BOCCI Red List
Calidris canutus	Red Knot	2	31/12/2011	BOCCI Red List
Columba livia	Rock Pigeon	34	09/12/16	EU Birds Directive Annex II
Charadrius hiaticula	Ringed Plover	4	31/12/2011	BOCCI Amber List
Aythya fuligula	Tufted Duck	24	22/04/2016	EU Birds Directive Annex II & III BOCCI Amber List
Alauda arvensis	Sky Lark	11	31/12/2011	BOCCI Amber List
Riparia riparia	Sand Martin	21	03/08/16	BOCCI Amber List
Bubo scandiaca	Snowy Owl	2	08/04/2016	BOCCI Amber List
Anas clypeata	Northern Shoveler	2	31/12/2011	EU Birds Directive Annex II BOCCI Red List
Muscicapa striata	Spotted Flycatcher	8	31/12/2011	BOCCI Amber List
Columba oenas	Stock Pigeon	9	31/12/2011	BOCCI Amber List
Larus melanocephalus	Mediterranean Gull	3	31/12/2011	EU Birds Directive Annex I BOCCI Amber List
Rallus aquaticus	Water Rail	3	31/12/2011	BOCCI Amber List
Emberiza citronella	Yellowhammer	6	31/12/2011	BOCCI Red List
Bats				
Nyctalus leisleri	Lesser Noctule	38	31/10/24	EU Annex IV; Wildlife Acts Protected species
Myotis daubentonii	Daubenton's Bat	113	05/09/2014	EU Annex IV; Wildlife Acts Protected species
Pipistrellus pipistrellus sensu lato	Common Pipistrelle	47	31/10/2014	EU Annex IV; Wildlife Acts Protected species
Pipistrellus pygmaeus	Soprano Pipistrelle	60	31/10/2014	EU Annex IV; Wildlife Acts Protected species
Plecotus auritus	Brown Long-eared Bat	6	02/09/2009	EU Annex IV; Wildlife Acts Protected species
Pipistrellus nathusii	Nathusius's Pipistrelle	1	04/08/2012	EU Annex IV; Wildlife Acts Protected species
Myotis nattereri	Natterer's Bat	2	04/08/2011	EU Annex IV; Wildlife Acts Protected species

Scientific Name	Common Name	Number of Records	Date of Last Record	Designation
IAPS – Flora				
Fallopia japonica	Japanese knotweed	60	22/05/19	High Impact Invasive Species EU Regulation No. 1143/2014 Regulation S.I. 477 (Ireland)
Gunnera tinctoria	Giant Rhubarb	2	12/07015	High Impact Invasive Species EU Regulation No. 1143/2014 Regulation S.I. 477 (Ireland)
Prunus laurocerasus	Cherry Laurel	4	08/06/19	High Impact Invasive Species
Acer pseudoplatanus	Sycamore	21	08/06/19	Medium Impact Invasive Species
Allium triquetrum	Three Cornered Garlic	6	25/04/19	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)
Buddleia davidii	Butterfly Bush	21	08/06/19	Medium Impact Invasive Species
Cotoneaster horizontalis	Wall Cotoneaster	1	31/03/2014	Medium Impact Invasive Species
Persicaria wallichii	Himalayan Knotweed	1	23/06/2012	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)
Fallopia japonica x sachalinensis = F. x bohemica	Bohemian Knotweed	16	17/06/2015	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Heracleum mantegazzianum	Giant Hogweed	6	15/06/19	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Leycesteria formosa	Himalayan Honeysuckle	4	21/01/19	Medium Impact Invasive Species
Impatiens glandulifera	Indian Balsam	88	31/1217	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Hyacinthoides non-scripta	Spanish Bluebell	1	14/04/18	High Impact Invasive Species Regulation S.I. 477 (Ireland)
IAPS- Fauna				
Mustela vison	American Mink	8	23/03/2014	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Rattus norvegicus	Brown Rat	8	30/09/2016	High Impact Invasive Species Regulation S.I. 477 (Ireland) (offshore islands only)
Oryctolagus cuniculus	European Rabbit	31	25/10/2018	Medium Impact Invasive Species
Dama dama	Fallow Deer	4	16/09/2018	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Cervus nippon	Sika Deer	6	09/06/17	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Sciurus carolinensis	Eastern Grey Squirrel	113	15/01/18	High Impact Invasive Species EU Regulation No. 1143/2014 Regulation S.I. 477 (Ireland)
Mus musculus	House Mouse	14	10/11/17	High Impact Invasive Species
Harmonia axyridis	Harlequin Ladybird	1	08/11/18	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Arthurdendyus triangulatus	New Zealand Flatworm	8	11/03/15	High Impact Invasive Species
Mammals				
Lutra lutra	Otter	19	28/09/17	EU Annex II, IV; Wildlife Acts Protected species
Erinaceus europaeus	West European Hedgehog	15	16/08/18	Wildlife Acts Protected species
Martes martes	Pine Marten	5	01/07/17	EU Annex V; Wildlife Acts Protected species
Meles meles	Eurasian Badger	45	09/10/18	Wildlife Acts Protected species

Scientific Name	Common Name	Number of Records	Date of Last Record	Designation
Sorex minutus	Eurasian Pygmy Shrew	10	12/07/18	Wildlife Acts Protected species
Sciurus vulgaris	Eurasian Red Squirrel	35	09/10/18	Wildlife Acts Protected species
Lepus timidus subsp. hibernicus	Irish Hare	3	17/03/17	Wildlife Acts Protected species
Amphibian				
Rana temporaria	Common Frog	116	18/06/2016	EU Annex V; Wildlife Acts Protected species
Lissotriton vulgaris	Smooth Newt	7	30/04/2016	Wildlife Acts Protected species

Table 3-4: NPWS Database

Scientific Name	Common Name	Location	Record Date	Flora of County Dublin Note[9]
Red Hemp Nettle	*Galeopsis angustifolia*	Three & Two Rock Mountains	1967	A native population in Dublin was noted on gravels at Old Bawn in upper Dodder catchment. Now considered extinct at this location.
		Dundrum	1866	
Lesser Snapdragon	*Misopates orontium*	Belalley Park	1849	No Note
Small White Orchid	*Pseudoorchis albida*	Three Rock Mountain	1804	Still present in pasture at Glenasmole in 1957.
Bog Orchid	*Hammarbya paludosa*	No location noted	1905	Very rare in flushes. Some still present in Bohernabreena (upper Dodder catchment)
		No location noted	1953	
		No location noted	1894	
Great Burnet	*Sanguisorba officinalis*	Templeogue	1903	No Note.
Sika Deer	*Cervus nippon*	Castlekelly	1991	Not applicable.
		Castlekelly	1991	

Table 3-5: Roadkill Database for mammals in Vicinity of Proposed Development

Record Date*	Common Name	Location
18th September 2013	*Badger*	No note provided on location.
3rd March 2017	*Badger*	Parkland adjacent to main road. Location pin on database suggests the report was west of Loreto High School Beaufort.

*Records up to March 2020.

3.2.1 Bat Survey – St. Enda's Park

Volunteers from the Dublin Bat Group undertook two reconnoitring surveys of St Enda's Park in August 2018, before undertaking a bat walk recording event (DBN, 2018). Within the park, there are a number of good quality habitat features for bats around the park in the form of mature trees, structures and the pond. Leisler's Bats had previously been recorded flying around the main building complex in the centre of the park, whilst bats in general have been noted by park staff. A 2018 survey of a section of St. Enda's Park[10] identified the following bat species, namely: Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano pipstrelle (*Pipistrellus pygmaeus*), Leisler's Bat (*Nyctalus leisleri*) and Daubentons bat (*Myotis daubentonii*). The two

[9] DNFC (1998). Flora of County Dublin.

[10] Dublin Bat Group (2018). Survey and Bat Walk Report for St. Enda's Park, Rathfarnham

pipistrelles were recoded across the park, while Leisler's were noted overflying. Daubenton's Bat, a water specialist was noted around the artificial pond.

3.3 Hydrological Environment

According to the EPA Online mapping[11] the entirety of the proposed development is located within the HA 09 Liffey and Dublin Bay Catchment. The Whitechurch Stream (referred to also as the Kilmashoge or locally as the Glynn/Glin River) is a tributary of the Owendoher (EPA name Owenadoher) River which is itself a tributary of the Dodder River and drains into the Irish Sea at Ringsend and is located within the Dodder Sub-catchment_010.

3.3.1 Salmon (*Salmo salar*), Brown trout (*Salmo trutta*) and Lamprey (*Lampetra* spp)

A review of Inland Fisheries Ireland records (www.wfdfish.ie) showed that there are no survey sites located on the Whitechurch Stream. Research in the 1980's was conducted within the Owendoher and Whitechurch Stream. It was concluded that both were important wild brown trout nursery streams. The Whitechurch Stream was noted as being a very highly productive stream for juvenile brown trout (0+ to 2+) and recorded high densities of trout (maximum 1.29 fish/m^2 near Marley Park) (Kelly-Quinn 1986, Kelly-Quinn 1988).

Monitoring has been carried out by the IFI in the upper reaches of the Owendoher River and along the length of the Dodder River. Within the Owendoher an electric fishing survey was conducted in 2011 and brown trout were the only species recorded. The IFI's 2011 WFD assessment the Owendoher scored '*Poor Ecological Fish Status'* (Kelly *et al*. 2012).

Within the Dodder, an electric fishing survey was carried out at the footbridge at Beaver Row, Donnybrook in 2008. Salmon and brown trout were the most abundant fish species recorded followed by eel, minnow, stone loach and sea trout. While salmon were found within the Dodder river, they can only travel upstream as far as Clonskeagh Weir which poses as a barrier to upstream migration (Kelly *et al.* 2009). Further upstream the Dodder at Bushy Park where the Owendoher enters the Dodder, brown trout was the most abundant species identified followed by European eel, lamprey spp. minnow, stoneloach and three-spined stickleback in a 2014 IFI survey. Here the Dodder scored '*Good Ecological Fish Status'* in 2014 (Kelly *et al.* 2015).

Lamprey spp. (either river or brook) have been recorded within the Dodder River from Beaver Row to Oldbawn during IFI surveys in 2013 and 2014 (Kelly *et al*., 2014, Kelly *et al*., 2015). Oldbawn is upstream of the Owendoher confluence with the Dodder. A desktop search did not reveal any records of sea lamprey within the Dodder and as with salmon the weir at Clonskeagh Bridge would act as a barrier to further upstream migration.

Further information is located within **Appendix F.**

3.3.2 WFD Surface Water Quality

Surface water body (river, lakes, transitional and coastal waters) monitoring is conducted by the EPA as part of WFD national surface water quality monitoring programme. Water bodies are classified, in accordance with the WFD, on the basis of a combination of ecological status (a combination of biological status, and the supporting elements of hydromorphology and physico-chemical parameters) and chemical status. EPA indices, EPA water quality status and WFD status are interpreted in **Table 3-6**.

The overall status of a water body is classified into one of five classes, as per Schedule 3 of the Surface Water Regulations 2009 (S.I. No. 272) (see **Table 3-6**). The first three-year cycle of WFD monitoring was undertaken between 2007 and 2009, the second three-year cycle between 2010 and 2012 and the most

[11] https://gis.epa.ie/EPAMaps/

recent cycle spanning from 2013 to 2015. Available results are documented on the EPA website https://gis.epa.ie/EPAMaps/.

The WFD Status for the Owendoher_10 which includes the Whitechurch Stream tributary was rated as 'Moderate' during the 2010-2012 WFD monitoring cycle and remaining 'Moderate' in the 2010-2015 monitoring cycle (**Table 3-7**). Currently the Owendoher_10 is At Risk of not achieving WFD objectives. The Owendoher_010 is also part of the Dodder Area for Action, which is a prioritised water body within the current River Basin Management Plan 2018-20121. One of the reasons it has been prioritised is because the Dodder river and its catchment is an important trout fishery, recruitment, salmon in the lower reach and ongoing work for removal of weirs to allow salmon to pass.

Table 3-6: EPA Q-rating and Equivalent WFD Water Quality Status Classes

Biotic Index	EPA Colour Coding*	EQR	EPA Quality Status	Water Quality	WFD Status
Q5	Blue	1.0	Unpolluted	Good	High
Q4-5	Blue	0.9	Unpolluted	Fair-to-Good	High
Q4	Green	0.8	Unpolluted	Fair	Good
Q3-4	Yellow	0.7	Slightly Polluted	Doubtful-to- Fair	Moderate
Q3	Orange	0.6	Moderately Polluted	Doubtful	Poor
Q2-3	Orange	0.5	Moderately Polluted	Poor-to-Doubtful	Poor
Q2	Red	0.4	Seriously Polluted	Poor	Bad
Q1-2	Red	0.3	Seriously Polluted	Bad-to-Poor	Bad
Q1	Red	0.2	Seriously Polluted	Bad	Bad

*Colour coding as employed under the WFD as specified in Schedule 3 of S.I. No 272 of 2009: High – blue, Good – green, Moderate – yellow, Poor – orange, and Bad – red

Table 3-7: Water Quality in Owendoher_010 Watercourse

Local name	EPA Waterbody Names	Risk	WFD status 2007-2009	WFD Status 2010-2012	WFD Status 2010-2015	WFD Status 2013-2018
Whitechurch Stream (River Glynn)	Owendoher_010 (IE_EA_09O11700)	At risk	Poor	Moderate	Moderate	Good

The results of the most recent macroinvertebrate survey (2016) for the water bodies with hydrological connectivity downstream to the proposed development are presented in **Table 3-8**.

Table 3-8: EPA Q-rating and Equivalent WFD Water Quality Status Classes in the Relevant Waterbodies

River	WFD waterbody Code	Station Code	Station Name	Biological Water Quality (Q-Value)
Owendoher	09O01	09O011700	Br u/s Dodder River confluence.	4
Dodder	09D01	09D010900	Footbridge, Beaver Row	3-4

4 FIELD SURVEY RESULTS

4.1 Habitats

A number of habitat types were recorded within the study area. These are listed in **Table 4-1** below with corresponding ecological evaluation and are illustrated in **Appendix B**. None of the habitats surveyed in the study area correspond to Annex I habitats. All of the habitats are highly modified through a combination of suburban nature the landscape inside and outside St. Enda's Park.

A habitat map was prepared to illustrate the key habitats encountered during the surveys for the proposed development. This was largely limited to the footprint of the proposed development, with some habitats immediately adjoining the footprint also mapped (**Appendix D**). It should be noted for clarity and owing to the linear and/or discontinuous nature of some habitats particularly along the watercourse alongside the public road, that only key habitats are mapped, but that all are discussed in the report. Although the intricate mosaic, where applicable is not always mapped, this does not detract from a general understanding of the receiving environment.

Table 4-1: Habitat Types Recorded & Ecological Valuation

Habitat Type	Fossit Category	Ecological Valuation	Rationale
Eroding/Upland River	FW1	Local (Higher)	Despite being a highly modified (within much of the study area), spate river, the value of this watercourse lies in the corridor that it provides to local ecology and the connectivity between areas of higher potential e.g. St Enda's park and the Dodder Valley.
Other Artificial Lakes and Ponds	FL8	Local (Higher)	Although a man-made and largely managed planted feature, the diversity and cover associated with of this habitat provide habitat for bird and bats species in particular.
Amenity Grasslands	GA2	Local (Lower)	Habitat is of low botanical importance, owing to its management. However, it may provide a foraging habitat for some species of fauna e.g. badgers and birds (passerine and wintering).
Dry Calcareous and Neutral Grassland	GS2	Local (Higher)	Poorly represented, and often in transition with Amenity grasslands near housing estates, these grasslands generally tend to be more botanically diverse than intensively managed estate grasslands. The habitat may provide a foraging habitat for some species of fauna e.g. passerine birds.
Wet Grassland	GS4	Local (higher)	Although limited in extent and often overshadowed by woodland vegetation, these grasslands generally tend to be more botanically diverse than amenity grasslands. The habitat may provide a habitat for some species of fauna or foraging habitat for some species of fauna e.g. bats and passerine birds.
Mixed (Broadleaved) Woodland	WD1	Local (higher)	The value of this habitat lays not in the fact that it is comprised of narrow linear woodland feature, but rather the diversity of species, particularly in St. Enda's Park.

Habitat Type	Fossit Category	Ecological Valuation	Rationale
Riparian Woodland	WN5	Local (higher)	Habitat is of moderate botanical importance; however, it provides breeding habitat for passerine birds and forage territory for bats.
Scrub	WS1	Local (higher)	Habitat is of low botanical importance; however, it provides breeding habitat for passerine birds or habitat for badgers.
Ornamental and Non-Native Shrub	WS3	Local (Lower)	This habitat is of low botanical importance and is often managed. Some dispersal of species from gardens along Whitechurch Stream banks.
Hedgelines	WL1	Local (higher)	As standalone habitat, this is well represented, in the suburban setting and I often found in mosaic with treelines, riparian woodland and Ornamental and Non-Native Shrub. Nonetheless it provides cover for birds and foraging potential for mammals.
Treelines	WL2	Local (Higher)	Similar to hedgelines, treelines are typically represented in garden boundaries and or as remnant from historical planting in St. Enda's Park. Nonetheless it provides cover for birds and foraging potential for mammals including bats.
Flower Beds ad Borders	BC4	Local (lower)	This habitat is locally distributed and subject to regular change. The only area to be impacted is likely to be within St. Enda's park car park where the proposed temporary compound is to be located.
Stone Walls and other stonework	BL1	Local (lower)	These features have the potential to support roosting bat and nesting birds e.g. Sarah Curran Roadbridge. However, the rubble stonewalls to be modified replaced would not be considered suitable.
Earth Banks	BL2	Local (lower)	This habitat is poorly represented in the proposed development, although elements of earth banks were noted under woodland copse within St. Enda's Park.
Buildings and artificial surfaces	BL3	Local (lower)	This habitat is of limited botanical importance although older buildings may provide habitat for fauna (in the wider landscape) e.g. roosting bats.
Spoil and Bare Ground	ED2	Local (lower)	This habitat is of limited botanical importance and is often indicative of areas where cut vegetation is temporarily stored or where pedestrian access along sections of the Whitechurch Stream is unhindered, such as in parts of St. Enda's Park.
Recolonising Bare Ground	ED3	Local (lower)	This habitat is of limited botanical importance and is often indicative of recent disturbance in suburban areas.

4.1.1 Eroding/Upland Rivers (FW1)

The Whitechurch Stream which rises to the south in the Dublin mountains, is a narrow, albeit flashy watercourse. It arrives at the upper end of the survey area in St. Enda's Park under a road culvert and immediately enters a man-made pond before flowing through a parkland setting before exiting the park. Downstream of St Enda's Park, the watercourse flows alongside Whitechurch Road through heavily urbanised areas. It is characterised in places by being canalised or going underground through long culverts.

There are a few places where natural sediment is present mostly gravels and silts such as in St Endas Park and some discrete semi-natural channel mixed substrates or man-made concrete slab. Water depth varies, a number of pools present although, infrequent. There are some older weirs or boulders impediments at places. In terms of flora there is little instream vegetation.

4.1.2 Other Artificial Lakes and Ponds FL8

The man-made pond is at the southern corner of St. Enda's Park, in the uppermost section of the study area. The pond has three man-made islands in it which have coalesced into one feature. There is little vegetation associated with the open water, and most is overhanging from the islands. Considerable cover is afforded waterfowl by virtue of this maturing vegetation and sections of fencing minimising access to parts of the pond. No works are planned for this area.

4.1.3 Amenity Grasslands GA2

Similar in respects to improved agricultural grassland in terms of floristic diversity and the fact that they are managed, this typically species-poor habitat was of limited distribution throughout the study area – associated with the playing pitches at St. Enda's Park and smaller areas of managed grassland fronting housing estates. These grasslands are typically characterised by short sward, a feature of regular mowing regimes. The key species are: Perennial ryegrass (*Lolium perenne*), Meadow grasses (*Poa* spp.), Daisy (*Bellis perennis*), Clover (*Trifolium* spp.), Dandelion (*Taraxacum officinale* agg.) and Plantains (*Plantago lanceolata*). Other herbaceous species occur is shaded or less frequently managed areas.

There is a small area of biodiversity enhancement feature at one location (**Appendix E**). It is delineated from regular mowing by a small string fence. The vegetation is taller and in places ranker and Brambles (*Rubus fruticosus* agg.) and saplings of Butterfly bush (*Buddliea davidii*). It will not be affected by the proposed development as the watercourse is culverted under this section.

4.1.4 Wet Grasslands GS4

Given the suburban setting and constrained nature of the watercourse, there is limited occurrence of this habitat within the proposed development area. Linear elements of the wet habitat were occasionally noted along wetter areas of the watercourse and in shallow depressions of the amenity grassland within St. Enda's Park. Elements of the habitat occur in corners or less intensively managed parts of amenity grassland along the Whitchurch road. The habitat is characterised by ground where the drainage may be impeded or is subject to periodic inundation by surface water. Floristically the habitat has many of the species from adjacent habitats particularly understorey scrub but may also include greater concentrations of Buttercup (*Ranunculus repens*), Silverweed (*Potentilla anserina*) and small tufts of Water Mint (*Mentha aquatica*).

4.1.5 Dry Meadows & Grassy Verges (GS3)

The typical habitat is not well represented within the study area and no fields were ascribed to the habitat. However, discontinuous elements of grassy verges, were noted, along sections of the Whitechurch road, which overlap with amenity grassland GA2. The verges, which for the most part are narrow in extent occurring immediately alongside the road network, are not regularly maintained. The local authority practice whereby road drainage is improved through occasional excavation of the verge to alleviate surface water ponding on the roads was noted. Evidence of road debris among the vegetation was not uncommon, as was the council practice of excavating discrete sections of verge to alleviate water ponding on roads.

Floristically the verges, do not for the most part correspond to the classic GS2 habitat owing to the shading from overhanging trees. But in some open areas, the flora reflects drier nature of the habitat and grasses such as Yorkshire Fog (*Holcus lanatus*) and the tussocky Cocksfoot (*Dactylis glomerata*) are prominent along with Docks (*Rumex* spp.), Cow parsley (*Anthriscus sylvestris*), Clovers (*Trifolium* spp.), Nettles (*Urtica dioica*), Oxe-eye daisy (*Leucanthemum vulgare*) and Vetch (*Vicia* spp). Another species which was occasionally abundant was the low impact invasive species Winter Heliotrope (*Petasites fragrans*).

4.1.6 Mixed (Broadleaved Woodland) WD1

The bulk of the wooded vegetation, certainly within St. Enda's Park would be classified here and it reflects the long established and modified demesne woodland and the variety of trees. There is variety of trees with no monocultures. The key species includes Beech (Fagus sylvatica), Sycamore (*Acer pseudoplatanus*), Horse Chestnut (*Aesculus hippocastanum)* and Ash (*Fraxinus excelsior*). The park woodlands are managed, and key species throughout include Monterey Cypress (*Cupressus macrocarpa*) which was planted along the avenues of the grounds. There are also Horse chestnut, Sycamore, Willow, Larch (*Larix decidua*), Pine trees (*Pinus* spp.) and Beech trees. Native Trees include Yew (*Taxus baccata*), Oak (*Quercus* spp), Ash, Birch (*Betula pubescens*) and Alder (*Alnus glutinosa*). The understorey and scrub layers are often planted/non-native species namely Cherry laurel (*Prunus laurocerasus*) although Holly (*Ilex aquifolium*) and Hawthorn (*Crataegus monogyna*) is locally distributed.

Outside of the park, there is a change in diversity of associated with the habitat alongside Whitechurch road, although the woodland vegetation is typically represented as a linear feature alongside parts of the watercourse, some of it long established, other self-seeded. Sycamore, Lime (*Tillia* spp) and Ash are the key canopy forming species, although Willow and Horse chestnut were also present. Where Willow becomes dominant, such as downstream of Willbrook Lawn, a discrete section of Willow dominated vegetation was noted.

4.1.7 Riparian Woodland WN5

Most wooded vegetation alongside the Whitechurch Stream is characterised as mixed broadleaved woodland, there is a discrete section of willow dominated riparian woodland downstream of the Willbrook lawn estate, where the watercourse emerges from a very long section of underground culvert. There is a wider area of ground between the road wall and the watercourse, and this low-lying ground is subject to periodic inundation as evidenced by the ground flora ground alongside the river. The willow which completely overshadows the watercourse also has Wild angelica (*Angelica sylvestris*) and Buttercup (*Ranunculus repens)* and Bramble (*Rubus fruticosus* agg.)

4.1.8 Scrub WS1

Areas of mixed scrub were encountered throughout the proposed development, often associated with overtopping woodland vegetation but also a feature of dereliction or lack of management at the edge of residential or commercial properties alongside the watercourse. Typically, the development of scrub vegetation is associated with linear screening e.g. walls and fences that screen private residences. It is rarely well defined as a discrete habitat except for area such as either end of the Rathfarnham Garage. This habitat is typically, although not always, characterised by low botanical diversity. In many instances it is characterised by the presence or dominance of a small number of species and occasionally non–native or garden escape. Species present in these areas included Hazel (*Corylus avellana*), Willow (*Salix* spp.), Elder (*Sambucus nigra*), Bramble (*Rubus fruticosus* agg) and Butterfly Bush (*Buddleja davidii*). Of these species, Bramble is a regular component, but less so in St. Enda's Park, where landscaped/ornamental shrubs often dominate.

4.1.9 Hedgerows WL1 & Treelines WL2

Both of these habitats are intimately linked with Woodland habitats. There are few distinct native hedgelines and most are characterised by maturing trees and scrub. Treelines are often intimately associated with garden screening planting, although they are occasionally present in as urban screening alongside the watercourse. They are characterised by linear rows or occasionally two rows of closely growing planted trees, sometimes native in origin but often planted. All of the treelines that were noted comprised mature or veteran trees, with some identified as important features capable of supporting bat roost features. These have been identified, as appropriate, as target notes in **Appendix I**. Most of the treelines are planted, with trees regularly spaced. The key trees identified largely included Beech (*Fagus sylvatica*), followed by Sycamore (*Acer pseudoplatanus*), Ash (*Fraxinus excelsior*) and Horse Chestnut (*Aesculus hippocastanum*)

and Lime (*Tillia* spp). Some discrete conifers treelines were noted such as the fast-growing Leyland cypress (*Cupressus X leylandii*) alongside the watercourse, typically associated with residential gardens. site of the proposed low-level reservoir.

4.1.10 Flower Beds and Borders BC4

This habitat is widespread throughout the wider landscape in keeping with the suburban setting. The main area of its distribution within the proposed works is surrounding the main car park to St. Enda's Park. It is a habitat that is in flux, as it would be regularly managed and indeed its planting changed.

4.1.11 Spoil & Bare Ground ED2 & Recolonising Bare Ground ED3

Both of these habitats can be intimately linked depending on the nature and extent of exposed ground. Bunded ground is often transient in nature or subject to disturbance such as in roadworks. Over time and with a reduction in disturbance, the seedbank within the bared ground can develop. Typically plant species that were noted are ruderals or fast-growing pioneer species which may or may not be replaced over time by more stable graminoids species typical of the surrounding landscape.

4.1.12 Stonework and Other Stonework BL1

This habitat, although present in discrete locations is not mapped. There are a number of older buildings, derelict walls and remnant structures that would fall into this category. Some, such as foot and road bridges may have been remodelled with new or expanded construction. With the exception of mosses or occasional algae if under water there is little flora to characterise this habitat.

4.1.13 Earthbanks BL2

Not extensively within the study area, it is nonetheless a habitat which is occasionally present where vegetation clearance occurred. The banks would become revegetated over time.

4.1.14 Buildings & Artificial Surfaces BL3

Given the suburban setting, it is not surprising that this habitat accounts for a considerable part of the footprint of the proposed development as well as proximal territory including public roads, footpaths, culverts, boundary walls and buildings. Vegetation is not typically associated with these man-made habitats except through dereliction or associated landscape/recreational planting.

4.2 Protected & Notable Flora

No rare or protected flora are noted from the NBDC database (**Table 3-3**) for the footprint of the proposed development. The NPWS dataset (**Table 3-4)** lists five plant species for the 10km grid square O12. None of the plant species listed were noted, nor would they be likely expected based on the habitat requirements.

One species of note from the locality is the presence of Mistletoe (*Vibiscum album*), for which three clumps were noted. This non-native hemi-parasite is typically associated with apple trees in old orchards. Three clumps were noted growing in a mature Lime (one of 4) along the public footpath.

4.3 Invasive Species

Surveys to identify the presence Invasive Alien Plant species were carried out over the course of a number of dates during 2018 and 2019. During preliminary ecological walkover for the project, a number of stands of Japanese Knotweed (*Fallopia japonica*) were identified. A single clump was noted alongside the upper pond in St. Enda's Park, whilst it was noted along four other areas, with the largest infestation along the eastern bank of the Whitechurch Stream a short distance upstream, where the Whitechurch Stream discharges into the Owendoher River.

One area of infestation is located on the western side of the watercourse in privately-owned land (Capri), for which some anthropogenic disturbance has been noted between preliminary walkover and detailed survey.

Another third schedule species that was noted on NBDC database includes Giant rhubarb (*Gunnera tinctoria*). This is noted from the NBDC records as occurring alongside the ponds in St. Enda's Park and the location of its planting was indicted by OPW staff. Despite searching with OPW parks staff, it was not relocated and the ground, which is damp but overshadowed by Cherry laurel had Butterbur growing throughout (*Petasites hybridus*).

There is some development of Three-cornered garlic (*Allium triquetrum*) alongside the watercourse in a number of areas. The main area is beneath the riparian woodland towards the lower part of the proposed development, immediately upstream of the main Japanese knotweed infestation.

Other Invasive species included the high impact invasive species Cherry laurel (*Prunus laurocerasus*) which was locally abundant, particularly in woodland understorey in St. Enda's Park. The remaining IAPS are largely medium impact species associated with watercourse edge and verges included: Sycamore (*Acer pseudoplatanus*) as well as locally abundant patches of Travellers joy (*Clematis vitalba*), Buddleia (*Buddleja davidii*) and occasional Winter heliotrope (*Petasites fragrans*). None of these species are listed on the Third Schedule of the Birds and Natural Habitats Regulations, although it is often recommended in urban areas that their spread is minimised, owing to their rapid establishment.

Although outside the optimal season for botanical surveys, the March 2020 re-survey, noted a new small stand of Three cornered garlic upstream of the Ford Garage, but in general the distribution of this species appeared similar to that previously recorded.

The locations of the IAPS are shown as target notes in **Appendix E.**

4.4 Protected Species

4.4.1 Badger

Badgers (*Meles meles*) are legally protected under the Wildlife Act 1976 (as amended). Evidence of badger activity around the proposed development area was spartan, and no setts were initially confirmed. There was limited evidence of badger activity in the wider landscape – notably in the form of limited discontinuous trails and occasional print noted in muds in the wider surrounds of St. Enda's Park. In places, the evidence indicated that badger, fox and rabbit were using the same territory.

Further survey of an otter slide in Whitechurch Stream within St. Enda's Park in 2019 identified a potential two-hole sett for which there was some evidence of recent excavation at one hole. This sett was located in a woodland dell away from public paths. However, there was evidence of antisocial behaviour nearby with discarded drinks cans noted, which was reconfirmed in March 2020 and although well-defined mammal trails were discernible, the holes showed no signs of recent activity and were largely infilled with fallen vegetative debris. The sett is outside the zone if impact of the proposed development.

Target notes relating to indicative badger activity are included in **Appendix E**.

4.4.2 Otter

Otters (*Lutra lutra*) are protected under the Wildlife Act (as amended) and are listed on Annex II and Annex IV of the EU Habitats Directive. Otters are widespread in Ireland and are documented from the Dodder catchment. The 2012 report[12] notes a sighting of otter from St. Enda's Park.

The January 2019 survey and follow-on surveys in 2020 confirmed evidence of otter activity along the Whitechurch Stream. The bulk of the evidence concerning otter activity was concentrated along the tie-in

[12] M. Tubridy & Associates (2012). The Owendoher and River Glynn Community Biodiversity Project

with the Owendoher River, where discrete trails and slides across pedestrian bridges as well as some relatively fresh spraints on boulders sitting above water. This was reconfirmed during 2020 revisit, although the secondary evidence was not typically re-found in the same locations. Elsewhere along the Whitechurch Stream, downstream of St Enda's Park, occasional elements of otter trails, paw prints and spraints atop prominent boulders were noted. This evidence was typically associated with structures, but over the course of a number of surveys repeat evidence such as sprainting locations was rarely relocated.

Although fish stock comprising larger fish were not noted, the IFI consultation indicates the presence of brown trout and historically the watercourse was known as a brown trout nursery (www.wfdfish.ie). Their presence, and spawning potential might be expected in some shallow gravel-rich watercourse, although none were recorded during current surveys.

During the 2019 survey, there were no discernible evidence of holts or resting sites (couchés) from much of the Whitechurch Stream, although there was clear evidence of commuting from the Owendoher River upstream. It is considered that the bankside habitat was for the most part is unsuitable to support holts owing both the proximity to human disturbance – traffic and houses, as well as the canalised nature of the watercourse. This corresponds with the 2019 survey evidence and the analysis published in 2019 (Macklin *et al*. 2019). However, data published in August 2019 (Macklin *et al*. 2019) noted two active holts along the Whitechurch stream, one a considerable distance upstream alongside the western boundary of Marlay Park, whilst a second was noted a short distance downstream of St Enda's Park. Evidence of this second holt, which was shown as being within the footprint of current survey area, was not relocated, despite a thorough search in March 2020. There are trails in the undergrowth along the left hand side of the narrow riparian zone, although dumping of garden waste, windthrown shrubs and evidence of lowering water levels from winter highs (~ 30cm) did not reveal any obvious holt feature either in the narrow riparian vegetation or under suitable bankside trees.

Evidence of potential otter resting (couché) and trail under overhanging tree root or habitation features was noted from the upper sections of the Whitechurch Stream within St Enda's Park in the 2019 surveys. The hols on the opposite side of the watercourse. The March 2020 survey noted further extension of the trails leading to the couché, that may be associated with bank erosion. There was little obvious evidence of recent activity in this area in March 2020, and the areas were all above obvious flood level.

During the March 2020 survey, a single hole under a tree root was noted at water level a short distance downstream of Sarah Curran Road Bridge. Recent vegetation clearance or tree pruning were noticeable along both sides of the watercourse, and a mixture of mammal trails were noted leading from the disturbed land alongside the watercourse towards the privately owned land were noted. The single hole under the tree did not appear to be actively used – no obvious paw marks were noted in the consolidated surface. Occasional prints in mud and gravels, often undistinguishable although some rat as well as canine prints were noted. In addition, the musky smell, reminiscent of fox was on the air, although no obvious fox prints were confirmed.

Target notes relating to the location of the spraints are included in **Appendix E**.

4.4.3 Hedgehog

Hedgehog (*Erinaceous europaeus*) are protected under the Wildlife Act 1976 (as amended). There is potential for hedgehog to occur within the study area particularly within the wooded areas in St. Enda's Park. No hedgehog were observed, although a small cluster of dropping were noted in 2019, which were attributed to Hedgehog owing to the size and dimensions, approximately 4.5cm long. A dead hedgehog with no obvious signs of predation was observed in the stream in March 2020 in close proximity to the location of the proposed access, the location of these sightings are indicated in **Appendix E**.

4.4.4 Bats

All bats and their roosting sites are legally protected under the EU Habitats Directive as transposed by the Habitats Regulations, as well as under the Wildlife Act (as amended). Across Europe, bats are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern

Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both of these conventions.

Habitat features were assessed for bat roost suitability during site walkovers. Some trees were identified as having low to moderate bat roost potential as per the classification scheme outlined in Collins (2016). This was due to the type of tree and/or the absence of suitable roosting features/Ivy cover. However, a number of mature trees (and existing structures) were identified that could support bats.

During the roost suitability survey, trees within the proposed development area were subject to visual assessment to identify features with bat roosting potential. A number of trees with suitable roosting features (e.g. tears, cracks, holes ivy cover, etc.) were identified, owing to the relative abundance and maturity of trees within the study area. No trees within the zone of influence of the proposed development were deemed to be of greater roost suitability than low. This was due in part to the light exposure of these trees during night hours. Features with low suitability for roosting bats were identified along the entire length of the proposed development. As only features of low suitability were recorded within the ZoI of the proposed development, no dedicated emergence surveys were required, and the focus switched to bat activity surveys.

The bat activity survey focussed on assessing the wooded vegetation that was likely to be lost as a result of the prosed development. There is potential commuting/foraging activity throughout the wider landscape, particularly associated with mature trees in St Enda Park and alongside the Whitechurch road. The watercourse also provides suitable roosting/commuting features.

The results of the two surveys (one dusk and one dawn), presented in **Appendix I,** suggest that bat are commuting between large wooded areas and also feeding locally along the watercourse. The activity survey found that the lands were used by a small number of bats species: Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Leislers (*Nyctalus leisleri*) and Daubentons (*Myotis daubentonii*).

High flying Leisler bat were noted flying into St. Enda's Park. There was evidence of Daubenton activity over the watercourse immediately upstream of Sarah Curran bridge, whilst Soprano and Common Pipistrelle were noted locally along the Whitechurch road. There was no evidence of Daubenton's bat recorded from the Whitechurch Stream downstream of St. Enda's Park, but this absence may be attributed to the modified nature of the watercourse and the density of the low woodland canopy over the watercourse which might impede access by bats along the watercourse. The presence of street lighting further decreases the benefits to foraging and commuting bats along the watercourse.

4.4.5 Other Mammals

There was some evidence of activity mammal activity in the area, with most of it concentrated in St. Enda's Park. Non-protected species, for which evidence was locally common in the study areas included:

- Rabbit (*Oryctolagus cuniculus)*;
- Fox (*Vulpes vulpes*), for which evidence of activity included prints and at least one kill site in scrub within St. Enda's park;
- Grey Squirrel *(Sciurus carolinensis*) – Single specimen observed in 2019 near entrance to Park;
- Brown Rat (*Rattus norvegicus*) – distinctive claw marks occasionally noted in river edge, whilst a single rat was noted during a February 2019 visit along the Owendoher river, a short distance upstream of the Whitechurch Stream tie-in. This is an SI 477 scheduled invasive species for offshore islands only and as such there is no specific requirement to manage; and
- American Mink (*Mustela vison*) – Characteristic malodourous faecal deposit noted in April 2019 under Sarah Curran Bridge. This is an SI 477 species. It is not considered that the proposed development will lead to greater dispersal of this species. A number of malodourous deposits, unconfirmed to animal

owing level of decomposition were noted in March 2020 survey around the same location. There had been vegetation clearance along both sides of the watercourse which may have resulted in displacement or more obvious activity along this section of the watercourse.

The NPWS online database (**Table 3-4)** notes two records both from 1991 for the non-native Sika deer from Castlekelly. No evidence of deer was noted in current survey, although separately, an unidentified young deer fatality was noted by the author on the central median of the M50 behind Marlay Park on the morning of 10th April 2019.

Other species likely to occur in the wider area, are based on suitability of habitat. Some of this is corroborated by records from the NBDC database, and discussions with OPW St. Enda's Park staff. This information is summarised in **Table 4-2**.

Table 4-2: Other Mammal Species Likely to Occur within the Study Area

Common Name	Scientific Name	Comment
Eurasian Red Squirrel	*Sciurus vulgaris*	Possible
Pygmy Shrew	*Sorex minutus*	Suitable habitat present.
Stoat	*Mustela erminea*	Suitable habitat present
Irish Hare	*Lepus timidus hibernicus*	Possible
Pine Marten	*Martes martes*	Possible
Field mice	*Apodemus sylvaticus*	Suitable habitat present.

4.4.6 Amphibians & Frogs

Common frog (*Rana temporaria*), Smooth newt (*Lissotriton vulgaris*) and Viviparous lizard (*Zootoca vivipara*) were not encountered during the site walkover survey, however the presence of all three cannot be ruled out and there are records of the presence of from the NBDC online database – **Table 3-4**.

No frogs or spawn were noted along the watercourse or in adjacent grassland mosaics. Frogs have previously been noted by OPW staff in the upper pond.

A smooth newt survey (under NPWS licence) was not deemed necessary owing to the lack of suitable features and habitat that might support newt.

Viviparous lizard may be found on grassland, hedgerows and road embankments (Edgar *et al*., 2010). However, given the nature of the territory, it is considered unlikely that they would be present in the proposed development area.

4.4.7 Salmon, Trout, River, Brook and Sea Lamprey

Previous WFD fish surveys conducted by IFI have identified salmon within the lower reaches of the Dodder river (IFI 2008). However, it is believed that salmon cannot access the upstream reaches of the Dodder past the Clonskeagh weir and therefore are not considered to be present within Owendoher River and Whitechurch Stream. Consultation with IFI noted that the Whitechurch Stream supported brown trout. The field survey which noted the presence of suitable potential spawning grounds along the watercourse did not confirm the presence of trout during field survey.

Lamprey species (either river or brook) have been recorded within the Dodder River from Beaver Row to Oldbawn during IFI surveys (IFI 2013, IFI 2014). Oldbawn is upstream of the Owendoher confluence with the Dodder River. A desktop search did not reveal any records of sea lamprey within the Dodder and as with salmon, the weir at Clonskeagh Bridge would act as a barrier to further upstream migration. Unlike river and sea lamprey, the brook lamprey is non-parasitic and non-migratory as an adult. Its entire life cycle is within

freshwater systems. As such the presence of brook lamprey within the Whitechurch Stream cannot be ruled out.

4.4.8 Avifauna

All birds and their nests are protected under the Wildlife Act (as amended). A large number of bird species are also afforded protection under the EU Birds Directive. There is considerable suitable habitat for breeding birds throughout the proposed study area including St. Enda's Park, where they are attracted by the trees, stream and lake and woodland shrubs. In addition, there is a network of linear wooded features and scrub and residential garden planting along the Whitechurch road, which is typical of the suburban setting and provides habitat for birds.

Discussion with OPW Parks staff on bird diversity from St. Enda's Park have been supplemented by ad hoc survey records, particularly alongside the Whitechurch Road corridor during site visits. These are detailed in **Table 4-3**. The range of birds known to make use of St. Enda's Park and those noted from the NBDC database is considerably greater than that which was recorded during the current survey. Many of the species noted were relatively common and typical of the setting.

In terms of key species associated with the watercourse, e.g. the Dipper and Kingfisher, no suitable bankface was noted within the proposed works area and no obvious nesting features recorded. Dipper prefer to breed on faster moving watercourse, often in upland areas. Dipper where encountered were individuals and were quick to disperse once disturbed. No nesting features were noted under accessible structures that were searched and the bulk of activity was associated with the Owendoher River, although a dipper was noted flying downstream away from St Gatiens Court.

Table 4-3: Bird Species Observed during the Surveys

Common Name	Scientific Name	Conservation Status	Comment
Blackbird	*Turdus merula*	Green	Common
Blue Tit	*Cyanistes caeruleus*	Green	Common
Chaffinch	*Fringilaa coelebs*	Green	Occasional
Dipper	*Cinclus cinclus*	Green	Occasional, but regularly seen
Kingfisher	*Alcedo atthis*	Amber	Several sightings along the Owendoher and 1 sighting in St. Enda's Park on Whitechurch Stream. Historical record from Whitechurch Stream tie-in to Owendoher River (Author's records)
Herring Gull	*Larus argentatus*	Bird Directive Annex, Annex I	Occasional in St. Enda's Park
Grey Wagtail	*Motacilla cinerea*	Green	One sighting
Moorhen	*Gallinula chloropus*		Upper ponds
Great Black-backed Gull	*Larus marinus*	Amber	St. Enda's Parkland
Black Headed Gull	*Chroicocephalus ridibundus*	Green	St. Enda's Parkland
Hooded Crow	*Corvus cornix*	Green	Common

Common Name	Scientific Name	Conservation Status	Comment
Jackdaw	*Corvus monedula*	Green	Common
Magpie	*Pica pica*	Green	Common
Robin	*Erithacus rubecula*	Amber	Occasional
Rook	*Corvus frugilegus*	Green	Common
Starling	*Sturnus vulgaris*	Amber	Numbers increasing
Swallow	*Hirundo rustica*	Amber	Old nests under Sarah Curran Roadbridge
Woodpigeon	*Columba palumbus*	Bird Directive Annex I,II & III. Green	Common
Wren	*Troglodytes troglodytes*	Green	Common
Mallard	*Anas platyrhnchos*	Green	Upper ponds and 1 pair in Whitechurch Stream at St. Gatiens estate
Little Egret	*Egretta garzetta*	Bird Directive Annex I	Immediately upstream of Sarah Curran roadbridge
Heron	*Ardea cinerea*		Downstream of tie -in to Owendoher River

4.4.9 Insects

Butterflies were not recorded during early surveys, owing to seasonality and undoubtedly the windy conditions during survey which may have had an impact on activity. The sole species confirmed from the studies was the common Small tortoiseshell (*Agalis urticae*), which was noted in St. Enda's Park near the borders at the front entrance.

A search of some vegetation with host plants did not identify any potential for Marsh Fritillary (*Euphydryas aurinia*) or Small Blue *(Cupido minimis*).

The presence of unidentified night-flying moths were noted, during dusk surveys for bats. They were not identified.

4.5 Aquatic Environment

A full report on the findings of the aquatic survey is contained in **Appendix F** of this report. Aquatic surveys were carried out by RPS Aquatic Ecologists on 9th April 2019. The survey comprised four sampling stations in total.

In summary, water quality results (Q-values) at the sampled locations indicate *Moderate* ecological quality within the Owendoher River and *Good* (Q4) to High (Q4-5) ecological quality in parts of the Whitechurch Stream (**Table 4-4**). The Q-value score improved as one travelled upstream from the Owendoher and up the Whitechurch Stream. Of particular note is the High ecological quality within St. Enda's Park which is indicative of the potential this urbanised stream can achieve.

Salmonid and lamprey spawning habitat varied from *Poor to None* to *Good* along the Whitechurch Stream and juvenile salmonid habitat also varied from *Poor to None* to *Very Good.* While there is potential habitat for salmon within the Whitechurch Stream, it is noted that their upward migration is restricted to the lower reaches of the Dodder River and salmon cannot access the Owendoher River and Whitechurch Stream. There is suitable habitat (spawning, juvenile and adults) for brown trout within the stream, in particular within St. Enda's Park (survey sites 3 and 4) with Good to High ecological quality and where the stream has not been as heavily modified and confined.

No brown trout were observed on the day of survey including within the pools investigated. Three-spined stickleback and minnow were the only fish species observed in the Whitechurch Stream. A series of large weirs within the Whitechurch Stream would make colonisation of larger fish from the Owendoher River unfavourable. If these barriers were removed, then there is suitable habitat available for brown trout to expand in to. An isolated resident population may be present within the upper reaches of the Whitechurch Stream and research conducted in the 1980's highlighted the stream as being a highly productive brown trout stream acting as an important nursery stream and reiterated by IFI consultation. Consultation response from the IFI confirmed that the Whitechurch Stream currently supports Brown trout.

While potential crayfish habitat was noted at sample site 3, given the lack of recorded of crayfish within the Dodder sub-catchment and barriers to access it is extremely unlikely crayfish are located within the Whitechurch Stream.

Table 4-4: Summary of Q-value results during Aquatic Survey

Site Survey Name	Location	Q-Value	Ecological Quality
Site 1 Owendoher River	Downstream Whitechurch Stream confluence	Q3-4	Moderate
Site 2 Whitechurch Stream	Along Whitechurch Road	Q4	Good
Site 3 Whitechurch Stream,	Northern end of St. Enda's Park	Q4	Good
Site 4 Whitechurch Stream	Southern end of St. Enda's Park	Q4-5	High

5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

All impacts are described in the absence of mitigation measures.

5.1 Construction Phase

5.1.1 Designated Sites

A separate Natura Impact Statement (NIS) (RPS 2020b) in support of Appropriate Assessment has been carried out to determine the potential for likely significant effects as a result of the proposed development. It has been concluded in the NIS, "*that there will be no potential for cumulative impacts arising in combination with any other plans or proposals, with the implementation of best practice and the recommended mitigation measures; it is considered that the proposed development will not adversely affect the integrity of downstream European sites*".

For similar reasons outlined there is no potential for impacts to nationally designated sites - pNHAs; due to the best practice construction methodology which forms part of the project design.

5.1.2 Habitats

The proposed development will involve the construction of flood protection infrastructure along a section of the Whitechurch Stream. Overall, the proposed development is relatively discrete in terms of area of land required for development (some additional temporary work areas during construction in the car park of St. Enda's Park).

There will be changes in vegetation composition, notable through loss of, and or pruning of tree and scrub vegetation but no appreciable loss of other habitat as the bulk of the works are linear in nature. Works will occur in close proximity to, and at times within the watercourse, but there should be no long-term alteration of instream habitat. Most of the habitats, by virtue of their location and are considered of Local (Lower) importance and an impact assessment is not provided in accordance with NRA evaluation criteria (**Appendix B**).

There will be a requirement to remove trees and bankside screening vegetation and sections of hedgerow and scrub to facilitate access and permit installation of the proposed flood measures. In the absence of mitigation, the alteration of the riparian zone and the loss of trees could result in a permanent, irreversible, negative impact significant at the local level. Furthermore, the loss of hedgerow and mature trees could result in a permanent, irreversible, negative impact significant at the local level.

5.1.3 Invasive Alien Species

A number of third schedule Invasive Alien Plant species occur along the watercourse, within the work area. There is potential for invasive species to further spread or become established in the intervening period between initial site surveys and commencement of construction works as a result of spread of vector material from areas outside the proposed development (e.g. other planning applications in the vicinity). Construction works and poor site practices could result in the spread of same both *in-situ* and *ex-situ*. Machinery, equipment and materials (including infected soil) that are being exported from the site for disposal could lead to the introduction of invasive species in other parts. This could lead to a significant impact at a County level.

5.1.4 Fauna

5.1.4.1 Badger

Potential mammal activity was investigated within the proposed development corridor (which was extended in St. Enda's Park in areas connecting the proposed temporary works compound and the watercourse. No badger setts were identified in the vicinity of the proposed development, although there is historical evidence of badger activity from St. Enda's Park.

While badger could be expected to occur within the wider landscape, particularly St. Enda's Park, the nature and location of the proposed development would not be expected to disrupt setts nor activity.

If new badger setts were to be established within the proposed development site in the interim, between pre-planning and construction, the proposed development could result in direct destruction of setts via excavations or via machinery driving over setts *en-route* to the construction area. Construction works could also lead to disturbance to the species at critical times in its lifecycle e.g. breeding season (December to June inclusive). Any storage or stockpiling of materials also has the potential to negatively affect badger setts within the footprint via direct destruction/disturbance.

In the absence of mitigation there could be a negative impact through direct destruction or disturbance to badger setts that might become established in the period between the surveys and commencement of construction. The proposed water infrastructure is generally all located on agricultural lands where machinery would currently be used, or lands adjoining existing roads that would be well used. If active badger setts were located in the development areas or immediately adjoin these areas at the time of construction then the impact would be permanent in terms of having to exclude a badger sett under licence from NPWS, however it is considered likely that badgers would move back into the area and re-establish setts once construction works cease reducing this impact to short term. It is considered likely that this short-term impact could negatively affect the conservation status of badger locally.

The limited removal of hedgerows and scrub in St Enda's Park may also impact on dispersal routes for badgers, however, the impact is likely to be temporary negative and not significant at a local level.

5.1.4.2 Otter

Otter are considered vulnerable given their reliance on fish food supplies, sensitivity to disturbance and pollution in addition to their short life cycle and small litter sizes (Channin, 2003). Of most importance are natal or breeding holting sites where Otters rear their young. Holting sites can be difficult to identify given that they can be unmarked by spraint, can occur in scrub, steep embankments and inaccessible areas. However, on occasion visible excavations in embankments are present and observations of adults frequenting a holting site can give away their presence. Otters can also use man-made structures for holting which include culverts, large crevices, bridge aprons and even abandoned buildings.

There is evidence of otter commuting/ foraging along sections of the Whitechurch Stream and the adjacent Owendoher River. The bulk of the activity was noted at the Owendoher River immediately downstream of the tie-in with the Whitechurch Stream, or in St. Enda's Park, upstream of the proposed development, where more semi-natural riverbank habitat, rather than the canalised watercourse for much of its length outside the Park.

Even though the riverbanks were shallow or eroded in places, some rooting trees noted in St. Enda's Park with potential holt and a confirmed couché (summer resting place) identified upstream of proposed works. Holts can be established a short distance removed from a watercourse, if suitable natural features allow, particularly if a breeding holt is involved, although in general otters confine their movements close to watercourses. The canalised nature of the watercourse (where much of the proposed development is destined to be undertaken) and proximity to exposed human activity along the Whitechurch Road is not conducive to holt establishment. Therefore, an impact of works to construct the flood relief works is likely to be temporary negative disturbance on the commuting route, but not significant at a local level.

In terms of the potential need to install sheet piling under certain retaining walls, this could result in a disruption to commuting territory and noise impact. Otter, like many mammals, are known to be sensitive to noise and vibration, and it could be argued that during the breeding season, that this could adversely impact on successful breeding. The works will likely occur outside the breeding season, although the impacts of disturbance through noise and vibration would be considered temporary negative given that the no habitation feature were recorded from the proposed works area and that Otter would not ordinarily be predicted to commute along the watercourse during working hours owing to the exposure of the watercourse and the background noise levels.

In the absence of mitigation, if a potential holt or couché were confirmed at the time of construction they could be negatively impacted by the works via disturbance or direct destruction. If active holts were located within 150metres of the proposed discharge the impact would be permanent in terms of having to exclude the holt under licence from the NPWS. However, it is considered likely that otters could re-establish holts in adjacent areas once construction works cease reducing this impact to short term. It is considered likely that this short-term impact could negatively affect the conservation status of otter locally. Therefore, a significant negative effect at the local level is concluded.

5.1.4.3 Bats

The usage of buildings and trees by individual or small numbers of bats cannot be ruled out on an annual cycle. There were a number of trees along the proposed development boundary identified as having moderate to high bat roost potential. No bat roosts were confirmed within the proposed development boundary and as such no negative impact in respect of roosts is predicted.

Notwithstanding the urban setting in which the proposed development is set and the absence of roost potential along much of the works areas where vegetation is to be removed, there remains the potential for roosts to occur in the Southern end of St Enda's Park. Given other studies have confirmed bat roosts elsewhere in the park, should any of these features require removal at construction stage there is potential for a negative impact on bats. If the features supported bat roosts and had to be removed as a result of the construction works, there would be potential for bat mortality. This could result in a long-term negative impact, significant at a local level.

Notwithstanding the fact that the surveys revealed an absence of roost potential outside the St Enda's Park, wooded vegetation along the river can act as commuting corridors for bats in the landscape. The proposed development requires the removal of trees along eastern side of the watercourse for the construction of the flood relief measures. In some cases, the vegetation to be removed will be in short sections, but elsewhere longer stretches of mature vegetation have been proposed. Given the level of activity recorded and the nature of the vegetation, which includes unvegetated clearings at housing estate entrances, removal of this commuting/foraging habitat is unlikely to impact on the conservation status of any bat species. In time, the proposed development, with natural re-establishment of vegetation along parts of the newly constructed flood measures could be expected and could likely act as a commuting corridor in time. Therefore, an impact is likely to be temporary, negative but not significant at a local level.

5.1.4.4 Other Mammals

Based on suitability of habitat and previous ecological records, there was evidence of some other mammals occurring within the park such as hedgehog, whilst for others such as pygmy shrew, red squirrel and pine marten, they might occur in St. Enda's Park, but would not be widespread in the wider area of the proposed development. The proposed development will involve the removal of scrub and trees alongside the Whitechurch Stream, see assessment under 'Habitats' in this section, the temporary disturbance of the understorey vegetation in places. In the absence of mitigation, if the species were present then negative impacts could arise via direct mortality or disturbance. It is considered that removal of narrow linear habitat would be permanent and largely irreversible (except for natural re-establishment), with disturbance from construction being short-term and reversible once construction is complete.

Given that these are mobile species and notwithstanding the urbanised setting, it is considered likely that pygmy shrew and hedgehog would re-establish in adjacent habitats and that the proposed development is extremely unlikely to negatively affect the conservation status of the species locally. Pine marten and red squirrel are unlikely to occur within any of the proposed development area, except possibly towards the wooded areas in St. Enda's Park. If anything, Grey squirrel which was recorded would influence the distribution of these species. Therefore, it is unlikely that a significant impact would arise.

5.1.4.5 Amphibians and Reptiles

No amphibians or reptiles were observed during site walkovers within the corridor of the proposed development, although it is recognised that amphibians, particularly frogs could occur in the wider landscape of St. Enda's Park. They are all mobile species and the proposed development does not involve the removal of any prime habitat for amphibians, such as ponds, although they may occur in hedgerows and damper areas of grassland within the proposed development site. Although lizards may utilise hedgerows, the removal of hedgerow is relatively limited. It is unlikely that significant negative impacts to reptiles will arise as a result of the proposed development.

In the absence of mitigation, there could be a negative impact on amphibians through direct mortality during construction works. Wheeled vehicles would most likely be required for any construction works. These will utilise the local public road network and lands adjacent to the proposed development which, with the exception of St. Enda's park, contains little suitable habitat for hosting frogs and frog spawn, and could directly trample frogs/frog spawn. Removal of vegetation also has the potential to result in direct mortality of frogs that utilise this habitat to shelter/hibernate. However, as frogs are generally widespread it is considered likely that they would move back into the area once construction works cease reducing this impact to short term negative. It is considered likely that this short-term impact could negatively affect the conservation status of frogs locally. Therefore, a temporary, significant negative effect at the local level is concluded.

5.1.4.6 Avifauna

All birds are protected under the Wildlife Act 1976 (as amended). If vegetation clearance is carried out during the breeding bird season (i.e. 1st March to 31st August), there is the potential for significant negative impacts to local breeding bird populations. During the breeding season noise, and notwithstanding the fact that increased human activity cannot be avoided owing to the location of the proposed development, vegetation removal/trimming, vibration and movement of construction vehicles associated with the construction phase of the proposed development has the potential to result in disturbance to local breeding bird populations. This could result in reduced breeding success of birds in habitats adjacent to or overhanging the watercourse and could potentially impact on the conservation status of bird species locally. Therefore, a significant effect at a local level is concluded.

The construction of the proposed development will require the removal of linear stretches of mature trees and some hedgerows/scrub and understorey vegetation. These habitats have the potential to provide breeding habitat for birds. Removal of these areas of habitat during the breeding bird season could potentially impact on the conservation status of bird species locally. The works will occur alongside the watercourse where Kingfisher and Dipper were noted commuting. Thus, the potential for construction generated disturbance beyond that which is normally experienced on the adjacent road cannot be ruled out.

The requirement to install sheet piling is classified as instream works and as such could only be carried out in the period July to September as advised by IFI. This would coincide in part with the statutory bird nesting season. Although vegetation identified to be removed would likely be done outside the bird nesting season, the disturbance of sheet piling at discrete locations in adjacent areas where riparian and semi-natural urban vegetation provides suitable resource. The installation of the sheet piles could result in disruption to local nesting birds by scaring them away, or if in the case of adjacent established nest where a first or subsequent brood was occurring, could result in aborted success or abandonment of nest.

Therefore, a significant effect at a local level is concluded.

5.1.5 Aquatic Environment

High levels of sediment which may become mobile during bankside and/or instream flood alleviation works can impact directly on salmonids (brown trout specifically within the Whitechurch Stream and Owendoher River). If of sufficient severity, salmonids could be affected by increased silt levels as gills may become damaged by exposure to elevated suspended solids levels.

If of sufficient severity, aquatic invertebrates may be smothered by excessive deposits of silt from suspended solids. Aquatic invertebrates make up a large proportion of salmonid food source and therefore excessive deposits of silt may cause an indirect impact through a loss of food resources.

Large quantities of organic fine sediment can reduce oxygen levels by increasing the biochemical oxygen demand (BOD). The effect of BOD is exacerbated by increased water temperature, which reduces the solubility of oxygen and increases microbial activity (Hendry, Cragg-Hine. 2003). Furthermore, increased macrophyte growth as a consequence of eutrophication can lead to oxygen sags due to the respiratory phase during darkness.

The installation of the sheet piling at discrete locations and outside the IFI designated fish breeding season would not result in a significant impact on local fisheries, given the nature of the works and the aquatic potential. However, where mobilised sediment finally deposits downstream, there is the potential for salmonid and lamprey spawning habitat loss.

Pollutants arising from poor on-site construction practices (e.g. accidental spillages, machinery movements) could potentially enter the Whitechurch Stream and the hydrologically connected Owendoher River. This could impact salmonid/lamprey populations directly through toxicity or indirectly through water quality and habitat alterations.

Therefore, in the absence of appropriate mitigation measures, there could be significant direct and indirect negative impact upon brown trout and lamprey spp. populations within the Whitechurch Stream and the hydrologically connected Owendoher River. Standard construction protective methodology has been recommended for the proposed development that includes the necessary measures to ensure protection of water quality and pollution control for sensitive habitats, including measures to control the release of silt laden run-off, please see **Appendix F** for further information.

5.1.5.1 Water Framework Directive Risk Assessment

Best practice construction methodology has been prepared for the proposed development that includes the necessary measures to ensure protection of water quality and pollution control for sensitive habitats, including measures to control the release of silt laden run-off, and which must be adhered to. It also requires development of a detailed construction methodology for bankside or in-stream works required for construction of flood relief measures or temporary crossing structures that may be required in consultation with IFI, to input into the development of the methodology and highlight any requirements, which may include specific designs, surveys in advance of works or requirement for licences. The methodology will be reviewed and agreed with the relevant statutory authorities in advance of any construction works taking place, specifically IFI, the County Council and any other authorities deemed necessary. Therefore, the proposed development will not introduce impediments to achieving good status to any waterbody if the best practice construction methodology is adhered to. This will also ensure no qualifying features are directly impacted and the development will not compromise the attainment of the necessary WFD Objectives.

The implementation of best practice construction methodology throughout the construction phase will ensure negligible residual impact from the proposal on waterbodies, and furthermore will prevent any knock-on detriment to the water bodies downstream.

5.2 Operational Phase

The proposed development is associated with specific flood alleviation measures on lands largely with semi-natural or disturbed habitats between the Whitechurch Stream and the existing public road. Activity along the

watercourse during operation will be limited to monitoring and/or maintenance/debris removal and would not be anticipated to be significantly different to the current level of activity along the watercourse.

5.2.1 Designated Sites

A Natura Impact Statement in support of the Appropriate Assessment process has been carried out to determine the potential for likely significant effects as a result of the proposed development. It has been concluded in the NIS Report (RPS 2020b) that the "proposed development, either individually or in combination with other plans or projects, will not have adverse effect on the integrity of any European site(s), given the implementation of mitigation measures outlined".

Similarly, for reasons outlined in the NIS report, no potential for impacts to pNHAs are envisaged, and any emergency or pollution event would be extremely unlikely event. Also, it is unlikely to result in significant negative impacts to water quality. Therefore, during operation of the proposed development no significant negative impact on any pNHA is anticipated.

5.2.2 Habitats

For reasons outlined in **Section 5.2.1** under pNHAs above, water quality will be maintained during operation of the proposed development. It is not considered likely that during operation of the proposed development that there would be any significant negative impact on habitats, particularly aquatic habitats within the footprint of the development or downstream habitats.

Over time the loss of wooded vegetation alongside the Whitechurch Stream will be a) compensated for as new planting becomes established and b) other vegetation, particularly in privately-owned gardens matures and overhangs the watercourse.

5.2.3 Invasive Alien Plant Species

Notwithstanding the treatment of Invasive Alien Plant Species (IAPS) within the proposed development during the construction phase, the potential for vector material from upstream infestations to become established in suitable areas within the operational areas of the proposed development cannot be ruled out.

South Dublin County Council currently undertake monitoring (and treatment programme of the Whitechurch Stream (within their Administrative Boundary) and will continue same in the years following the completion of the flood alleviation works (*SDCC pers. comm.).* Thus, it is not considered likely that during the operation of the proposed flood relief works that there would be any significant negative impact as a result of IAPS.

5.2.4 Fauna

5.2.4.1 Badger

It is not considered likely that during operation of the proposed development that there would be any significant negative impact on badger populations.

5.2.4.2 Otter

The installation of new infrastructure, specifically trash screens, could dependant on the design hinder movement unless a flood period results in debris locking culverts. There may also be localised reduction in riparian accessibility alongside the watercourse owing to the installation of sheet piles to enable dry passage for otter, particularly in urban areas such as alongside the Whitechurch Stream. Owing to the location of the works, there will be no change to known otter habitation features on the Whitechurch Stream and otter could likely continue commuting along the watercourse. Thus, it is considered unlikely that during operation of the proposed development that there would be any significant negative impact on otter.

5.2.4.3 Bats

With the exception of debris screens and the woodened debris trap/access slipway, the proposed development will not greatly alter the route of the water watercourse nor the physical infrastructure e.g. culverts currently in existence. No lighting is proposed as part of the development. However, the removal of trees could influence light spill from adjacent residential properties and from on road lighting. Natural re-establishment by tree species such as Sycamore and Willow and Birch would not be expected for some years into the operation of the proposed development. Thus, it is considered likely that during operation of the proposed development that there would be any significant negative impact on bats.

5.2.4.4 Other Mammals

It is not considered likely that during operation of the proposed infrastructure that there would be any significant negative impact on any other mammals.

5.2.4.5 Amphibians & Reptiles

It is considered unlikely that during operation of the proposed development that there would be any significant negative impact on amphibians and reptiles.

5.2.4.6 Avifauna

There is a requirement for the removal/trimming of tree and scrub vegetation alongside the Whitechurch Stream to facilitate the construction and thereafter reduce the potential for debris blockage from loose vegetation. However, the loss of vegetation should in part be compensated for by the presence of considerable suitable vegetation in the immediate vicinity of the proposed development.

Furthermore, additional landscape planting at designated areas to account for the loss of mature vegetation could potentially provide additional nesting habitat for breeding birds, over time as it matures. It is unlikely that the operation of the proposed development would result in any significant impact on local breeding bird populations.

5.2.5 Aquatic Environment

In the absence of mitigation there is potential for impacts during operation, in particular with the proposed installation of trash/debris screens. IFI guidance (2016) prohibits the installation of trash screens on culverts, particularly newly built culverts, and alternative methods of reducing potential blockages caused by accumulating debris must be considered. This is because inappropriately designed screens have the potential to block fish passage. In the current project this could block brown trout/lamprey movements (e.g. shallow depths, high velocities, culvert perching) along the Whitechurch Stream.

Culverts are already in place on the Whitechurch Stream and as space restrictions, identified in the preliminary design report (OPW 2019a), confirm limited alternative solutions. Following discussions with the project ecologist and IFI it has been determined that the free space beneath the proposed trash screen i.e. the unhindered gap between the concrete and the river base shall be 300mm. This level is expected to control the passage of larger debris into the long culverts but would not hinder passage of fish. Furthermore, a minimum clear spacing of 140mm between each of the upright bars of the trash screen is considered suitable for many fish species other than salmon (Environment Agency, 2009). Regular cleaning of screens would be required and also emergency response cleaning in the event the screens become blocked during a flood. In the absence of proper maintenance planning the potential for fish movement blockage due to the build-up of debris cannot be ruled out. Blockages can impede fish passage via the physical debris barrier or through the creation of shallow flow downstream from debris damming. Irregular removal of debris has the potential to release sediment built up behind the debris causing temporary water quality and habitat degradation.

All culvert works will be done in accordance with best practice measures within the preliminary CEMP and in accordance with IFI guidelines and IFI consultation and requirements to date. Trash screens will be fitted with computer systems to send alerts when debris removal is required.

Local Authority staff will be responsible for debris removal which will involve regular maintenance. Therefore, it is not considered likely that during operation of the flood alleviation scheme measures that there would be any significant negative impact on the aquatic environment.

6 MITIGATION

6.1 Construction phase

The mitigation measures described below have been developed to minimise negative impacts where they are likely to arise on the identified ecology of the Whitechurch Stream as a result of the proposed development. The intent of the measures has been reproduced in the preliminary Construction Environmental Management Plan (included as an **Appendix G**). The appointed contractor will be obliged to include all mitigation measures in this EcIA and the NIS as appropriate into the final CEMP, for the approval of the Local Authority and Inland Fisheries Ireland (where required).

Furthermore, the contractor will appoint a suitably qualified person, or persons, to the role of Environmental Clerk of Works (EnCoW) to monitor the construction works. The EnCoW will work closely with the contractor's site supervisors to monitor activities and ensure that all relevant environmental legislation is complied with and that the requirements of the finalised CEMP are implemented. The EnCoW will have the authority to review method statements, oversee works and instruct action, as appropriate, including the authority to require the temporary cessation of works, where necessary. The EnCoW may engage a suitably qualified ecologist (as necessary) to supervise any ecologically sensitive elements of construction works, as advised by the EnCoW. This should include a review of any ecological mitigation and supervisory requirement arising from the Ecological Impact Assessment (and NIS as appropriate).

6.1.1 Designated Sites

The design has from the outset been mindful of the ecological sensitivity of the Whitechurch Stream and an iterative design process between the project designers and the ecologists has incorporated a number of guidance principles or measures to ensure that impacts to biodiversity are avoided in the first instance and minimised through design measures.

The preliminary CEMP (**Appendix G)** includes standard design and best practice measures in this regard to ensure the protection of the downstream European sites and their Qualifying Interests (QIs) and Special Conservation Interests (SCI's) including the practical reduction of the release of silt and other pollutants, and the ensuring that third schedule IAPS are not spread.

No additional mitigation required.

6.1.2 Habitats

Habitats within the footprint of the proposed development identified as sensitive ecological receptors include the Whitechurch Stream itself and the mature wooded vegetation in St. Enda's Park and localised/individual mature trees alongside the watercourse.

Where construction activity takes place within or adjacent to the watercourse it is important that activity is restricted to the footprint required for construction of the proposed development. Similarly, activities within or adjacent to wooded habitat types in St. Enda's Park must be clearly demarcated with temporary fencing or another suitable method to restrict access to areas adjacent to the works area. Vegetation should only be removed where absolutely essential and within the appropriate season (or as advised by Environmental Clerk of Works). The amount (and number) of trees to be removed to facilitate construction of the proposed flood alleviation works and safe access routes to works areas etc. for will be kept to a minimum.

A key step in preventing alteration of water quality has been through the design measures including the installation of proven measures to ensure that silt and other pollutant cannot enter the watercourse. The design and location of these measures will be included in the final CEMP and will include for measures where waters from excavations etc must be returned to the watercourse.

Notwithstanding the need for safe access, trees and hedgerow (that are to be retained) adjoining/adjacent to the construction area shall be protected from root damage by machinery by an exclusion zone/root protection area. This is generally calculated as an area equivalent to a circle with a radius of 12 times the

stem diameter at breast height, or more roughly, it should extend to below the edge of the outermost branches of the tree. Such protected trees shall be fenced off by adequate temporary fencing prior to other works commencing. NRA guidelines on the protection of trees and hedges prior to and during construction should be followed (NRA, 2006b). Owing to the likely narrow nature of the works area, this may not always be practical. The appointed contractor shall be advised by an arboriculturalist on an appropriate approach in this regard.

No soil, spoil, construction materials or rubbish will be stored or tipped nearby, and no construction plant or vehicles will be parked within the spread of existing/retained trees or hedgerows.

When dealing with habitats, it is preferable that enhancement for biodiversity gain be considered in the first instance, rather than as mitigation for something to be lost. Based on the project corridor and adjacent built infrastructure constraints, there is limited scope for new creation or restoration. Thus, mitigation is the next phase, although it is recognised that replanting will take a number of years to establish and provide any biodiversity value.

Based on the findings of the tree survey and the landscape and visual impact assessment, there are few trees, from an arboricultural perspective that are characterised as high quality trees. Most are classified as "Moderate" or "Low" ranking with some being classed, from an arboricultural perspective, as "U" unsafe to retain. Notwithstanding this fact, all such vegetation can have an intrinsic biodiversity value. Despite an iterative design process, whereby the retention of trees is important, there are areas where unavoidable tree loss tree is proposed.

A review of SDCC tree planting schedule in spring 2019 in the vicinity of the proposed works indicates the following species are being planted.

- *Malus* "Royalty";
- *Sorbus aria* "majestica";
- *Acer* "vanessa";
- *Betula pubescens;*
- *Ulmus glabra;* and
- *Acer pseudoplatanus* "Spaethii"

In respect of the current project, the following species are suggested (**Table 6-1**), which are cognisant of the species that are being specified by the Local Authority in 2019. The suggested species, which are neither tall trees nor produce excessive leaf litter are considered ideal for reinstating in respect of removed trees. The list comprises trees and shrubs that are suitable for urban settings. Sycamore has not been listed owing to its naturalised status and potential to rapidly establish, and accounts for many of the trees to be removed along the watercourse edge.

In keeping with the Local Authorities tree management policy[13], and as part of the iterative design assessment process, this list was considered as part of the landscape and visual assessment (RPS 2020c) of the proposed development and refined to take account of the actual areas where compensatory planting is proposed. Initially, two potential areas for replanting of trees had been identified with South Dublin County Council, but these have been increased with vegetation to be reinstated in four areas alongside the watercourse following completion of the project. The areas are as follows:

- St Enda's Park – comprising a small area of shrub planting and three multi-stem birch trees (*Betula jaquemontii*) introduced to screen the proposed debris management poles and slipway within the stream at St Enda's Park;

[13] SDCC (2015). Living with Trees: South Dublin County Council's Tree Management Policy 2015-2020.

- Whitechurch Road – South of St Gatiens Court – comprising a linear area of shrub planting and grass verge (low maintenance seeding) and 7 no. extra heavy standard trees (*Tilia cordata*). Spring flowering bulbs feature in the grass verge;
- Whitechurch Road – North of St Gatiens Court – comprising a linear area of shrub planting and grass verge (low maintenance seeding) and 5 no. extra heavy standard trees (*Tilia cordata*). Spring flowering bulbs feature in the grass verge; and
- Whitechurch Road –within existing open space immediately south of the junction between Whitechurch Road and Willbrook Lawn and featuring 5 no. extra heavy standard trees (*Prunus* 'Amanogawa').

Additional, tree planting will take place at a range of locations as directed by South Dublin County Council. The extent of the proposed planting will be determined, having regard for the extent of tree and woody vegetation that will have to be removed to facilitate Whitechurch Stream FAS. This will be in accordance with South Dublin County Council objectives in their recently published Climate Change Action Plan 2019-2024 (SDCC 2019).

Table 6-1: Potential List of Replacement Trees

Common Name	Scientific Name	Flowering Period
Hazel	*Corylus avellana*	Feb-April
Birch	*Betula pubescens*	April-June
Alder	*Alnus glutinosa*	April-June
English Elm	*Ulmus procera*	March to April
Willow	*Salix* spp.	March to May
Blackthorn	*Prunus spinosa*	Mar to May
Hawthorn	*Cratageus monogyna*	April to June
Wild Cherry	*Prunus avium*	April to May
Rowan	*Sorbus aucuparia*	May to June
Whitebeam	*Sorbus aria*	May to June
Elder	*Sambucus nigra*	May to June
Crab Apple	*Malus sylvestris*	May – June
Wild Privet	*Ligustrum vulgare*	May to July
Holly	*Ilex aquifolium*	May to August
Wild Rose	*Rosa canina*	June to August
Honeysuckle	*Lonicera pericylmenum*	June to August
Bramble	*Rubus fruticosus* agg.	May to September

Based on discussions with the Local Authority, pollinator friendly species are recommended in accordance with guidance[14] and All Ireland Pollinator Plan[15] and the species mix should attempt to include the use of native species of local origin (as far as is practical) and sourced from nurseries who supply stock certified for the Native Woodland Scheme. However, from a practical management perspective, the list of species that might be considered for planting is constrained by practical management concerns. Replacement soft landscaping, comprising small areas of shrub planting and trees will be located within St Enda's Park.

Specifying the nursery stock for the four compensatory areas is provided in the landscape and Visual Assessment report and the locations of the replanting shown on accompanying drawings appended to that

[14] SDCC (2017). Biodiversity and the Planning Process.

[15] NBDC (2015). All Ireland Pollinator Plan 2015-2020

report (RPS 2020c). As part of the finalised CEMP, a management specification for the proposed planting will be developed.

6.1.3 Invasive Alien Plant Species

Although a number of IAPS have been recorded from within the proposed development corridor, a key ecological consideration is the presence, and indeed proximity of Japanese Knotweed (*Fallopia japonica*) to the Whitechurch Stream. There are a number of stands, all of which are within areas of proposed flood alleviation measures. At present they are subject to chemical treatment by the Local Authority. However, given the proximity to the watercourse and the need to excavate some ground to allow for the installation of proposed development, this option is not considered feasible, as this process can take up to 5 years before certainty of eradication. For this reason, an outline invasive species management plan (ISMP) has been prepared in respect of the likely eradication regime (**Appendix H).**

The presence of the three-cornered garlic in close proximity to the largest stand of Japanese knotweed will also require careful management as the spread of the bulbs is to be avoided. Thus, similar measures as outlined in **Appendix H** may be applicable including removal of infected soil to a licenced facility.

Prior to undertaking any construction works of the proposed development and certainly if a growing season passes between grant of planning permission and commencement of works, the appointed contractor must engage a suitably qualified specialist to undertake an preconstruction invasive species survey, within the appropriate botanical survey season (April to September), of the development area to satisfy themselves as to the presence of IAPS and any additional establishment. Furthermore, the appointed contractor should update the outline ISMP and produce a detailed construction methodology which must include best practice measures in relation to invasive species, with reference to biosecurity, preventing introduction and/or spread of invasive species. These should be included in the finalised CEMP.

Where any new record of IAPS is noted and confirmed during pre-construction or construction surveys, they should be, with the approval of South Dublin County Council, notified to National Biodiversity Data Centre for inclusion on its database.

6.1.4 Fauna

All records of protected species that are identified during pre-construction or monitoring surveys should be, with the approval of South Dublin County Council, notified to National Biodiversity Data Centre for inclusion on its database.

6.1.4.1 Badger

No badger setts were identified within the proposed works areas and badgers would not ordinarily be impacted by any of the proposed works. One potential badger sett was identified in 2019 in St Enda's Park upstream of the within the proposed development, although removed from any works associated by the proposed development. Based on the evidence from 2019 and 2020 surveys, it is likely that badger are not currently residing in the identified sett, but nonetheless could be residing elsewhere in St. Enda's Park.

Notwithstanding this fact, badger(s) could establish new setts in the intervening period between site survey and commencement of construction of the proposed development. Precise mitigation measures for badger will be informed by a preconstruction badger survey prior to commencement of works to identify any setts and confirm the level of activity and breeding status of setts at that time. The preconstruction survey will include the proposed development corridor and the proposed site compound in the car park of St. Enda's Park.

The following measures are proposed:

- Prior to construction works commencing the contractor will engage the services of a suitably qualified ecologist to conduct a pre-construction badger survey of the proposed development area, including habitat features within 50m of same;

- If an active sett is encountered, mitigation measures as outlined in national *Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes* (NRA, 2005) will apply. In brief these are, but are not limited to:
  - During the breeding season (December to June inclusive) a clearly marked exclusion zone of 50m should be established around the active sett and no works should take place within this exclusion zone;
  - Outside of the breeding season (July – November inclusive) a clearly marked exclusion zone of 30m should be established around the active sett and no heavy machinery used within this exclusion zone. Lighter machinery (wheeled vehicles) should not be used within 20m of a sett entrance and light work such as digging by hand should not take place within 10m of a sett entrance;
  - Any works in and around setts must be supervised/carried out by a suitably qualified and experienced ecologist;
  - If the above detailed exclusion zones cannot be adhered to and disturbance to setts is deemed likely during the construction phase, then the EnCOW will contact the local NPWS conservation ranger will be contacted. This may require an application for a "Letter of non-opposition" from the NPWS to exclude the sett (Derogation licences no longer issued, as advised by NPWS). If required, any further mitigation measures required will follow those outlined in the *Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes* (NRA, 2005) and will be agreed with the NPWS at the time of licence application.

6.1.4.2 Otter

There are a number of closely spaced otter habitation features – 2 X potential holt features in close proximity, (the evidence from the 2020 site visit suggests currently inactive as well as a confirmed couché identified within the proposed development boundary. These features are in excess of 150 upstream of the proposed works. Another shallow tunnel at water level near Sarah Curran Bridge is not considered to be used by Otter, rather mink owing to the concentration of malodorous faecal material nearby, although it is within close proximity of a proposed pedestrian bridge replacement.

Otters do not normally maintain multiple holts in their territory and rarely do populations overlap. The potential holts are upstream of the proposed works area and as such should not be directly impacted by the works and the construction of an artificial holt is not proposed. Neither is there a requirement at this time to seek a derogation licence to temporarily close holts.

The EnCoW shall maintain a watching brief until such time that mobilisation of plant and personnel is completed along the proposed development. This is particularly important in respect of works associated with sheet piling, replacement of pedestrian bridge and installation of trash screen as, disruption to commuting pathways could occur if not sensitively managed.

While commuting territories along the Whitechurch Stream are unlikely to be significantly impacted in terms of physical impediments, it is unlikely that new holts would be constructed within the proposed works area given the nature of the watercourse and the level of background disturbance outside St Enda's Park. However, the establishment of new holts cannot be ruled out in the interim between planning and construction. In the interest of best practice and to ensure compliance with legal protection afforded to otters the following measure is proposed:

- Prior to construction works commencing, the appointed contractor will engage the services of a suitably qualified ecologist to conduct a preconstruction otter survey of the proposed development including downstream of the tie-in to the Owendoher River. The survey should be undertaken in accordance with *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (NRA, 2006a); and
- If an active otter holt is confirmed within 150m of the proposed works, then the local NPWS conservation ranger will be contacted. This may require an application for a derogation licence from the NPWS to exclude the otter holt. If required, any further mitigation measures required will follow those outlined in the *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (NRA, 2006a) and will be agreed with the NPWS at the time of licence application.

6.1.4.3 Bats

While the disturbance and/or fragmentation along commuting/foraging routes is recommended, the loss of trees, mostly self-seeded broadleaf species alongside the Whitechurch Stream is unavoidable, there should be no loss of roosting features. There will be a potential loss of or at least interference with to commuting/foraging habitat for bats in the landscape.

The following general mitigation applies.

- In the unlikely event that bats are found on the proposed development sites during construction works, works will immediately cease in that area and the local NPWS conservation ranger will be contacted. The bats will be removed by hand by a suitably qualified and licenced bat surveyor, under licence from the NPWS.
- Existing hedgerows and trees should be retained where possible and site boundaries replanted where feasible. Through an iterative process, the bulk of the trees within the proposed developments footprint are being retained, although openings at housing estates and light spill from existing lighting will not change. Replacement planting has been proposed, where practical, to compensate for trees and vegetation lost as a result of the proposed development. This replanting will take some time to mature. Treelines are of far greater benefit to bats than single, free-standing trees or shrubs, as they provide corridors for movement, avoidance of light and predators, a better shelter belt for the clustering of insects and provide greater substrate for insect breeding and feeding (bats food source). Broadleaved trees are generally more beneficial to bats. Ideally native and local plant species should be used in replanting, although given the nature and setting of the proposed development there is limited scope for species diversity. The species used will likely be landscaping variants of native species and preferably of local origin, ideally sourced from nurseries who supply stock certified for the Native Woodland Scheme.
- All existing trees adjacent to the proposed development boundary that are to be retained shall be protected from root damage by machinery by means of an exclusion zone of at least seven metres or equivalent to canopy height. Such protected trees shall be fenced off by adequate temporary fencing prior to other works commencing as required by NRA guidance (NRA 2006b).
- All trees requiring removal in the proposed development area should be felled and left in place on the ground for 24 hours prior to removal/disposal to allow any wildlife beneath foliage to escape overnight.
- In general, artificial light creates a barrier for commuting bats so lighting should be avoided where possible. If any external lighting is required to facilitate night-time working or security lighting in the construction areas, it must be sensitive to the presence of bats commuting in the area. Directional lighting (i.e. lighting which is focussed on work areas and not nearby countryside) shall be used to prevent overspill. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only. Lighting levels should be the minimum required for health and safety requirements, and vertical light spill at light sources should be below 3 metres to avoid identified or potential bat flight paths. The location and design of any new or additional security lighting, if required shall be cognisant of the recent BCT (2018) guidance and will be approved by the EnCoW (or retained ecologist with experience in bats).

6.1.4.4 Amphibians & Reptiles

The Environmental Clerk of Works shall maintain a watching brief for frog spawn (and frogs) throughout construction works, but particularly if works being carried out when spawn is present (usually January to early march). If frog spawn is identified, this should be translocated, under derogation licence issued by the NPWS, by a suitably qualified and approved scientific agent, to an alternative suitable habitat, ideally in slow moving/stagnant water. It is suggested, that with the approval of the OPW parks staff at St. Enda's, that slow-moving sections of the pond, upstream of the proposed works might be suitable. The final decision would be dependent on the licence conditions.

6.1.4.5 Avifauna

To limit the potential impact of construction on breeding birds, any vegetation removal/trimming (including individual trees, treelines and hedgerows) will not be permitted during the breeding bird season (1st March to 31st August inclusive). All retained vegetation within the works corridor shall be kept clear of machinery and materials shall not be stored against them as per the recommendations in BS5837: 2012. If this seasonal restriction cannot be accommodated, a suitably qualified ornithologist will be required to confirm presence/absence of breeding birds prior to removal/trimming and seek a derogation licence from NPWS as necessary.

There will be some increase in noise and disturbance, above background levels as a result of the proposed works, although in general nothing that might be considered excessive in terms of the urbanised nature of the corridor. It is suggested that breeding birds in the locale would be habituated to traffic and human disturbance along the Whitechurch Road and adjacent residential areas. There is limited potential for screening of the works from adjacent retained vegetation.

Notwithstanding this fact and to reduce excessive disruption and/or displacement, the selection of plant machinery with low inherent potential for generation of noise and/or vibration is recommended. All construction plant and equipment to be used at the site will be modern equipment and will comply with appropriate regulations.

One area of disruptive noise relates to the installation of the proposed sheet piling. It is seasonally constrained by IFI requirements that instream works be carried out between July and September, which overlaps in part with breeding bird season. It is proposed that to reduce the disruptive impact of the sheet piling on nesting birds, that this element of the proposed works be programmed to be carried out in the final two months of the Fisheries required window e.g. August and September. This is at the end of the nesting season (August) and as such most birds would have bred and the young having had a chance to fledge.

6.1.5 Aquatic Environment

Owing to the identified sensitivity of the Whitechurch Stream and its connection to the Owendoher and ultimately Dodder River, the design and operation for instream (or proximal works) shall be seasonally dependant as per IFI consultative discussions. Instream works will be limited to the period July to September this will include for the installation/removal of all temporary crossings, watercourse re-alignments etc.

No works will be permitted until such time that the design and methodology is approved by Inland Fisheries Ireland (and NPWS as appropriate).

The preliminary Construction Environmental Management Plan (**Appendix G**) methodology details a number of guidance documents, protective measures and requirement for development of detailed construction methodologies for bank side works.

- In order to minimise excessive disturbance to the Whitechurch Stream, all works shall be in the first instance be cognisant of the mitigation measures listed in the preliminary CEMP prepared for the project;
- The construction works shall be carefully scheduled to minimise activity in the sloped ground in the vicinity of the watercourse. And to ensure that instream works are kept to a minimum; and
- All works in the vicinity of the Whitechurch Stream shall be monitored by the EnCoW to ensure that all protection measures listed above and also in **Section 4** of the preliminary CEMP as appropriate and emergency responses (where such is required) are enacted.

6.2 Operational Phase

6.2.1 Designated Sites

Unless, already in place, a method statement for all routine or emergency maintenance operations that might be required as a result of routine inspections of the flood alleviation works should be developed for the site. Although outside of the construction phase, the protective measures shall follow all appropriate measures detailed in the final CEMP. Furthermore, a log of all inspections and/or maintenance operations should be maintained by the Local Authority and or OPW as appropriate. This log should also detail responses to any emergency situation so that Local Authority/OPW and its staff can have an immediate understanding of the lead up to any emergency and therefore respond to the procedures with informed improvements if required.

No additional mitigation measures are required.

6.2.2 Habitats

South Dublin County Council have advised that they will seek a landscape maintenance plan that will cover a five (5) year period to ensure successful establishment of newly planted vegetation. Thereafter, the management of the public realm will be under the operational remit of Local Authority Staff. Every effort should be made to ensure that all newly planted stock is maintained and replaced as necessary in accordance with industry norms and/or BS 4428.

No additional mitigation measures are required.

6.2.3 Invasive Alien Plant Species

The Local Authority will resume the monitoring for IAPS in its Administrative Boundary and any subsequent course of action that was in place prior to the commencement of construction e.g. monitoring of the entirety of the watercourse within their administrative boundary and treating as required.

It is recommended that operational works be incorporated into a Standard Operating Procedure (SOP) or similar for the Local Authority. Annual surveys of the Whitechurch Stream should document the location of all Third schedule IAPS so that the efficacy of the treatment methodology can be reviewed as necessary.

Where any new record of IAPS might be confirmed during operational monitoring, they should be notified to National Biodiversity Data Centre for inclusion on its database.

No additional mitigation measures are required.

6.2.4 Fauna

6.2.4.1 Badger

No additional mitigation measures are required.

6.2.4.2 Otter

It is important that inspections for accumulations of debris are regularly removed from in front of trash screens, so as to reduce potential impediment of otter commute and reduce the need for them to traverse exposed overland to access the watercourse elsewhere.

No additional mitigation measures are required.

6.2.4.3 Bats

The bulk of the landscaping works where appropriate, including the reinstatement of planting is should be implemented in the first growing season following grant of planning (if outside the immediate works area) or in the first season post construction. Thus, the retained or existing mature urban landscape will provide some

foraging and commuting routes for bats along the watercourse. Over time, it would be hoped that this might be reinforced by the proposed new planting.

Artificial light creates a barrier for commuting bats, so additional lighting should be avoided where possible. The only lighting that might be used by the project will be operational lights during winter months. It is unlikely that they would be operational at night-time, given the project parameters. However, this lighting and any security lighting, where needed, must be sensitive to the presence of bats in the area. Directional lighting (i.e. lighting which only shines on work areas and not nearby countryside) shall be used as far as is practical to prevent overspill (and should include for accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only). Lighting levels should be the minimum required for health and safety requirements, and vertical light spill at light sources should be below 3m to avoid potential bat flight paths.

6.2.4.4 Other Mammals

No additional mitigation measures are required.

6.2.4.5 Amphibians & Reptiles

No additional mitigation measures are required.

6.2.4.6 Avifauna

No additional mitigation measures are required.

6.2.5 Aquatic Environment

While the OPW currently have a Standard operating procedure (SOP) for drainage[16], vegetation clearance /debris removal during the operational phase will be undertaken by the Local Authority. It is recommended that a documented SOP or similar be developed by the Local Authority, if not already done, to account for biweekly monitoring and debris clearance operations in respect of scheduled or unscheduled works within/alongside the Whitechurch Stream.

No additional mitigation measures are required.

6.3 Do Nothing Scenario

The likely do-nothing scenario for the proposed development is the continued flow of the Whitechurch Stream with occasional flash flooding and potential flooding event. It could have implications for local residents and road users.

It is not possible to quantify the potential impacts to biodiversity as a result of a ‘do-nothing’ scenario.

6.4 Worst Case Scenario

The worst-case scenario related to the proposed development, although highly unlikely, would be the alteration of the hydrological regime, resulting in the deterioration of the Watercourse itself and immediate alteration and negative impacts within, and downstream in the ecologically sensitive Dodder catchment.

An accidental pollution incident during construction and/or operation of a magnitude that would result in mortality of aquatic and riparian species and detrimental impacts to aquatic habitats may occur. The outline construction environmental management methodology details the measures that must be adhered to prevent impacts to water quality ensure that this scenario remains unlikely.

[16] OPW 2011 Arterial Drainage Maintenance Environmental Management Protocols & Standard Operating Procedures

6.5 Cumulative Impacts

Legislation, guidance and case law requires that cumulative effects with other plans or projects are considered. On this basis, a range of other plans and projects were considered in terms of their potential to have in-combination effects with the proposed development.

The area adjacent to the proposed development are zoned as 'Existing Residential' and 'Open Space, Park' under the South Dublin County Council Development Plan 2016 -2022 with targets to protect and/or improve residential amenity and preserve/provide for open space and recreational amenities.

Potential for in-combination impacts as a result of the proposed development and the infrastructure projects are listed in **Tables 6-2** and **6-3** and mainly relate to degradation of habitat, disturbance species, fragmentation of ecological corridors, and cumulative impacts on water quality.

A search of An Bord Pleanála's website[17] was completed to identify any relevant applications, including Strategic Infrastructure Development (SID) and Strategic Housing Development (SHD) in the past three years, in close proximity to the proposed development. No relevant projects were identified.

A number of planning applications have been lodged with SDCC for lands in proximity to the proposed development and these have potential to result in surface water and/or groundwater pollution. The bulk of the projects are consented and include measures to ensure pollution to surface water or groundwater does not occur. However, two of note remain live in the planning system. These include the Capri Site (Reference PL06S.235823 and SD09A/055 and others) and the Maxol Petrol Station Site (Reference SD16A/0247).

In relation to the Capri site there is a possibility for in-combination pollution to surface water or groundwater and spread of invasive species to occur by virtue of its proximity to the Whitechurch Stream (10m) and given that in addition to provision of residential units, the applications include reference to 'replacement of existing bridge' and changes to 1.2m flood walls as part of the proposed works. This would take place along Whitechurch Stream. While the original application was granted subsequent modifications to same are still in the planning system and as of March 2020, additional information on drainage and invasive species ahs been south by the PA.

Another development SD16A/0247 was consented in April 2017 but has not yet commenced. It occurs along and atop the culverted sections of the Whitestream Stream at the former Maxol petrol station on Whitechurch Road. Planning conditions include the provision of detailed water pollution and drainage plans which must be agreed with the planning authority and plans for the identification and management of IAS including reference to survey of adjacent sites.

It is recognised that the above-mentioned projects have the potential to result in cumulative impacts if carried out simultaneously or without the benefit of planning controls however this is considered unlikely given the evidence of ongoing control by the planning authority in these live applications.

No other pathways have been identified by which any plan or project could have a likely significant in-combination effect.

6.6 Predicted Residual Impact

Following the implementation of the mitigation measures outlined above, it is considered unlikely that there will be any residual impacts as a result of the proposed development.

[17] http://www.pleanala.ie/lists/2018 - 2013/sid/index.htm & http://www.pleanala.ie/shd/applications/CurrentApplications/CurrentApplications23Apr.pdf (An Bord Pleanála has confirmed that it does not keep an accessible online repository of Strategic Housing Developments).

Table 6-2: Cumulative Impacts Associated with the Proposed Development

Planning Application Reference	Applicant Name & Proposed Location	Names of the Plan or Project	Potential Cumulative or In-Combination Impacts
Plans			
N/A	N/A	The National Development Plan 2018-2027	The National Development Plan 2018-2027 (Government of Ireland, 2018) includes projects with potential to act in-combination with the proposed development in the South Dublin Area (e.g. Vartry Water Supply Scheme). However, because these projects and plans are subject to environmental law and regulations, it is not likely that they will create in-combination effects with the proposed development.
N/A	N/A	South Dublin County Council Development Plan 2016-2022	The South Dublin County Council Development Plan 2016-2022 (South Dublin County Council, 2016) sets out several relevant biodiversity objectives, including: - C12 Objective 2: To maximise the leisure and amenity resource offered by each of the County's parks through the promotion of Management Plans that provide for the continued improvement of the park setting, biodiversity and recreational facilities. - Green Infrastructure: It is the policy of the Council to promote and develop a coherent, integrated and evolving Green Infrastructure network in South Dublin County that can connect to the regional network, secure and enhance biodiversity, provide readily accessible parks, open spaces and recreational facilities. - Infrastructure and Environmental Quality: It is the policy of the Council to manage surface water and to protect and enhance ground and surface water quality to meet the requirements of the EU Water Framework Directive. Several potential larger scale infrastructural projects within the county are highlighted as follows: - Whitechurch River Flood Alleviation Scheme (the proposed development) as part of the Dodder CFRAMS - Consolidation and sustainable intensification of development to the east of the M50 and south of the River Dodder. - Dodder Greenway - Upgrade of the Dodder Valley Sewerage Scheme to increase drainage capacity in the south of the County. There is potential for in-combination impacts as a result of the proposed development and the infrastructure projects listed above, mainly in relation to water quality and water supply, if both the proposed development and the infrastructure projects resulted in impacts to

Planning Application Reference	Applicant Name & Proposed Location	Names of the Plan or Project	Potential Cumulative or In-Combination Impacts
			same. However, such projects will also be subject to the appropriate environmental assessments to avoid such impacts and adhere to the biodiversity and water quality objectives listed above.
N/A	N/A	River Basin Management Plan for Ireland 2018 – 2021	The River Basin Management Plan for Ireland 2018 – 2021 (DoHPLG, 2018) sets out the condition of Irish waters and a summary of status for all monitored waters in the 2013 – 2015 period, including a description of the changes since 2007 – 2009. The objectives of the RBMP are to - Prevent deterioration; - Restore good status; - Reduce chemical pollution; and - Achieve water related protected areas objectives Nationally, both monitored river water bodies and lakes at high or good ecological status, appear to have declined by 3% since 2007 – 2009; nevertheless, this figure does not reflect a significant number of improvements and dis-improvements across these waters since 2009. Provisional figures from the EPA suggest that approximately 900 river water bodies and lakes have either improved or dis-improved. In addition, the previously observed long term trend of decline in the number of high-status river sites has continued. Chapter 5 of the RBMP presents results of the catchment characterisation process, which identifies the significant pressures on each water body that is *At Risk* of not meeting the environmental objectives of the WFD. Importantly, the assessment includes a review of trends over time to see if conditions were likely to remain stable, improve or deteriorate by 2021. This work was presented in the RBMP for 81% of water bodies nationally, which had been characterised at the time. 1,517 water bodies were classed *At Risk* out of a total of 4,775, or 32%. An assessment of significant environmental pressures found that agriculture was the most significant pressure in 729 river and lake water bodies that are *At Risk*. Urban waste water, hydromorphology and forestry were also significant pressures amongst others.

Table 6-3: Planning Search Results from the County Planning and EIA Portal Maps

Planning Application Reference Number	Project Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
SD158/0013	Cycling and Walking Scheme. South Dublin County Council, Grange Road	The project involves the construction and upgrading of a walking and cycle scheme and public realm improvement scheme on Grange Road (R822). The scheme route runs parallel to proposed development at an approximate distance of 160m. The Whitechurch Stream provides a hydrological pathway to downstream European sites via the Dodder river. South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA are located approximately 13km downstream, however the Grange Road proposed development is separated from the Whitechurch Stream by residential development and road networks buffering any potential pollutants.	Closed to submissions 074/12/2015	On Grange Road, alongside the eastern boundary of St Enda's Park	Not given
Various	Housing Upgrades. Various applicants	There are a number of individual residential planning applications currently in the planning system throughout the South Dublin County Council administrative area. Without supporting available documents (e.g. AA screenings, NIS or EIAR) it is difficult to identify specific implications to groundwater and surface water; however, such developments are often subject to drainage and mitigation requirements under permission grants and construction is temporary and localised minimising the duration of potential disturbance.			
S18A/0433	Change of house type of the approved dwellings to 4 semi-detached, 3 bed dwellings and associated car parking for 8 cars, access bridge, road and footpath and modify existing bridge for a pedestrian entrance and associated site works and landscaping on a site with permission granted for 4 semi-detached, 2 bedroom with study dwellings and associated works under	Although the centre application was refused by the Local Authority, there is a long planning history associated with this site and a permitted grant of planning and later modification to same remain valid. The originally development was originally consented under SD09A/0055 after appeal to ABP. The conditions included confirmation prior to development of surface and foul water management on the site owing to the recognised potential to impact to the Whitechurch Stream. It is not known if these have been submitted. Further applications, the majority of which were refused, but for which a modification was approved after appeal. There were conditions that related back to the original planning Ref Sd09A/055 and ABP decision PL06S.235823. In the absence of final detail of management of construction and operational management of polluting substances and or disturbance by virtue of proximity to watercourse (suggested at less than 10metres in accordance with objectives of County Development Plan), it cannot be ruled out that if the consented development were to be undertaken at the same time as the proposed flood alleviation scheme, that an in-combination impact would not occur without mitigation.	SD18A/0433 refused permission 12/02/19 Original Planning permission SD09A/055 & PL06S.235823 And follow on Modification to consented design SD11B/0236	Capri, on Whitechurch Road, alongside Whitechurch Stream	15/12/2009. ABP appeal not upheld. Permission granted 20/05/2010 17/02/2012, ABP Pleanála appeal declared invalid. Date of Final grant: 24/10/2016

Planning Application Reference Number	Project Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
	SD09A/0055 and SD11B/0236.				
SD20A/0016	Change of house type of the approved dwellings to 4 semi-detached, 3 bed dwellings; replacement of existing bridge and 1.2m flood defence walls, internal road and footpaths; 8 car parking spaces and associated site works and landscaping on previously granted site for 4 semi-detached, 2 bedroom with study dwellings and associated works under SD09A/0055 and SD11B/0236.	This is the latest application associated with this site and previous applications are discussed above under application S18A/0433. Regarding the current application, there is direct connectivity to the Whitechurch Stream and waterborne pollution has the potential to be washed into the stream. The levels of pollution have been described as negligible and localised and mitigation measures are recommended, in-combination impacts were ruled out. Furthermore, the screening for appropriate assessment indicated that potential impacts as a result of the development would cause neither direct nor indirect significant impacts to any protected site or nearby waterbody. On the contrary, the Ecological Impact Assessment raises issues regarding the presence of third schedule invasive- Japanese Knotweed, but it was concluded that the spread of this species is negligible due to the proposal to excavate and dispose of all sources of this invasive species on site by a specialist contractor in advance of construction works. A proposal for Japanese Knotweed control is included but as this application is still pending and there is no final detail of the final management regime for this invasive species during the construction and operation phase it cannot be ruled out that if the consented development were to be undertaken at the same time as the proposed flood alleviation scheme, that an in-combination impact would not occur without mitigation.	Pending. Decision due 22/03/20.	Capri, on Whitechurch Road, alongside Whitechurch Stream.	23/03/20 Request Additional Information. No details on planning website as yet.
SD16A/0247	Demolition of existing buildings, closing vehicular access at southern end of site and retaining main vehicular entrance at northern end, construction of new 3 storey building over basement, with storage facilities in basement, two 1 bed apartments on ground floor, two 2 bed apartments on second floor and third floors, a communal roof garden,	The Screening for Appropriate Assessment included environmental data relating to a previously detected hydrocarbon spillage in groundwater. There is connectivity via a site culvert that ultimately discharge to the Whitechurch Stream and it was noted that contamination could ultimately arrive at Dublin Bay, although rated as low to moderate (Separate consultants conclusions). It was stated that the risk to water quality from the proposed development would be protected against through the implementation of mitigation measures including stormwater attenuation and flood mitigation. No loss of Annexed habitat or impacts to SCI species were predicted. There is a reliance on mitigation measures to ensure that no adverse impacts on water quality within a small site. There was no data in respect of mobile species including Otter. The consented development has not yet commenced, although there are a number of preconstruction requirements to be discharged to the Planning Authority in advance of any works commencing. And while it is unknown when and if works might commence, there remains the possibility that an in-combination impact on	Granted	Whitechurch Road, southern side of Rathfarnham Ford Garage, alongside Whitechurch Stream.	24//04/17

Planning Application Reference Number	Project Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
	and all associated site and development works.	the water quality and disturbance to otter were both developments to occur simultaneously without mitigation.			
SD18B/0535	Construction of vehicular entrance to the curtilage of a Protected Structure to accommodate 3 car spaces on a paved surface that shall abut directly onto the public realm; provision of pedestrian entrance and path to the back of the spaces, to access the period house directly; erection of a 2m high boundary metal fence and 1m hedge screening along the boundary facing St. Patricks Cottages replacing the existing chain-link fence.	With the exception of a tree constraints report, there was no AA provided in respect of the application. However, given the nature of the proposed development and its location, it is considered unlikely, by virtue of the nature of the project, were it granted planning to result in LSE on European sites.	Granted 16/09/19	Whitechurch Road, Rathfarnham, Dublin 14	Under appeal to An Bord Pleanála who issued an acknowledgement letter on 6th of November that it will take into account submission made in respect of the appeal
SD19B/0341	Erection of railings and granite base wall to front and side at extended Site 7 (to include former Site 8) Silveracre Avenue (within the curtilage of a Protected Structure, Silveracre House, RPS 277).	There was no AA provided in respect of the application. However, by virtue of the nature of the proposed development, it is considered unlikely, by virtue of the nature of the project, were it granted planning to result in LSE on European sites.	Granted	, Sarah Curran Avenue, Dublin 16	21/10/2019
D13A/0370/E	Housing development. M & N O'Grady Development Ltd, Nutgrove Avenue, Rathfarnham	Residential development consisting of 47 detached houses located 1km east of the proposed development with project extension granted. Permission is granted until 2024. The Whitechurch Stream provides a hydrological pathway to Downstream European sites via the Dodder river. South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA are located approximately 13km downstream. However, the ongoing construction works for the Nutgrove housing development is separated from	Granted		Permission granted to 2024

Planning Application Reference Number	Project Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
		the Whitechurch Stream by 700m of residential development and road networks providing a significant buffering to any potential pollutants.			
SD17A/0263	Extension to Golf course. The Trustees of Grange Golf Club, Taylor's Lane, Rathfarnham	Extension to Grange Golf Club located immediately south of the proposed development. The extension of the golf course playing area into the car-park has potential for in-combination impacts to the Whitechurch Stream proving a pathway to South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA located 14km downstream. The potential for effects arise during construction as this is immediately upstream of the proposed development. Permissions for the extension are however subject to the compliance of drainage and disposal of surface water with technical requirements of the Council's Water Services and/or Irish Water as appropriate including the Greater Dublin Regional Code of Practice for Drainage Works. As such, the potential for significant in-combination effects to European Sites is deemed unlikely.	Granted	Upstream of St. Enda's Park	Permission granted 22/09/17
SD178/0003	Dodder Greenway. South Dublin County Council	A section of proposed Dodder Greenway (within the administrative boundary of SDCC) is being developed 1km downstream of the proposed development. The Greenway route is approximately 14km in length and has potential to lead to in-combinations impacts through habitat loss, disturbance and water quality implications. This development has however been subject to the appropriate environmental assessments informing the design process and it is currently understood that there will be further assessments to identify and mitigate such impacts. While sections of the Dodder Greenway within the SDCC administrative area have been undertaken, the remainder of the project, extending downstream in the DCC and DLR administrative boundaries has been halted owing to reconsideration of project.	Closed to Submissions 22/06/2017	Downstream of proposed development	Not given on website
3324/19	Private Development on Lands at the former Paper Mills site, bounded by the river Dodder to the east, Clonskeagh Road to the west, Clonskeagh bridge to the South West, Dublin 6	Planning permission sought for the following revisions to the previously approved development Planning reg. ref.- 3159/17 (96 units to 116 units) as part of an overall composite development on the site to include the following previous planning permission reg. ref.- 2620/14 (parent permission 88 units), reg. ref.- 2308/16 (88 units to 96 units), reg. ref.- 2477/17 (20 units) and reg. ref.- 2996/17 (ESB substation). The revisions to the development consist of a change of block to a Build to Rent; block of accommodation. Revisions to block 4 include the reconfiguration of ground floor plan including changing 3 no. 2 bed apartments to 1 no. 2 bed apartment and 2 no. 1 bed apartments, provision of a ground floor communal room and alterations to the penthouse plan consisting of changing 2 no. 2 bed	Last date for Observations 25/07/2019	Alongside River Dodder	Application Withdrawn 12/08/19

Planning Application Reference Number	Project Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
		apartments to 1 no. 2 bed apartment and 2 no. 1 bed apartments, incorporating an overall increase in apartment units from 14 to 15 with the addition of a new ground floor communal room, bringing the total number of units on the lands from 136 units to 137 units. The original application was subject to planning including Screening for Appropriate Assessment. The design included for attenuated surface water management, diversion of the foul sewer to Irish Water treatment facilities, in recognition of the requirements of the Greater Dublin Drainage Strategic Drainage Study (GDSDS 2005) and reviewing the QI and Sci for downstream European sites, it was concluded that the project either alone or in combination with other plans or projects were not likely to result in significant effects to the integrity of the Natura 2000 network. The site has been cleared, but it is unclear if works have commenced on the originally consented application. Notwithstanding this fact, the measures included in the original design if implemented should not result in an LSE to European sites as previously concluded.			
N/A	Blood Stoney Bridge	The proposed Blood Stoney Bridge is currently at the preliminary design stage. It will provide a new crossing point from New Wapping Street to Blood Stoney Road in the Dublin Dockland Area and will be a pedestrian and cycling-only facility. The Blood Stoney Bridge development is approximately 12km downstream from the proposed development however provides potential for potential in-combination effects on downstream European Sites via hydrological pathways to South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA. The scope of works and potential impacts are currently unknown as this application is pre-planning, however the development will be subject to the appropriate environmental considerations including Appropriate Assessment before planning approval.	Pre-application Stage	Approximately 10km downstream	N/A
N/A	Dodder Public Transportation Bridge	Dublin City Council has commenced the planning and design of the Dodder Public Transportation Opening Bridge. The scheme comprises a new public transportation opening bridge over the River Dodder at its confluence with the River Liffey along with the construction of approach roads associated with the bridge; the construction of a new control building; the provision of a new club house and facilities for St Patrick's Boat Club; the reclamation of land to the west of Tom Clarke Bridge to facilitate the build; the landscaping of the area between York Road/Thorncastle street and the R131 over the extents of the project. The development will be subject to the appropriate	Pre-application Stage	Approximately 9.5km downstream	N/A

Planning Application Reference Number	Project Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
		environmental considerations including Appropriate Assessment before planning approval.			
N/A	Point Pedestrian Bridge	Dublin City Council are currently preparing tender documents to procure a designer for this scheme. The project has not yet been fully defined or designed at this stage. Once developed, this project will be required to undertake the appropriate assessments including EIA and AA Screening and consider the cumulative effects resulting from all other projects as appropriate. An assessment of cumulative effects with this project without detail on scale and design is not feasible at this stage and is not included as part of this assessment.	Pre tender Stage	Approximately 11km downstream	N/A

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Appendix A

Project Drawings

CO. DUBLIN

Whitechurch

SECTION WC26
SECTION WC25
SECTION WC24
SECTION WC23
SECTION WC22
SECTION WC21
SECTION WC20
SECTION WC19
SECTION WC18
SECTION WC17
SECTION WC16
SECTION WC15
SECTION WC14
SECTION WC13
SECTION WC12
SECTION WC11
SECTION WC10
SECTION WC09
SECTION WC08
SECTION WC07
SECTION WC06
SECTION WC05
SECTION WC04
SECTION WC03
SECTION WC02
SECTION WC01

Section WC23
Proposed Staged Trash Screen with water level gauge upstream of bridge/culvert face.

Landscape Proposal with mixed species hedgerow, bulb planting and grass seeding

Landscape Proposal with Tree Planting

Sections WC16
Replace metal railing at parking area off Whitechurch Stream Bridge, with low level 400mm defence wall and railing to tie into bridge parapet and railing.
Access to be provided for Maintenance

Sections WC17 to WC18
Return wall around dual culvert inlet to tie into bridge parapet and existing boundary wall.

Landscape Proposal with Hedgerow Planting

Retention of existing right bank wall to be cladded with stone.
New right bank flood wall to tie into existing wall.

Sections WC15 to WC16
Replace left bank existing metal railing with low level defence wall with railing on the left bank from WC15 to WC16;
Wall height 600mm above existing ground levels.
Wall and railing to tie into bridge parapet and railing.

Removal and replacement of bridge access to Capri Site.
Bridge parapets to tie into new flood walls left and right bank.

Section WC13
New head wall to culvert outlet level 58.25mOD.
Flood walls left and right bank to tie into the new head wall.

Sections WC10 to WC11
New right bank flood wall tying into new head level 60.4mOD.
Permanent sheet piling underneath new wall extended upstream of WC11 for 30m.

Section WC12
Increase of concrete plinth around culvert opening to 600mm above ground level and new railing with top at 1.2m above the ground level.

Proposed Landscaping Area with tree planting, bulb planting & grass seeding.
Existing footpath to be reinstated.

Section WC11
New head wall at culvert inlet at level 60.4 mOD
with return wall left bank tying into existing wall; Wall height 1.9m.
Proposed Staged Trash Screen to culvert inlet with water level gauge.
Permanent sheet piling underneath new wall extended upstream of WC11 for 4.6m.

Section WC09
New right bank flood wall replacing existing low wall and fence.
at level 61.8mOD. Wall height 1.2m.
Permanent sheet piling underneath extended downstream of WC09 for 30m.

Section WC09
New head wall at culvert outlet at level 61.8mOD,
with return wall on left bank replacing railing and tying into existing wall.
Permanent sheet piling underneath extended downstream of WC09 for 5.5m.

Sections WC07 to WC08
New right bank flood wall replacing existing fence; design level 62mOD. Wall height 1.2m-1.3m.
Permanent sheet piling underneath new wall extended upstream of WC08 for 30m.

Section WC08
New head wall at culvert inlet at level 62mOD,
with return wall on left bank, which will replace existing railing and tying into existing wall.
Permanent sheet piling underneath new wall extended upstream of WC08 for 7.5m.

Proposed Landscaping Area with tree planting, bulb planting & grass seeding.
Existing footpath to be reinstated.

New flood wall on the right bank side tying to existing stone wall
(Level 62.95mOD) approximately 27m downstream of Bridge Outlet crossing Whitechurch Rd.

Replacement of the timber bridge with one of similar size and in the same location as the existing.

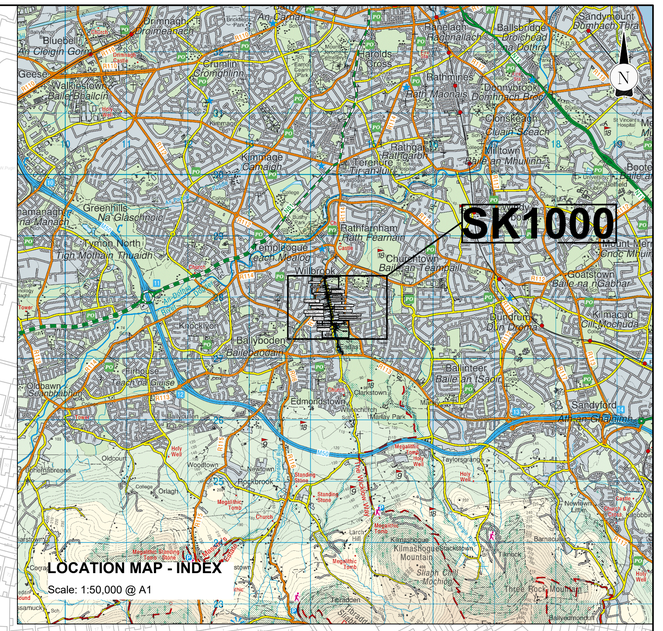
Proposed Debris Trap with base of concrete scour mat.

Sections WC01 to WC03
Localised bank raising at 65.1mOD
with rip rap erosion protection for approx. 50m.
Removal of trees and bankside vegetation will be required to accommodate the works.

Slipway Access

Proposed Woodland Planting on the left bank

N



LEGEND

- Landscape Proposals
- Site Extents
- Bridge Removal
- Bridge Replacement
- Debris Trap
- Defence Walls
- Defence Walls - Permanent Sheet Piling
- Existing Footpath
- Trash Screen
- Bank Raising
- Existing Walls
- River Centreline *(Chainage)*
- Bank Improvement Works

10m SCALE 1:2000

R:\MDW0825 - Whitechurch Flood Alleviation\8.0 Drawings\SK\MDW0825-RPS-00-XX-DR-C-SK1000 Prefered Option Full Location.dwg

Client

Comhairle Contae Átha Cliath Theas
South Dublin County Council

OPW Oifig na nOibreacha Poiblí Office of Public Works

General Notes

(i) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

(ii) DO NOT SCALE, use figured dimensions only.

(iv) Information including topographical survey, geotechnical investigation and utility detail used in the design have been provided by others.

(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn	Chk	Amendment / Issue	App
P02	06/07/20	PB	PT	Issued for Information	MD
P01	26/06/20	PB	PT	Issued for Information	MD

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Model File Identifier

Scale	1:500 @ A1 1:1,000 @ A3
Created on	11/10/19
Sheets	01 of 01

Project: **WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME**

Title: **Prefered Option - Full Location**

File Identifier	Drawing No.	Status	Rev
MDW0825-RPS-00-XX-DR-C-SK1000 Prefered Option Full Location	SK1000	S2	P02

CO. DUBLIN

Whitechurch

CONTINUES TO SK1002

Replacement of the timber bridge with one of similar size and in the same location as the existing.

SECTION WC05 Chainage 0+622.07m

SECTION WC04 Chainage 0+600.30m

SECTION WC03 Chainage 0+572.25m

Sections WC01 to WC03
Localised bank raising at 65.1mOD with rip rap erosion protection for approx. 50m.
Removal of trees and bankside vegetation will be required to accommodate the works.

SECTION WC02 Chainage 0+543.80m

Proposed Debris Trap with base of concrete scour mat.

Proposed Woodland Planting on the left bank

Slipway Access

SECTION WC01 Chainage 0+510.10m

Proposed Site Compound Location

Car Park

CURRAN AVENUE

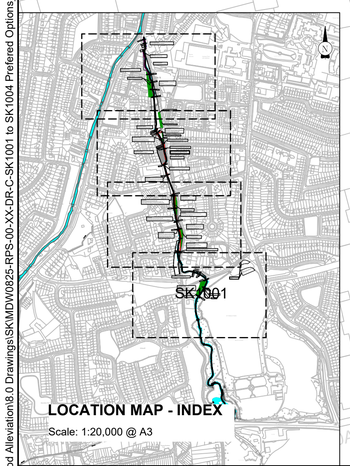
SARAH

WHITECHURCH ROAD

Glin River

ST ENDA

N



LOCATION MAP - INDEX
Scale: 1:20,000 @ A3

LEGEND

- Landscape Proposals
- Site Extents
- Bridge Removal
- Bridge Replacement
- Debris Trap
- Defence Walls
- Defence Walls - Permanent Sheet Piling
- Existing Footpath
- Trash Screen
- Bank Raising
- Existing Walls
- River Centreline *(Chainage)*
- Bank Improvement Works

10m SCALE 1:1000

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P02	06/07/20	DB	PT	Issued for Information	MD
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Model File Identifier

Scale	Project
1:500 @ A1 1:1,000 @ A3	WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME
Created on 04/09/19	**Title** PREFERRED OPTION - Measures: WC01 to WC05
Sheets 01 of 04	

File Identifier	Drawing No.	Status	Rev
MDW0825-RPS-00-XX-DR-C-SK1001 to SK1004	SK1001	S2	P02

R:\MDW0825 - Whitechurch Flood Alleviation\8.0 Drawings\SK\MDW0825-RPS-00-XX-DR-C-SK1001 to SK1004 Prefered Options_Section Locations.dwg

CO. DUBLIN

Whitechurch

CONTINUES TO SK1003

Section WC11
New head wall at culvert inlet at level 60.4 mOD
with return wall left bank tying into existing wall; Wall height 1.9m.
Proposed Staged Trash Screen to culvert inlet with water level gauge.
Permanent sheet piling underneath new wall extended upstream of WC11 for 4.6m.

Sections WC10 to WC11
New right bank flood wall tying into new
head level 60.4mOD.
Permanent sheet piling underneath new wall
extended upstream of WC11 for 30m.

Proposed Landscaping Area with tree
planting, bulb planting & grass seeding.
Existing footpath to be reinstated.

Section WC09
New right bank flood wall replacing existing low wall and fence.
at level 61.8mOD. Wall height 1.2m.
Permanent sheet piling underneath extended downstream of WC09 for 30m.

Section WC09
New head wall at culvert outlet at level 61.8mOD,
with return wall on left bank replacing railing and tying into existing wall.
Permanent sheet piling underneath extended downstream of WC09 for 5.5m.

Sections WC07 to WC08
New right bank flood wall replacing existing fence;
design level 62mOD. Wall height 1.2m-1.3m.
Permanent sheet piling underneath new wall
extended upstream of WC08 for 30m.

Section WC08
New head wall at culvert inlet at level 62mOD,
with return wall on left bank, which will replace
existing railing and tying into existing wall.
Permanent sheet piling underneath new wall
extended upstream of WC08 for 7.5m.

Proposed Landscaping Area with
tree planting, bulb planting & grass seeding.
Existing footpath to be reinstated.

Sections WC03 to WC08
Tree clearing and vegetation removal
along the right bank to reduce blockage risk
at Whitechurch Rd. culvert.
Bank protection measures and underpinning will be required.

New flood wall on the right bank side tying to existing stone wall
(Level 62.95mOD) approximately 27m downstream of Bridge Outlet crossing Whitechurch Rd.

CONTINUES TO SK1001

SECTION WC11 Chainage 0+917.57m
SECTION WC10 Chainage 0+872.57m
SECTION WC09 Chainage 0+828.07m
SECTION WC08 Chainage 0+803.03m
SECTION WC06 Chainage 0+729.07m

ST ENDA'S DRIVE
ST ENDAS PARK
WHITECHURCH ROAD
ST GATIEN COURT
WILLBROOK DOWNS

LEGEND

- Landscape Proposals
- Site Extents
- Bridge Removal
- Bridge Replacement
- Debris Trap
- Defence Walls
- Defence Walls - Permanent Sheet Piling
- Existing Footpath
- Trash Screen
- Bank Raising
- Existing Walls
- River Centreline *(Chainage)*
- Bank Improvement Works

SK1002

LOCATION MAP - INDEX
Scale: 1:20,000 @ A3

10m SCALE 1:1000

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Scale	1:500 @ A1 1:1,000 @ A3
Created on	04/09/19
Sheets	02 of 04
Project	WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME
Title	PREFERRED OPTION - Measures: WC06 to WC11
File Identifier	MDW0825-RPS-00-XX-DR-C-SK1001 to SK1004
Drawing No.	SK1002
Status	S2
Rev	P02

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CO. DUBLIN

Whitechurch

CONTINUES TO SK1004

Sections WC17 to WC18
Return wall around dual culvert inlet to tie into bridge parapet and existing boundary wall.

Landscape Proposal with Tree Planting

Sections WC16
Replace metal railing at parking area off Whitechurch Stream Bridge, with low level 400mm defence wall and railing to tie into bridge parapet and railing.
Access to be provided for Maintenance

Landscape Proposal with Hedgerow Planting

Sections WC15 to WC16
Replace left bank existing metal railing with low level defence wall with railing on the left bank from WC15 to WC16;
Wall height 600mm above existing ground levels.
Wall and railing to tie into bridge parapet and railing.

Retention of existing right bank wall to be cladded with stone.
New right bank flood wall to tie into existing wall.

Removal and replacement of bridge access to Capri Site.
Bridge parapets to tie into new flood walls left and right bank.

NOTE: The location of the replacement bridge may be upstream of this original location and is part of the proposed developments at the Capri Site.

Sections WC13 to WC16
Removal of existing trees and vegetation from both sides of Whitechurch Stream to facilitate works

New flood walls left and right bank with permanent sheet piling underneath extended downstream of WC13 for 30m.

Section WC13
New head wall to culvert outlet level 58.25mOD.
Flood walls left and right bank to tie into the new head wall.

Section WC12
Increase of concrete plinth around culvert opening to 600mm above ground level and new railing with top at 1.2m above the ground level.

CONTINUES TO SK1002

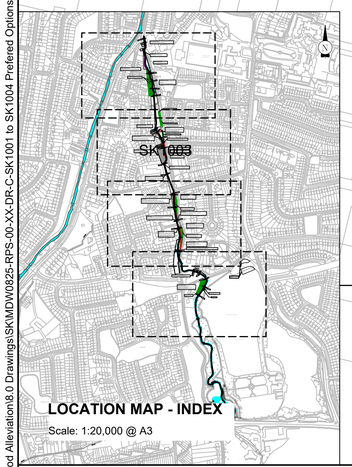
SECTION WC18 Chainage 1+144.35m
SECTION WC17 Chainage 1+140.41m
SECTION WC16 Chainage 1+112.41m
SECTION WC15 Chainage 1+107.91m
SECTION WC14 Chainage 1+075.41m
SECTION WC13 Chainage 1+000.41m
SECTION WC12 Chainage 0+985.41m

CAPRI SITE

WILLBROOK DOWNS

LEGEND

- Landscape Proposals
- Site Extents
- Bridge Removal
- Bridge Replacement
- Debris Trap
- Defence Walls
- Defence Walls - Permanent Sheet Piling
- Existing Footpath
- Trash Screen
- Bank Raising
- Existing Walls
- River Centreline *(Chainage)*
- Bank Improvement Works



LOCATION MAP - INDEX
Scale: 1:20,000 @ A3

10m SCALE 1:1000

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1:500 @ A1 1:1,000 @ A3	WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME
Created on 04/09/19	Title: PREFERRED OPTION - Measures: WC12 to WC18
Sheets 03 of 04	

File Identifier	Drawing No.	Status	Rev
MDW0825-RPS-00-XX-DR-C-SK1001 to SK1004	SK1003	S2	P02

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CO. DUBLIN

Whitechurch

LEGEND

- Landscape Proposals
- Site Extents
- Bridge Removal
- Bridge Replacement
- Debris Trap
- Defence Walls
- Defence Walls - Permanent Sheet Piling
- Existing Footpath
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- Bank Raising
- Existing Walls
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- Bank Improvement Works

Sections WC24 to WC26
Tree and bankside vegetation management
to reduce blockage risk to the culvert discharging to Owendoher River.

Section WC23
Proposed Staged Trash Screen with
water level gauge upstream of bridge/culvert face.

Sections WC19 to WC23
Removal of existing trees and vegetation
from both sides of Whitechurch Stream.

Sections WC19 to WC23
Localised left bank raising with rip rap erosion protection.
Wire mesh fence panels at 1.2m height above the footpath.

Landscape Proposal with mixed species
hedgerow, bulb planting and grass seeding

Sections WC19 to WC23
Right Bank Existing walls to be maintained at
current level;
Railing to be placed above existing walls.
Top of railing at 1.2 m height above the footpath.

Landscape Proposal with Tree Planting

SECTION WC26 Chainage 1+449.07m
SECTION WC25 Chainage 1+436.82m
SECTION WC24 Chainage 1+421.25m
SECTION WC23 Chainage 1+403.73m
SECTION WC22 Chainage 1+330.08m
SECTION WC21 Chainage 1+302.07m
SECTION WC20 Chainage 1+277.57m
SECTION WC19 Chainage 1+250.57m

Owendoher River
BALLYBODEN ROAD
WILLBROOK GROVE
WILLBROOK
WILLBROOK VILLAS
WHITECHURCH ROAD
TARA HILL CRESCENT
Sports Ground
Hockey Pitch (All weather)

N

SCALE 1:1000
10m

LOCATION MAP - INDEX
Scale: 1:20,000 @ A3

SK1004

CONTINUES TO SK1003

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Created on	04/09/19
Sheets	04 of 04
Project	WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME
Title	PREFERRED OPTION - Measures: WC19 to WC26
File Identifier	MDW0825-RPS-00-XX-DR-C-SK1001 to SK1004
Drawing No.	SK1004
Status	S2
Rev	P02

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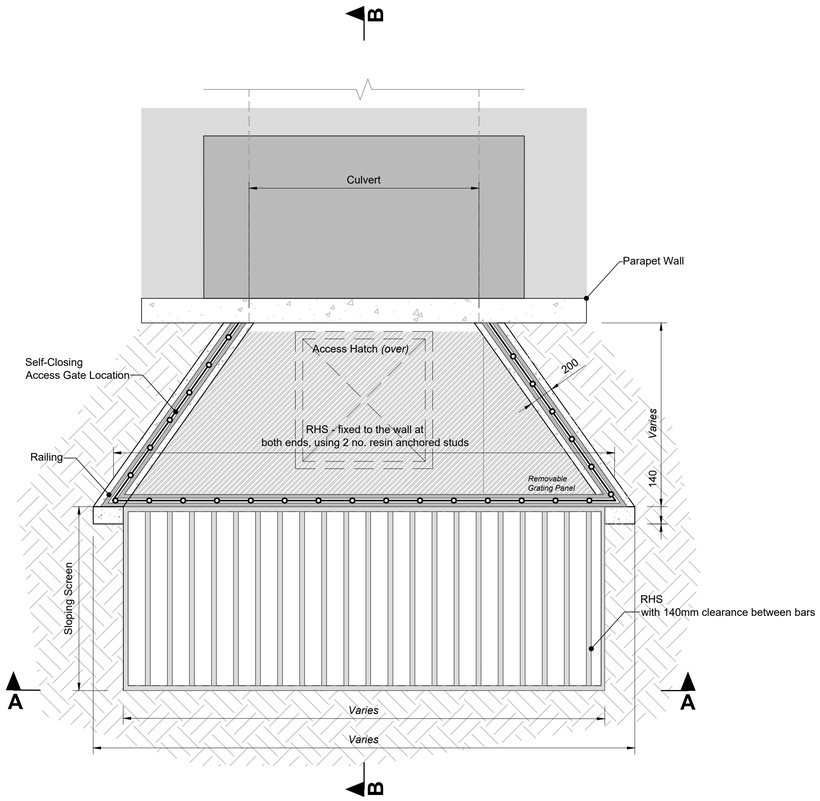
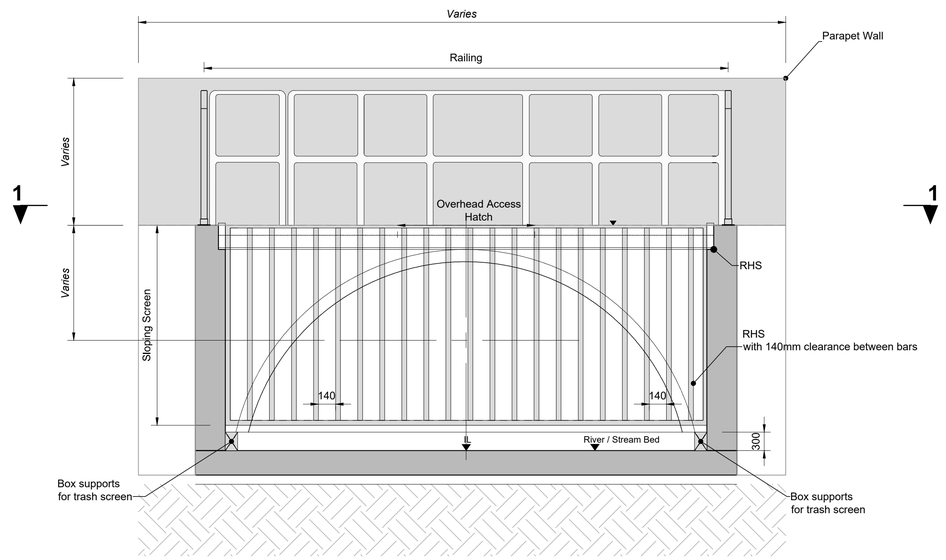
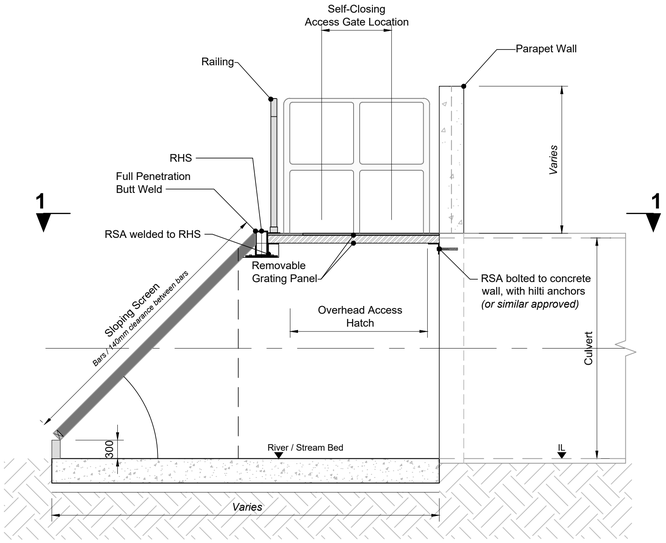


PLAN 1-1



SECTION AT A-A



SECTIONAL DETAIL B-B

1m SCALE 1:50

R:\MDW0825 - Whitechurch Flood Alleviation\8.0 Drawings\DG\MDW0825-RPS-00-XX-DR-C-DR0402 Typical Trash Screen_Std Detail.dwg

Client

Comhairle Contae Átha Cliath Theas
South Dublin County Council

OPW Oifig na nOibreacha Poiblí Office of Public Works

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Rev	Date	Drn	Chk	Amendment / Issue	App
P01.02	21/04/20	DR	PT	Issue for Stage Approval	MD
P01.01	09/04/20	DR	PT	Issue for Stage Approval	MD

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Model File Identifier

Scale 1:25 @ A1 1:50 @ A3

Created on 04/09/19

Sheets 01 of 01

Project **WHITECHURCH FLOOD ALLEVIATION SCHEME**
Section 177AE of the Planning & Development Act 2000 *(as amended)*

Title **PLANNING APPLICATION DRAWINGS**
Trash Screen Detail

File Identifier	Drawing No.	Status	Rev
MDW0825-RPS-00-XX-DR-C-DR4002	DR4002	S4	P01.02

Appendix B

Ecological Evaluation Criteria

Ecological Valuation Criteria

International Importance:
• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
• Proposed Special Protection Area (pSPA).
• Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
• Features essential to maintaining the coherence of the Natura 2000 Network.[1]
• Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
• Resident or regularly occurring populations (assessed to be important at the national level)[2] of the following:
  ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and / or
  ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
• Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
• World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
• Biosphere Reserve (UNESCO Man and the Biosphere Programme).
• Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
• Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
• Biogenetic Reserve under the Council of Europe.
• European Diploma Site under the Council of Europe.
• Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).[3]

National Importance: • Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park.

[1] See Articles 3 and 10 of the Habitats Directive.

[2] It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

[3] Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

Ecological Valuation Criteria

- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level)[4] of the following:
  - ✓ Species protected under the Wildlife Acts; and/or
  - ✓ Species listed on the relevant Red Data list.

Site containing 'viable areas'[5] of the habitat types listed in Annex I of the Habitats Directive

National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level)[6] of the following:
  - ✓ Species protected under the Wildlife Acts; and/or
  - ✓ Species listed on the relevant Red Data list.
- Site containing 'viable areas'[7] of the habitat types listed in Annex I of the Habitats Directive.

[4] It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

[5] A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

[6] It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

[7] A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

Ecological Valuation Criteria

County Importance:

- Area of Special Amenity.[8]
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level)[9] of the following:
    - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
    - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
    - Species protected under the Wildlife Acts; and/or
    - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan (BAP) if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)[10] of the following:
    - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
    - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
    - Species protected under the Wildlife Acts; and/or
    - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;

[8] It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

[9] It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County importance where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

[10] It is suggested that, in general, 1%of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

Ecological Valuation Criteria
• Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (lower value): • Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; • Sites or features containing non-native species that are of some importance in maintaining habitat links.

Appendix C

Consultation Response

MEMO

Date: 25 March 2019
To: Peter Maxwell
From: Tim Ryle
Pages: 2 inc. this page
Regarding: Whitechurch Flood Alleviation Scheme

Summary record of meeting between SDCC & RPS with IFI

Present:
Gretta Hannigan (GH) - Senior Fisheries Environmental Officer, Inland Fisheries Ireland
David Grant (DG) – Senior Project Engineer, South Dublin County Council
Chris Galvin - Senior Engineer, South Dublin County Council
Tim Ryle (RPS) – Senior Ecologist, RPS

Peter

The following is a summary of the observations and recommendations provided by Gretta Hannigan. They relate to the section of the meeting for which I was present (I was brought in half way through the meeting after SDCC had outlined the project requirements to IFI).

- Ideally, IFI would prefer no trash screens, but in relation to this project accepted their need.
- Similarly for “Totem Pole” in St. Enda’s
- Designers should be cognisant of recent guidance documents for screen design.
- IFI note that the Owendoher River is the “jewel” of the Dodder system in relation to aquatic potential. Water quality is good and brown trout nursery present (the Whitechurch stream should be considered similarly and that despite the physical impediments e.g. the very steep drop in watercourse in upper St Endas park, that distinct brown trout populations could be expected upstream of the project
- Discussion on the small section of realignment at Fort Garage – this is season dependant e.g. instream works only allowed with agreement of IFI between **July** and **September**. Discussion regarding potential to undertake some works offline in other months, but unlikely viable owing to land constraints.
- IFI reiterated that any temporary river crossings should preferably be by Bailey bridges but that given the nature of the project, that instream pipes (appropriately positioned with the pipe invert **below** river bed) could be considered if required and after sizing by flood designer. Their installation should ensure

continuity of waterflow even in summer periods (IFI might consider permission to install in May, but typically only allowed to be installed and removed in the 4-month summer period or the following year.

- IFI also noted that haul roads if required should be away from watercourse
- Issues that IFI require is a robust CEMP that clearly specifies
  - Silt measures or runoff to ensure reduction of siltation in watercourses. The assessment can refer to generic features for the assessment, but the final CEMP must detail them.
  - Biosecurity measures – clean site, etc.
  - Clean soil importation – Agreed that a guarantee letter from suppliers confirming absence of Invasive pant species etc would be a requirement
  - Similarly for rubble/boulders, it should be washed and RPS understand this to mean free from fine material (as far as is practical)
  - Best practice measures regarding use of concrete near watercourses and protective measures to be implemented
  - Best practice measures regarding storage of excavated spoil etc away from watercourse and ensuring no runoff. DG explained that temporary storage area would likely be in St Enda's car park away from watercourse.
  - Gabions not preferred e.g. at Funeral Home – IFI prefer **large boulders** be emplaced and asked that designers are made aware of this, the base of which is sunk beneath the original river level. Smaller boulders can be stacked on top to provide additional protection against scour/undermining of the bank.
  - Silt protection measures need to be best standard practice measures that are robust and will ensure no runoff from
  - Regrassing of bared ground should be undertaken as soon as is practical to reduce risk of runoff
- In terms of Aquatic survey, IFI identified different licences that might be required. RPS confirmed in receipt of national Crayfish survey licence. RPS do not have a Section 14 survey licence from DMNR (e.g. electrofishing permit) nor the capability to undertake same. However, based on the level of survey planned and the nature of the project, IFI unlikely to seek one in respect of enumerating fisheries stock.
- RPS explained about the potential need to remove trees - mostly sycamores etc to facilitate works. Full extent not complete as terrestrial surveys outstanding. IFI was interested in the proposal to plant two areas of native trees along the route.
- GH indicated a willingness to walk the route with DG if required.

Tim Ryle
Senior Ecologist
tim.ryle@rpsgroup.com
00353 1 488 2983

RE: Whitechurch Stream FAS - Amended design drawings

GH

Gretta Hannigan <Gretta.Hannigan@fisheriesireland.ie>
To Tim Ryle
Cc Mesfin Desta; Roisin O'Callaghan; Josie Mahon

Reply | Reply All | Forward | ...

Tue 24/03/2020 12:17

You replied to this message on 24/03/2020 15:08.

Tim,

Thank you for the draft drawings for the Whitechurch stream Flood Alleviation Scheme.

I don't need to go into the merits of a well vegetated river bank in maintaining a healthy aquatic environment sufficient to say every effort should be made to maintain a diverse riparian zone of native species throughout. Only where all other options are exhausted should sheet piling be considered . We do not favour the installation of thrash screens on culverts particularly on a system as the Whitechurch where Brown trout move up and down continuously, debris traps will also require consideration and must not impact the unhindered passage of fish. Please keep us posted on progress on the design.

Kind regards,

Gretta

Gretta Hannigan
Senior Fisheries Environmental Officer
Inland Fisheries Ireland- Dublin

Iascach Intíre Éireann
Inland Fisheries Ireland

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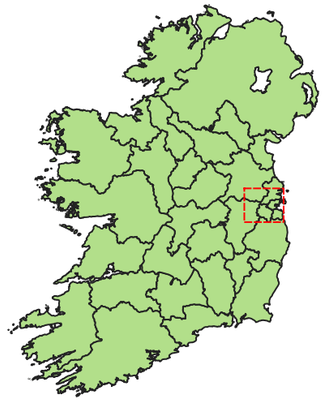
Appendix D

Habitat Map

Legend



- Depositing/lowland rivers
- Other artificial lakes and ponds
- Flower beds and borders
- Buildings and artificial surfaces
- Recolonising bare ground
- Hedgerows
- Treelines
- Scrub
- Scrub/tree planting mosaic
- Mixed woodland
- Amenity grassland (improved)

Client

Comhairle Contae Átha Cliath Theas
South Dublin County Council

Project **Whitechurch stream Flood Alleviation Scheme**

Title

APPENDIX D

RPS | Consulting UK & Ireland
West Pier Business Campus
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Issue Details

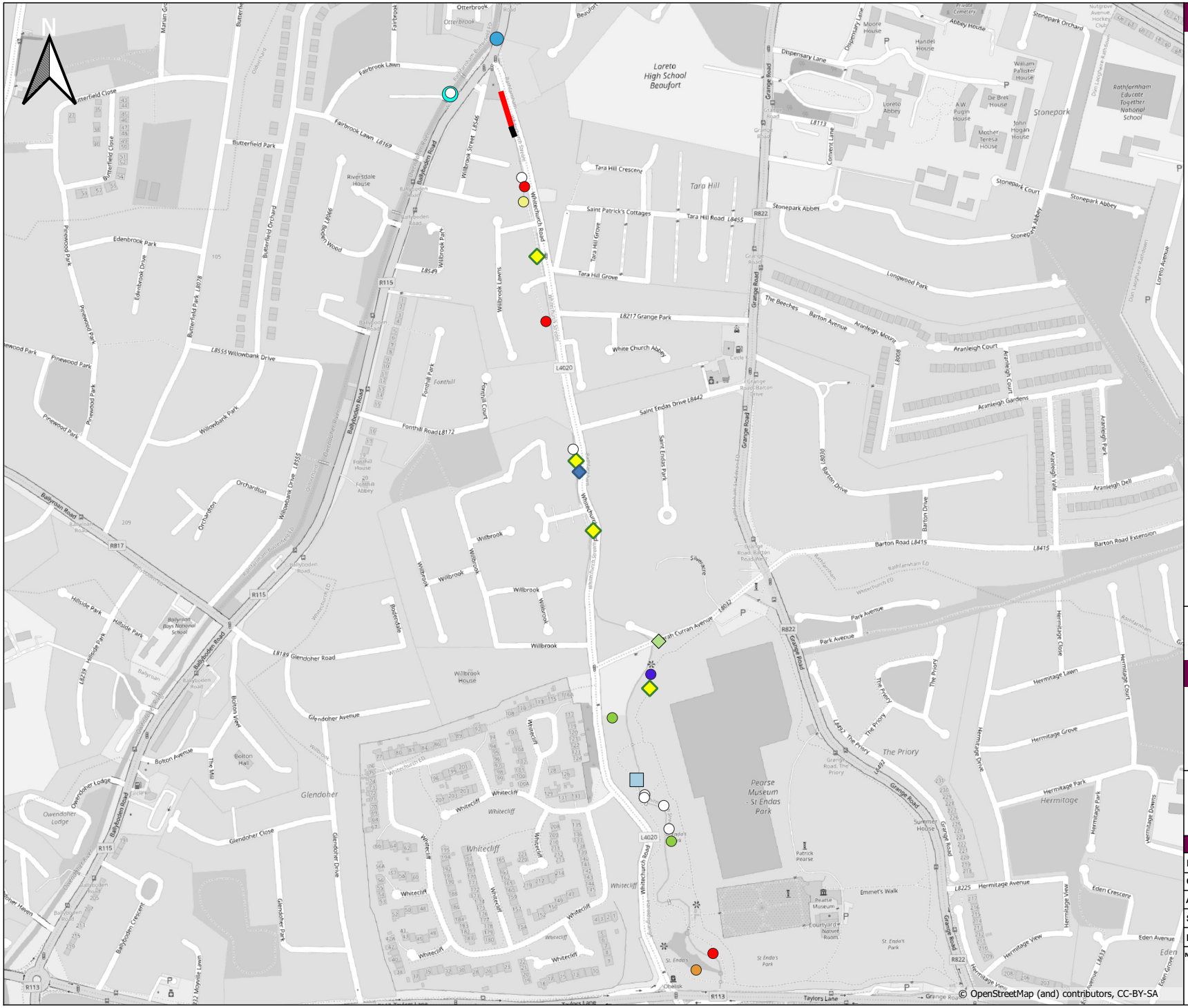
Drawn:	KWB	**Project:**	MDW0825
Checked:	TR	**File Ref:**	MDW0825QG0005F02
Approved:	MD		
Scale:	1:4,500 @ A3	**Projection:**	IRENET95 / ITM
Date:	09/03/2020		

Notes

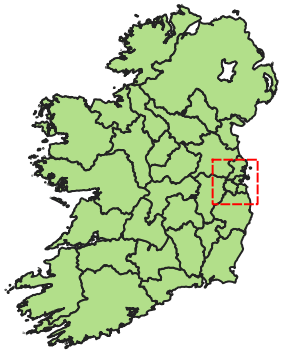
1. This drawing is the property of RPS Group Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. Ordnance Survey Ireland Licence No. EN 0005020

Appendix E

Ecology Target Notes & Proposed landscaping Planting Areas



Legend



- Japanese knotweed
- Three-cornered garlic
- Badger
- Dipper
- Hedgehog
- Historical Gunnera
- Japanese knotweed
- Kingfisher
- Local community biodiversity patch
- Mink
- Mistletoe
- Molluscs in water
- Otter
- Proposed Tree Replanting Area

Client: Comhairle Contae Átha Cliath Theas, South Dublin County Council

Project: **Whitechurch stream Flood Alleviation Scheme**

Title

APPENDIX E

RPS | Consulting UK & Ireland
West Pier Business Campus
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Issue Details

Drawn:	JMM	**Project:** MDW0825
Checked:	TR	**File Ref:** MDW0825QG0006F01
Approved:	MD	
Scale:	1:7,000 @ A4	**Projection:** IRENET95 / ITM
Date:	28/11/2019	

Appendix F

Aquatic Assessment

WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME

Aquatic Ecology Survey

Whitechurch
Aquatic Ecology Survey
F01
28 November 2019

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
A01	Client Approval	CR LC	TR	MD	26/04/19
F01	Final	LC	TR	MD	28/11/19

Approval for issue

Mesfin Desta		28 November 2019

Prepared by:

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Contents

Tables

Figures

1 INTRODUCTION

This report was prepared to investigate the macroinvertebrate community and habitat quality for the Whitechurch Stream and Owendoher River with regard to the following protected aquatic species; salmon (*Salmo salar*, Annex II,V), lamprey (*Lampetra fluviatilis* Annex II, V, *Lampetra planeri* Annex II, *Petromyzon marinus* Annex II) and white clawed crayfish (*Austropotamobius pallipes* Annex II,V). Visual signs and/or presence of otter (*Lutra lutra*), an Annex II and IV species, were noted during the aquatic survey but results are discussed in the Terrestrial Ecology report (RPS 2019). In addition, habitat was assessed to include a further salmonid species, e.g., brown trout (*Salmo trutta*) and is referred to as salmonid habitat.

The purpose of gathering the above baseline aquatic information is to help inform an Ecological Impact Assessment of a proposed flood alleviation works to be carried out within the Whitechurch Stream. The EPA name for this watercourse is the Kilmashogue, while it is also locally known as the Glynn/Glin River. For the purposes of this report, it shall be referred to as the Whitechurch Stream.

The proposed works encompass a 1.3km section of the Whitechurch Stream from the Southern end of St. Enda's Park to the confluence with the Owendoher River. Proposed works include; the removal and/or replacement of existing structures, bank improvement works, raising existing walls, inserting debris traps, construction of new bank hard defences and some conveyance improvement.

1.1 Existing Environment

1.1.1 Water Bodies

The site of the flood alleviation works is located within the Whitechurch Stream (EPA Code: 09K06, EPA River Waterbody Code IE_EA_09O011700). The EPA name for this watercourse is the Kilmashogue, it is also called the Glynn River but in this report, it is referred to as the Whitechurch Stream. This stream rises from Kilmashogue and Tibradden Mountains and flows in a northerly direction. It flows under the M50, through Marley Park, Grange Golf Club and Saint Enda's Park. It then runs parallel with the Whitechurch Road being diverted underground for short sections and then enters the Owendoher River (EPA Code: 09O01, EPA River Waterbody Code: 09O11700) at the Whitechurch/Ballyboden /Willowbrook roads junction. There are a number of weirs located along the length of Whitechurch Stream (4 weirs and 6 culvert/bridge structures). The Owendoher flows north for another 0.84km before flowing into the Dodder River and it too has a number of weirs along its length (10 weirs and 16 culverts) (RPS 2016).

Both the Whitechurch Stream and the Owendoher River become urbanised in their lower reaches and are spate rivers characterised by rapid increases in water levels. Both form part of the Dodder_SC_010 WFD sub-catchment.

1.1.2 Salmon (*Salmo salar*), Brown trout (*Salmo trutta*) and Lamprey (*Lampetra* spp.)

A review of Inland Fisheries Ireland records (www.wfdfish.ie) showed that there are no survey sites located on the Whitechurch Stream. Research in the 1980's was conducted within the Owendoher and Whitechurch Stream. It was concluded that both were important wild brown trout nursery streams. The Whitechurch was noted as being a very highly productive stream for juvenile brown trout (0+ to 2+) and recorded high densities of trout (maximum 1.29 fish/m^2 near Marley Park) (Kelly-Quinn 1986, Kelly-Quinn 1988).

Monitoring has been carried out by the IFI in the upper reaches of the Owendoher and along the length of the Dodder River.

Within the Owendoher an electric fishing survey was conducted in 2011 at Cruagh Bridge on the R116, approximately 1km southeast of Rockbrook near Edmondstown. Brown trout were the only species recorded ranging in two ages classes (1+ and 2+), younger fish accounted for 85% of the total brown trout catch.

The IFI's 2011 WFD assessment the Owendoher scored '*Poor Ecological Fish Status'* and recorded the lowest diversity within the ERBD catchment surveyed, the report named the presence of barriers to fish migration as primary impact on fish community, composition and population structure.

Within the Dodder, an electric fishing survey was carried out at the footbridge at Beaver Row, Donnybrook in 2008. Salmon and brown trout were the most abundant fish species recorded followed by eel, minnow, stone loach and sea trout. While salmon were found within the Dodder river, they can only travel upstream as far as Clonskeagh Weir which poses as a barrier to upstream migration. Further upstream the Dodder at Bushy Park where the Owendoher enters the Dodder, brown trout was the most abundant species identified followed by European eel, lamprey spp. minnow, stoneloach and three-spined stickleback in a 2014 IFI survey. Here the Dodder scored '*Good Ecological Fish Status'* in 2014.

The Owendoher River and Whitechurch Stream have been identified as waterbodies which are at risk of not meeting WFD objectives due to significant river hydro-morphological pressures (www.catchments.ie). Therefore, it is believed that salmon cannot access the upstream reaches of the Dodder past the Clonskeagh weir and therefore and not considered to be present within Owendoher River and Whitechurch Stream.

Fish populations are protected and supplemented through routine fisheries management measures, in addition to annual stocking by such organisations as the Dodder Anglers Club, a club with a membership of over 1,000 with a special interest in the river.

Lamprey spp. (either river or brook) have been recorded within the Dodder River from Beaver Row to Oldbawn during IFI surveys (IFI 2013, IFI 2014). Oldbawn is upstream of the Owendoher confluence with the Dodder. A desktop search did not reveal any records of sea lamprey within the Dodder and as with salmon the weir at Clonskeagh Bridge would act as a barrier to further upstream migration.

1.1.3 White-clawed crayfish (*Austropotamobius pallipes*)

A review of the National Biodiversity Data Centre maps indicates that there are no records of crayfish within the Dodder sub-catchment and the outer circle of the M50 appear to represent the most easterly distribution of crayfish. Crayfish have been identified within the adjoining sub-catchment (Liffey_SC_090) with records from the River Camac in 2007 (EPA Code: 09C02) at the Riversdale Estate Br (O 072 316, EPA 2013, EPA biologist). (www.biodiversityireland.ie).

1.1.4 Surface Water Quality and Risk Characterisation

Work for the Whitechurch Flood Alleviation scheme will be carried out within the Whitechurch Stream upstream of the Owendoher River confluence. The waterbody Owendoher_010 incorporates both the Whitechurch Stream and Owendoher River. The Owendoher_10 has been at Moderate WFD Status for the last two monitoring cycles (2010-2012 and 2010-2015) which represents an improvement from its previous Poor WFD status in 2007-2009 (**Table 1-1**). Both waterbodies are "At Risk" of not achieving WFD objectives and the Owendoher_010 is part of the Dodder Area for Action, which is a prioritised water body within the current River Basin Management Plan 2018-20121. One of the reasons it has been prioritised is because the Dodder is an important trout fishery, recruitment, salmon in the lower reach and ongoing work for removal of weirs to allow salmon to pass.

Table 1-1 Summary of WFD status for the Owendoher_010

EPA Waterbody Name	Code	Risk	WFD Status 2007-2009	WFD Status 2010-20012	WFD Status 2013-20015
Owendoher_10	IE_EA_09O011700	At Risk	Poor	Moderate	Moderate

2 METHOLOGY

On the 9th April 2019, an RPS aquatic ecologists carried out a survey at three sites within the Whitechurch Stream and one site on the Owendoher River downstream of the Whitechurch Stream confluence. Q-value surveys (macroinvertebrates) were conducted at all four sites.

The suitability of habitat for the following Annex II protected species was also assessed; white-clawed crayfish, salmon and lamprey spp. In addition, habitat was assessed to include a further salmonid species, brown trout (*Salmo trutta*) and is referred to as salmonid habitat.

An electric fishing survey was not conducted. The surveyor walked the length of the Whitechurch Stream from the Owendoher to where it enters St. Enda's Park and any fish present were noted, in particular pools were investigated for resting fish. This encompassed the extent of the proposed works.

2.1 Macroinvertebrate Survey

Macroinvertebrates were collected using a two-minute kick sampling method with a standard hand net (0.5 mm mesh). Survey technique adhered to the ISO Standard (10870:2012) for kick sampling and utilised the Environmental Protection Agency (EPA) standard protocol and RPS recording sheets. Stone washing was also undertaken to ensure collection of species which cling to rock surfaces.

Q-values and water quality classes are assigned using a combination of habitat characteristics and the structure of the macroinvertebrate community within the waterbody. Individual macroinvertebrate taxa are ranked for their sensitivity to organic pollution and the Q-value is determined based on their relative abundance within a sample.

The macroinvertebrate survey was conducted in early April. The Q-value is usually applied in summer/autumn when anthropogenic pressures are greatest on macroinvertebrates due to lower flows and higher temperature. The number of sensitive species excepted in winter is higher due to a combination of flow and species life cycles and therefore the Q-value may be higher in winter compared to summer/autumn samples. This seasonal difference was taken into account when calculating the Q-value.

The Environmental Quality Ratio (EQR) represents the relationship between the values of the biological parameters observed for a body of surface water and the values for these parameters in the reference conditions applicable to that body. The ratio is expressed as a value between zero and one, with high ecological status represented by values close to one and bad ecological status by values close to zero. In Ireland it is calculated as Observed Q-value/Reference Q-value (i.e., Q5). The EQR allows comparison of water quality status across the European Union as each Member State has an EQR value for 'High'; 'Good' etc., based on an intercalibration of boundaries between water quality categories e.g., 'High-Good'; 'Good–Moderate'.

EPA indices, EPA water quality status and Water Framework Directive (WFD) status are interpreted in **Table 2-1.**

Table 2-1: EPA biotic index (Q-value) and equivalent WFD water quality status classes

Biotic Index	EQR[1]	EPA Quality Status	WFD[2] Status
Q5	1.0	Unpolluted	High
Q4-5	0.9	Unpolluted	High
Q4	0.8	Unpolluted	Good
Q3-4	0.7	Slightly Polluted	Moderate
Q3	0.6	Moderately Polluted	Poor
Q2-3	0.5	Moderately Polluted	Poor
Q2	0.4	Seriously Polluted	Bad
Q1-2	0.3	Seriously Polluted	Bad
Q1	0.2	Seriously Polluted	Bad

(colour coding as employed under the WFD as specified in Schedule 3 of S.I. No 272 of 2009: High – blue, Good – green, Moderate – yellow, Poor – orange, and Bad – red

2.2 Habitat Assessments

The habitat assessment included surveys for a general river habitat survey, crayfish/lamprey/salmonid habitat potential and invasive aquatic species. The general physical characteristics and hydromorphological features of each site were recorded including substrate, flow types and aquatic vegetation during surveys. All sites were assessed in terms of:

- Stream width and depth;
- Substrate type, listing substrate fractions in order of dominance;
- Flow type, listing prevalence of flow types in the area;
- Instream vegetation, listing plant species occurring and their percentage coverage of the stream bottom at the sampled area;
- Dominant bankside vegetation, listing the main species overhanging the watercourse;
- Estimated cover by bankside vegetation, and estimated shading of the sampling site, and
- The degree of siltation was recorded on a scale of clean, slight, moderate and heavy, prior to kick sampling.

The rating of habitat for salmonids, crayfish and lamprey is on a scale of *None/Poor/Fair/Good/Very Good/Excellent*. This rating assesses the physical suitability of the habitat; the presence/absence/density of

[1] EQR = Environmental Quality Ratio (Observed/Reference)

[2] WFD = Water Framework Directive (EPA, 2006)

the species in question will also depend on present and historical water quality and accessibility of the section to these species.

A rating of;

'***None'*** indicates that the ecologist carrying out the assessment regards it as impossible that the watercourse could support the species in question in the relevant life stage.

'***None – Poor***' indicates that it is regarded as possible but extremely unlikely that the stream could support the species in the relevant life stage.

'Fair' indicates that it is possible that the stream section could support the species in question.

'**Good**' indicates that the ecologist considerers it possible and likely that the stream could support the species in question.

'**Very Good**' indicates that the stream certainly could support the species.

'**Excellent**' indicates that the ecologist regards the stream as the ideal habitat for the species in question.

2.2.1 Criteria used for Assessment of White-clawed Crayfish Habitat Quality

Assessment of the quality of crayfish habitat is based on published information on the habitat criteria for crayfish (Holdich 2003, Peay 2002 and Peay 2003) as well as the surveyor's personal experience in aquatic sampling and research. The white-clawed crayfish occurs in areas with relatively hard, mineral-rich waters on calcareous and rapidly weathering rocks. Crayfish are found in a wide variety of environments, including canals, streams, rivers, lakes, reservoirs and water-filled quarries and are typically found in watercourses 0.75 m to 1.25 m deep, but the species may occur in very shallow streams (about 5 cm of water) and in deeper, slow-flowing rivers (2.5 m). They occupy cryptic habitats under rocks and submerged logs, among tree roots, algae and macrophytes, although they usually emerge to forage. Juveniles, in particular may also be found among cobbles and detritus such as leaf litter. Adults may burrow into suitable substrates, particularly in the winter months. The presence of juveniles and a varied size range of adults are indicative of a breeding population.

White-clawed crayfish may be found associated with:

- Undermined, overhanging banks;
- Sections exhibiting heterogeneous flow patterns with refuges;
- Under cobbles (juveniles) and rocks in riffles, and under larger rocks in pools;
- Among roots of woody vegetation, accumulations of fallen leaves and boulder weirs;
- Under water-saturated logs;
- Slow-flowing glides and pools (provided there are refuges), localised velocity of 0.1m/s or less;
- Loose boulders (>25cm) or other similarly sized material;
- Boulders or large cobbles in groups with crevices between them;
- Deep crevices in bedrock;
- Underlying substrate of fine gravel/sand with some pebbles;
- Submerged refuges in stable banks (e.g. natural crevices, stone block reinforcement or stable slightly undercut banks with overhanging vegetation, large tree roots, etc);
- Unmortared stone revetting which protects banks from erosion; and
- Stands of submerged and emergent aquatic plants.

2.2.2 Criteria used for assessment of lamprey habitat quality

Each surveyed location was rated for its quality to support lamprey. Assessment of the quality of lamprey habitat is based on published information on the habitat criteria for lamprey (Maitland 2003) as well as the surveyor's personal experience in lamprey sampling. General habitat requirements are discussed for the three lamprey species that occur in Ireland (river, brook and sea lamprey). Lamprey habitat preferences change with the stages of their life cycle. They show a preference for gravel-dominated substratum for spawning similar to salmonids. After hatching, lamprey larvae (ammocoetes) swim or are washed downstream by the current to areas of sandy silt in still or slow flowing water where they burrow and spend the next few years in tunnels. Lampreys therefore require mainly silt and sand dominated substratum for nursery habitat. Other important environmental characteristics for optimal ammocoete habitat are shallow waters with low velocity, and the presence of organic detritus

Suboptimal habitat supporting only a few individuals may consist of a few square centimetres of suitable silt in an open, comparatively high-velocity, boulder-strewn streambed.

The following summarises the ecological requirements of lamprey;

- Spawning habitat is broadly similar to that favoured by salmonids. Usually occurs at the tails of pools where the gravels have been deposited from upstream and the scouring of pools but the current is still reasonably fast with some water flow through the substrate;
- Larval nursery beds are at the edges of streams and rivers, well away from the main current, and that the current over them is often not only very slow, but is actually a backwater in reverse of the main current;
- Water depth in nursery areas is typically 0.1 to 0.5 m with silty/sandy substrate;
- Channelization can be damaging to lampreys, mainly through destruction of their habitat. The removal of areas of riffle and associated spawning gravels, and the dredging of essential nursery silt beds, may entirely eliminate lampreys from a river; and
- Dams/weirs can be obstacles to upstream migration of sea lamprey.

2.2.3 Criteria used for assessment of salmonid habitat quality

Assessment of the quality of salmonid (salmon and trout) spawning, nursery and adult habitat is based on published information on the habitat criteria of salmonids (Bjorn & Reiser 1991, Hendry & Cragg-Hine 2003), water quality criteria listed in the Salmonid Regulations and the surveyor's personal experience in fish sampling and research. Habitat features important to the lifecycle of salmonids include; stream width, depth, flow type, substrate type, vegetation cover, gradient and altitude. These habitat requirements can vary during the life stages of salmonids and the proximity of juvenile habitat to spawning gravels may be significant to their utilisation. The more diverse the stream habitat in terms of substrate, flow rate, depth, riparian vegetation, light conditions etc., the richer the biological community is likely to be, and the more suitable it is likely to be for salmonids.

The presence of overturned gravels lighter in colour compared to the rest of surrounding substrate is used to indicate the presence of salmonid redds. Excessive fine sediment can be detrimental to the survival of eggs by limiting the amount of dissolved oxygen to diffuse across the egg membrane. The presence of 10% fine sediment can reduce egg survival to hatching to 43% (Cocchiglia *et al*., 2012) Fine sediment content of substrate is assessed visually and high levels present indicate reduce spawning habitat quality.

Permanent stream structures such as culverts, dams, bridge abutments, perched aprons and weirs can present an obstacle to upstream migration to spawning sites. Salmon can surmount obstacles 2–3 m high,

providing there is an adequate pool in front of the obstruction. The presence of obstacles is also considered during a habitat survey as well as cumulative impact of many small obstacles.

The following summarises ecological requirement of salmonids;

- Salmon spawning is likely to occur where the gradient of a river is 3% or less;
- Typical spawning sites are the transitional areas between pool and riffle where flow is accelerating and depth decreasing, where gravel of suitable coarseness is present and interstices are kept clean by up-welling flow;
- Salmon fry and parr occupy shallow, fast-flowing water with a moderately coarse substrate with cover;
- Deep or slow-moving water, particularly when associated with a sand or silt substrate, does not support resident juvenile salmonids;
- Suitable cover for juveniles includes areas of deep water, surface turbulence, loose substrate, large rocks and other submerged obstructions, undercut banks, overhanging vegetation, woody debris lodged in the channel, and aquatic vegetation;
- Adults require holding pools immediately downstream of spawning gravels in which they can congregate prior to spawning;
- Cover for adult salmon waiting to migrate or spawn can be provided by overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, floating debris, deep water and surface turbulence; and
- EPA Q-value of Q4 or higher.

Water Quality Criteria within the Salmonid Regulations S.I. 293/1988.

- pH ≥ 6 ≤9;
- Dissolved Oxygen ≥9 mg/l (50% off the time);
- Temperature downstream of point thermal discharge not exceed (a) 21.5°C or (b) 10°C from 1st Nov to 30th Apr during reproductive season;
- Sediment ≤25 mg/l (annual average).

2.2.4 Compliance with the Water Framework Directive (2000/60/EC)

The potential for the proposed development to impact upon water quality is assessed in the context of the EU WFD (Directive 2000/60/EC). The WFD established a framework for the management of water resources throughout the EU. The WFD overarching goal is to achieve at least good ecological status and good chemical status for all surface waters by 2015, or by 2021/2027 via extended deadlines. The WFD aims are specified in Article 1:

- Prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands;
- Promote the sustainable consumption of water;
- Reduce pollution of waters from priority substances and phasing out of priority hazardous substances;
- Prevent the deterioration in the status and to progressively reduce pollution of groundwater; and
- Contribute to mitigating the effects of floods and droughts.

The WFD established four core environmental objectives to be achieved for surface waters which include rivers, lakes, transitional and coastal waters (out to 1 nautical mile):

- Prevent deterioration;
- Protect, enhance and restore good status by 2015;
- Protect and enhance artificial and heavily modified water bodies (aim to achieve Good Ecological Potential and good surface water chemical status); and
- Progressively reducing pollution from priority substances and ceasing or phasing out emissions, discharges and losses of priority hazardous substances.

Environmental objectives are set for each water body in the River Basin Management Plan for Ireland 2018 – 2021 and are based on scientific evidence, extensive surface water quality monitoring, and risk characterisation undertaken by the EPA. The target in most cases is for a river to be of at least good status (Q4).

Figure 2.1: Aquatic survey locations

3 FIELD SURVEY RESULTS

3.1 Site 1 - Owendoher River

At this location the Owendoher is a 10m wide, widened, straightened modified River which has been reinforced with a high wall and is approximately 0.15m deep (ITM 714147 728368). The flow was normal with moderate velocity and the river composed mostly of riffle and glide habitat (50/50%). The river had no turbidity and no colour, there was light shading with no cattle access with predominantly suburban land use. The substrate was made up of mostly cobble and coarse gravel, with low siltation and low levels of plumes when disturbed.

Bank side vegetation mostly comprised of butterfly bush (*Buddleja davidii*), sycamore (*Acer pseudoplatanus)*, snowberry (*Symphoricarpos albus*), ivy (*Hedera hibernica*) and butterbur (*Petasites hybridus*). Low levels of filamentous algae (*Cladophora* sp.) were present and instream boulders were dominated with bryophytes. Macroinvertebrate diversity was low with mainly Group C taxa. More class A species were expected given habitat conditions however no group C species were found in excessive numbers. *Rhithrogenia semicolorata* were numerous however this was the only class A species and given the time of the year (early April) more Class A species would be expected. A Q-value of 3-4 (Moderate) was therefore assigned. A Q4 (Good) was assigned to this river during EPA 2016 survey.

Salmonid and lamprey spawning habitat was rated as *Good* due to the presence of cobble substrate with riffle and glide habitats dominant, resting pools for adults present, and low amounts of siltation present. Levels of dissolved oxygen were found to be 11.5mg/l, a range of cover is provided by overhanging vegetation, instream woody debris making *Very Good* habitat for juvenile brown trout. (Salmon cannot access this river due to barriers in the Dodder)

There were no signs of recent dredging or channelisation of the river however it has been straightened historically. Lamprey nursery habitat was rated as *Fair* due to the presence of some sandy/mud areas available in the margins of the river however the lack of slow flow/backwater areas limited juvenile lamprey habitat.

Good crayfish habitat is present, with detritus/leaf litter providing cover and food sources along with suitable boulder habitat present. Otter spraint was found in a culvert within the Whitechurch Stream just before the confluence with the Owendoher River, no crayfish remains were recorded in the spraint. It must be note that while crayfish habitat was assessed as Good, there are no records within the Dodder sub- catchment for crayfish and the outer ring of the M50 represents the most easterly extent for records.

3.2 Site 2 - Whitechurch Stream

This site is located downstream of the conveyance improvement works (ITM 714230 727996). Here the stream has been heavily modified through straightening, widening and reinforcement of the stream banks. The steam is 3m in width and 20cm in depth. The substrate was found to be a cobble, gravel and fine gravel mixture with low siltation. The velocity was moderate with no turbidity or no colour and light shading. The habitat composition of the river is riffle/glide. Bank side vegetation was composed of sycamore (*Acer pseudoplatanus)*, willow (*Salix* spp.), nettles (*Urtica dioica*), dock (*Rumex* spp.), butterbur (*Petasites hybridus)*, ivy (*Hedera Hibernica)*, bramble (*Rubus fruticosus* agg.) and cleavers (*Galium aparine).* The invasive species, Butterfly bush (*Buddleja davidii)* and Japanese knotweed (*Fallopia japonica*) were also recorded along the bank. Fool's-water-cress (*Apium nodiflorum*), brooklime (*Veronica beccabunga*), low levels of filamentous algae (*Cladophora*) and red alga (*Hildenbrandia*) made up the aquatic vegetation at Site 2.

Within the macroinvertebrate sample there was one A class ‘numerous’ (21-50%) and one ‘few’ (1-5%). Diversity was not reduced and no one species was dominant. A Q-value of Q4 (*Good*) was assigned.

There was *Poor-None* salmonid spawning habitat present with dominant cobble substrate, with mostly glide and some riffle habitat present and no pools.

The habitat most common in the reach was glide with a modified bank and channel. No holding pools were found d/s for resting salmonid adults. A series of small weirs plus a large weir within the reach was recorded downstream of the sample site. The stream is diverted underground for short sections (<100m) both up and downstream of the sampling site.

Fair juvenile salmonid habitat was recorded with shallow moderate flowing sections and coarse substrate. Instream cover was limited in the form of overhanging trees and 1 %boulders. River has been straightened with artificial banks.

Poor-None lamprey spawning and *Fair* nursery habitat was assigned with limit areas of slow flow, silty margins and undercutting. Adult lamprey habitat was rated as *None* due to the historic dredging and channelisation, barriers to access downstream and low percentage of boulder substrate.

Crayfish habitat was *None* with limited leaf litter, low percentage of channel boulder material. Furthermore, at this point the stream was heavily modified with reinforced banks.

3.3 Site 3 - Whitechurch Stream

This sample site is located at the north-west of Saint Enda's Park upstream of a weir (ITM 714365 727522). The stream is 4m in width and 0.15 cm deep. The stream has been straightened historically. The stream has been modified with low concrete banks. The substrate composition is mostly coarse gravel and followed by cobble. The surrounding land use is parkland with access to the stream utilised by dogs noted. The velocity was moderate with no turbidity or colour present, shading was moderate. The river habitat was made up of glide (70%) and riffle (30%). Bank side vegetation comprised of native hogweed (*Heracleum sphondylium*), butterbur (*Petasites hybridus)*, sycamore (*Acer pseudoplatanus)*, conifer spp., holly (*Ilex aquifolium*) and ash (*Fraxinus excelsior*). Cherry laurel (*Prunus laurocerasus*) and flowering currant (*Ribes sanguineum)* were two invasive plants species found. Hildenbrandia coated the instream cobbles and low levels of Cladophora were present instream. Three-spined stickleback (*Gasterosteidae* sp.) were seen in a deep pool under the bridge upstream of the sample site.

Macroinvertebrate species at this site were diverse with 16 taxa present. One class A, *Rhithrogenia semicolorata* were numerous (21-50%) and *Amphinemura* sp. were common (6-20%) The sample site scored Q4 '*Good'*. There were no single taxa dominating the sample and a Q4 was assigned.

Good spawning habitat for salmonid and lamprey was found with coarse gravel and riffle/glide/pool habitat present, holding pools were also present for resting adults. However, there was slight siltation within the gravel substrate and a long weir (60cm high and 3m wide) presenting a barrier to any upward migrating adults.

There was also *Very Good* juvenile salmonid habitat with shallow fast flowing water, coarse substrate and submerged cover present. Although salmon cannot access the Whitechurch Stream this represents optimal habitat for brown trout.

Lamprey nursery habitat was *Fair* with limited areas of slow flow and mud silty margins.

Crayfish habitat was assessed as *'Fair'* with limited boulders and quite shallow flow but overhanging banks, submerged tree roots were recorded.

3.4 Site 4 - Whitechurch Stream

Located at the south-west of St Enda's Park. The stream measure 3.5 in width and 0.15m deep (ITM 714444 727131). Both the channel and banks have been modified via widening and straightening, artificial bank walls (1.5m) were recorded. The substrate comprised of mostly cobble, coarse gravel and fine gravel. Parkland was the surrounding land use. The stream had moderate velocity with no turbidity or colour. The stream habitat was made up of 50% riffle and 50% glide with pools present. Willow, alder, dock, ivy and nettle made up the bankside vegetation. Invasive species present were snowberry (*Symphoricarpos albus*) and butterfly bush (*Buddleja davidii)*. Aquatic vegetation included Fool's-water-cress (*Apium nodiflorum*), brooklime (*Veronica beccabunga*) low levels of filamentous algae (*Cladophora*). Three-spined stickleback was the only fish recorded.

The macroinvertebrate community showed good diversity with 21 taxa recorded. Five class A species were present with numerous *Rhithrogenia semicolorata* common *Ecdyonurus* spp. and *Amphinemura* spp. and few *Isoperla* spp. and *Chloroperla* spp. The stream was assigned Q4-5 (High) at this location.

Good salmonid and lamprey spawning habitat was available with suitable substrate present albeit slight siltation, the main habitat is riffle and glide with some pools present and Q4-5 assigned. The presence of a large 3 meter vertical weir immediately downstream forms another barrier on the Whitechurch Stream to any upstream migrating adults.

Juvenile salmonid habitat was *Fair*, with coarse substrate and moderately flowing shallow water. However, instream cover in the form of boulders, vegetation or debris was very limited. Banks have been reinforced with concrete wall and boulders.

The was *Good* lamprey nursery habitat present with sandy substrates and slow flows present in the margins

Crayfish habitat was rated as *None* due to the heavily modified banks, leaving no soft banks for burrowing, no undercut banks, limited leaf litter and suitable boulder substrate.

The results of the aquatic survey are summarised in **Tables 3-1** to **3-4** below.

Table 3-1: Site 1 Owendoher River

Site Name	Q-value	Invasive sp.	Land use	ITM
Site 1 Owendoher River	Q3-4 Moderate	Butterfly bush Snowberry	Suburban	714147 ,728368

Salmonids	**Spawning:** *Good,* suitable spawning substrate available with low amounts of silt present, riffle/glide/pool sequence present. Q3-4 indicating moderate water quality condition which is tolerated by brown trout but below requirements for salmon and low levels of *Cladophora* present. Salmon access to the Owendoher stream is not possible.
	Juveniles: *Very Good* conditions for brown trout with a range of instream cover provided, areas of fast shallow flow and pools present.
Lamprey	**Spawning**: *Good,* suitable spawning substrate available with low amounts of silt present, riffle/glide/pool sequence present. Q3-4 indicating moderate water quality condition and low levels of *Cladophora* present.
	Nursery habitat: *Fair*, silt/sandy areas and slow flowing/backwater areas available in margins but limited.
Crayfish	**Habitat:** *Good*, detritus/leaf litter providing a cover and food sources and suitable boulder habitat present there was no soft or overhanging banks for burrowing. Crayfish have not been recorded within the Dodder sub catchment.
Comment	Otter spraint in culvert in Whitechurch Stream just before confluence with Owendoher, fish remains in spraint.

Table 3-2: Site 2 Whitechurch Stream

Site Name	Q-value	Invasive sp.	Land use	ITM
Site 2 Whitechurch Stream along Whitechurch road	Q4 Good	Butterfly-bush Japanese knotweed stand	Suburban	714230 727996

Salmonids	**Spawning:** *Poor-None,* dominant cobble substrate, however mostly glide and limited riffle habitat present. No pools present for resting adults and series of weirs downstream presents barrier for upstream migration. Would expect flashy conditions in high flows. Salmon access to the Whitechurch Stream is not possible.
	Juveniles: *Fair,* Q4 assigned, shallow fast flowing water, coarse substrate present. However, Instream cover is limited with some overhanging vegetation. Stretch of stream straightened with artificial banks.
Lamprey	**Spawning**: *Poor-None,* dominant cobble substrate, however mostly glide and limited riffle habitat present. No pools present for resting adults and series of weirs downstream presents barrier for upstream migration. Would expect flashy conditions in high flows
	Nursery habitat: *Fair,* silt/sandy areas and slow flowing/backwater areas available in margins but limited.
Crayfish	**Habitat:** *None*, No soft or overhanging banks for burrowing. Limited detritus instream, artificial banks, low percentage of channel boulder material. Crayfish have not been recorded within the Dodder sub catchment.
Comment	Heron observed flying overhead.

Table 3-3: Site 3 Whitechurch Stream

Site Name	Q-value	Invasive sp.	Land use	ITM
Site 3 Whitechurch Stream, northern end of St Endas park	Q4 Good	Cherry laurel Flowering currant	Parkland	714353 727522

Salmonids	**Spawning:** *Good,* coarse gravel and riffle/glide/pool habitat present, holding pools present for resting adult salmonids. Q4, Slight siltation within the gravel substrate and a large weir (3m wide) which limits upstream access spawning habitat. Salmon access to the Whitechurch Stream is not possible
	Juveniles: *Very Good,* for brown trout with undercut banks and overhanging vegetation and boulders for cover. Shallow moderately flowing water. Large weir restricting movement upstream.
Lamprey	**Spawning**: *Good,* coarse gravel and riffle/glide/pool habitat present, holding pools present for resting adult salmonids. Slight siltation within the gravel substrate and a large weir (3m wide) which limits upstream access spawning habitat.
	Nursery habitat: *Fair*, silt/sandy areas and slow flowing/backwater areas available in margins but limited.
Crayfish	**Habitat:** *Fair*, with limited boulders and quite shallow flow but undercut banks, submerged tree roots and woody debris available instream. Crayfish have not been recorded within the Dodder sub catchment.
Comment	Three-spined stickleback in deep pool under bridge upstream. Recent bankside vegetation clearance upstream of survey site.

Table 3-4: Site 4 Whitechurch Stream

Site Name	Q-value	Invasive sp.	Land use	ITM
Site 4 Whitechurch Stream	Q4-5 High	Snowberry Butterfly-bush	Parkland	714444 727131

Salmonids	**Spawning:** *Good, s*uitable spawning substrate, Q4-5. Habitat mainly riffle and glide with limited pools for resting adults. Slight siltation. Large weir downstream presents a barrier to upstream migration. Salmon access to the Whitechurch Stream is not possible
	Juveniles: *Fair*, moderately flowing water shallow water, suitable water quality but very limited amounts of cover.
Lamprey	**Spawning**: *Fair, s*uitable spawning substrate, water quality present, slight siltation and a very large weir downstream limited the habitat.
	Nursery habitat: *Good,* lamprey nursery habitat present with sandy/silty substrates in margins and slow flows
Crayfish	**Habitat:** *None,* artificial banks, no soft banks for borrowing, no overhanging banks vegetation or trees for cover and limited leaf litter and suitable boulder substrate.
Comment	Three-spined stickleback and minnow noted in stream.

4 CONCLUSIONS

Water quality results (Q-values) at the sampled locations indicate *Moderate* ecological quality within the Owendoher River and *Good* (Q4) to High (Q4-5) ecological quality in parts of the Whitechurch Stream. The Q-value score improved as one travelled upstream from the Owendoher and up the Whitechurch Stream. Of particular note is the High ecological quality within St. Enda's Park which is indicative of the potential this urbanised stream can achieve.

Salmonid and lamprey spawning habitat varied from *Poor to None* to *Good* along the Whitechurch Stream and juvenile salmonid habitat also varied from *Poor to None* to *Very Good.* While there is potential habitat for salmon within the Whitechurch Stream it is noted that their upward migration is restricted to the lower reaches of the Dodder and salmon cannot access the Owendoher and Whitechurch Stream. There is suitable habitat (both spawning and juvenile) for brown trout within the stream, in particular within St. Enda's Park (Sites 3 and 4) with Good to High ecological quality and where the stream has not been as heavily modified and confined.

No brown trout were observed on the day of survey even in pools investigated. A series of large weirs within the Whitechurch Stream would make colonisation from the Owendoher unlikely. If these barriers were removed, then there would be suitable habitat available for trout to move into. An isolated resident population may be present within the upper reaches of the Whitechurch Stream and early research conducted in the 1980's highlighted the stream being an important brown trout nursery stream.

Brown trout are known to occur within the Owendoher with *Good* spawning and *Very good* juvenile habitat observed at Site 4. This river is seen to be important brown trout nursery. Lamprey spp. are also known to occur within the Owendoher with *Good* spawning habitat and *Fair* nursery habitat observed. As a result, works within the Whitechurch Stream for flood alleviation should be cognisant of Owendoher and any release of pollutants (e.g. sediment or chemicals) could impact brown trout and lamprey populations within the Owendoher. The following measures are recommended;

1. Works to facilitate flood alleviation would need to be conducted in accordance with IFI guidance and with plans and timing of works agreed.
2. Given the importance of brown trout in the Owendoher, any instream works should be avoided. If required this should be conducted outside of the spawning season (July to September) and with IFI approval.
3. Obligations under WFD should maintain the current status of the Whitechurch Stream and Owendoher river and degradation prevented. Therefore, the necessary measures to protect water quality should be incorporated into the implementation of the flood alleviation works.
4. If de-watering is necessary to allow works to proceed, water pumped from the contained area should be passed through a settlement pond or pre-fabricated settlement tanks with oil interceptor before being discharged to the river.
5. If required, areas which may be temporarily dammed and dewatered should be kept to the minimum required. Except where absolutely necessary, machinery should operate from the bankside and not instream.
6. If the removal of any structures within the stream is required, it should be first assessed whether large volumes of sediment have not accumulated behind the structure as this will be released downstream upon removal. If this is the case, then measures will be required to prevent this. The method should be agreed with IFI and sediment disposed of correctly.
7. Were possible precast concrete should be used.
8. Any wash down from trucks, machinery should be conducted away from the watercourse and trapped on site, allowed to settle and reach neutral pH before release.

9. For construction activities close to the river bank, eroded sediments should be retained on site with erosion and sediment control structures such as sediment traps, silt fences and sediment control ponds. Sediment ponds and grit/oil interceptors should be placed at the end of drainage channels.
10. No further obstructions to fish passage should be placed in the stream which is already suffering from a number of historical barriers.

While crayfish habitat was noted at Site 3, given the lack of recorded of crayfish within the Dodder sub-catchment and barriers to access it is extremely unlikely crayfish are located within the Whitechurch Stream. No further measures to protect crayfish are therefore deemed necessary.

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Appendix G

Outline Construction Environmental Management Plan (OPW)

Introduction

The preferred option for flood alleviation within the study area will require a detailed Construction Environmental Management Plan (CEMP) which will be developed in Stage II of the project. The following chapters provide a high level overview of the preliminary construction methodology in order to inform the assessment of environmental impacts at the planning stage and inform the final CEMP. It may however be considered as a preliminary draft to the final CEMP at the preliminary design stage.

Description of Proposed Works

Two options have been presented in the Preliminary Design Report as possible flood alleviation schemes for Whitechurch Stream;

Option 1- Direct Hard defences

Option 2 – Direct Defences and Conveyance Improvement (Dredging)

The flood defence works will include;

- Site Compound and site set-up
- New Sections of flood defence wall
- Repair and or/replacement of existing walls
- Construction of a debris trap in St.Enda's Park
- Construction trash screens along Whitechurch Stream
- Site clearance of woody bankside vegetation along the stream which pose a significant blockage risk.
- Bank stabilisation along vulnerable reaches susceptible to scour.
- Removal/replacement of an access bridge.
- Ancillary works e.g. provision of non-return valves on drainage outfalls, diversion and sealing of utility services, demolition of existing structures, public lighting, river railings, footpath reinstatement etc.
- Specific to Option 2 – Dredging of the river bed with weir removal, underpinning of right bank walls and bank protection measures on the left bank

Sensitive Receptors

Sensitive receptors will be identified as a result of Environmental Surveys and detailed in the associated Environmental Reports produced as part of Stage I of this project.

Control of the Construction Process

Roles and Responsibilities

The anticipated roles and responsibilities are outlined below. It should be noted that all members of staff are responsible for ensuring the requirements of the construction methodology are followed.

South Dublin County Council (DCC) Project Resident Engineer

The Project Resident Engineer is responsible for the appointment and co-ordination of competent Project Ecologists around the agreed programme of construction works.

The principal duties and responsibilities of the SDCC Resident Engineer will include:

- Dealing with all queries and complaints from the public. The Site Manager will be responsible for commuting these with the OPW and responding to each of these. The Site Manager will also be responsible for maintaining a register of complaints together with details of follow up actions which have been undertaken.
- Appointment of competent environmental/ecological resources to provide advice and monitoring during the construction phase.

OPW Engineer (Site Manager)

The principal duties and responsibilities of the OPW Engineer in relation to the final CEMP will include:

- Implementing the CEMP, monitoring the performance of subcontractors and maintaining records to demonstrate compliance with and implementation of the Construction Method Statement;
- Routinely updating the CEMP
- Ensuring all site staff receive an induction prior to starting work on-site and are provided with the relevant information concerning environmental sensitivities and protection measures;
- Production of all method statements / risk assessments and PRA's and ensuring an appropriate programme of tool box talks are developed and effectively communicated;
- Working closely with the assigned Project Ecologists to ensure environmental monitoring programmes, inspections etc. are undertaken as required;
- Ensuring that all relevant permits and consents are in place in advance of works commencing and that their requirements are adhered to; and

Project Archaeologist

The Project Archaeologist if deemed necessary will report to SDCC and will be responsible for advising on all archaeological monitoring activities, supervising works and distributing information relevant to monitoring. Their responsibilities and duties will include the following:

- Liaison with the National Monuments Service of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs as required, including applying for a testing licence in sufficient time prior to the construction phase;
- Liaison with OPW Engineer / Foreman to note where there are sites located in close proximity to the proposed development that could be inadvertently impacted during the construction phase;
- Monitor all ground disturbance works associated with the construction phase; and
- Ensure appropriate course of action is taken in the event that archaeological material is discovered during the works.

Project Ecologist

The Project Ecologists will report to SDCC and is responsible for the protection of habitats and species encountered during the construction phase. The responsibilities and duties will include the following:

- Provision of specialist input and supervision of construction activities in relation to sensitive habitats and species;
- Provision of specialist advice on ecological monitoring, and conduct surveys (e.g. otter survey), monitoring and site inspections as set out in the Environmental Impact Statement;
- Liaise with the National Parks and Wildlife Services (NPWS) and Inland Fisheries Ireland as required.

All Staff and Subcontractors

All staff and subcontractors have the responsibility to:

- Work to agreed methods and procedures to eliminate and minimise environmental impacts;
- Note areas of sensitive receptors;
- Understand the importance of avoiding pollution on-site, including water, noise and dust, and how to respond to an event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to the OPW Engineer/Foreman; and
- Co-operate as required with site inspections and audits.

Reporting

All environmental reporting completed by Project Ecologists will be submitted to SDCC and the OPW for their records and any relevant arising actions will be recorded at the SDCC chaired monthly progress meetings.

Monitoring, Continual Improvement and Review

To ensure the CEMP remains 'fit for purpose' for the duration of the construction phase it should be reviewed and updated where necessary to ensure that it remains suitable to facilitate efficient and effective delivery of the project environmental commitments.

Environmental Complaints and Incidents

The OPW Engineer will record any environmental complaints and/or incidents on the OPW incident reporting system. All such incidents will be discussed at the SDCC chaired monthly progress meetings where their status and any arising actions will also be discussed and recorded.

Construction Works Management

Construction Period and Programme

The approximate period from construction commencement to completion of the flood alleviation works is currently estimated at approximately 12 months. This period is subject to revision following detailed design and detailed site investigation. The construction period will be finalised by the Contractor on the project at detailed design stage through consultation and agreement on suitable construction methodologies and sequencing of works with the relevant project stakeholders. A works programme will be drawn up following same for the final project CEMP.

Construction Phasing

The following construction phasing is likely for the Whitechurch stream flood Alleviation Scheme subject to consultation with the relevant statutory authorities and stake holders to agree a works programme and minimise impacts.

- **Consultation:** Consultation with relevant statutory authorities (including Inland Fisheries Ireland) to agree a works programme and detailed design which minimises impacts to aquatic ecology.
- **Site Compound and Welfare Facilities:** Site storage, welfare compound are set up and secured with pad locked gates and perimeter fencing/hoarding within St. Enda's Park.
- **Site Inductions:** Site inductions are held on site at the commencement of construction works. Through site inductions, all site personnel will be made aware of the CEMP, project environmental issues/ sensitive receptors and environmental standards etc.
- **Vegetation management:** Removal of invasive species within the work zone. Tree cutting and removal of bankside vegetation which pose a blockage risk on Whitechurch Stream and removal of tress and bankside vegetation which cause an obstruction to works required for direct flood defences.
- **Sediment Control:** Implemented throughout.
- **Construction of debris trap** within St. Enda's Park including slip way, access works and bank protection.
- **Construction of new flood defence walls**/remediation of existing walls, widening and lower of river bed where required, construction of trash screens and ancillary works. Works to be phased in line with a suitably designed traffic management plan.
- **Removal of site welfare facilities** and compound including reinstatement works within St. Enda's Park.

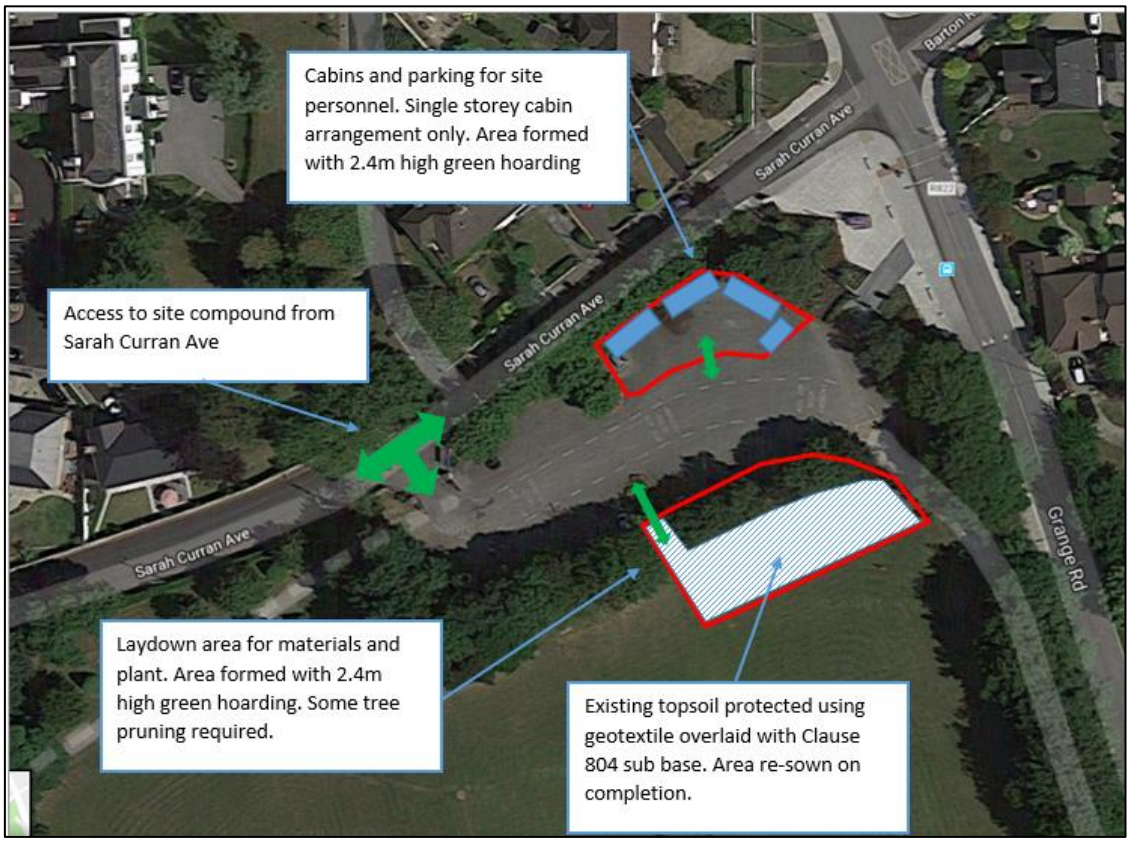
Working Hours

Construction work will be confined to the hours of 0730 to 1630 Monday to Friday. Works will not be permitted outside of these hours. In some instances, approval to vary the prescribed hours may be sought based on the following considerations:

- Nature, location and extent of work to limit potential nuisance;
- Location of the site in relation to 'sensitive' zones;
- The urgency or emergency nature of the works;
- Safety requirements such as risk to the public/workers;
- Sequential/timing issues;
- Traffic management considerations;
- Noise reduction measures;
- Measures taken to address any potential complaints;
- Requirements of other authorities (e.g. ESB, Eircom); and
- Public interest.

Site Compound and Facilities

A site compound and welfare facility will be set-up and will remain operational for the duration of the works. The compound is to be sited within St.Enda's Park with the agreement of Park Supervisor. The proposed location of the compound and welfare facilities can be seen in the Figure below.



Proposed Location of Site Compound and Welfare Facilities

Construction Equipment

During the construction programme, the following plant and equipment will be required on site for use or as contingency.

Plant Equipment	Activity
Excavators, rock breaking and piling attachments (for excavators), mobile crane, pumps, well pointing equipment (for dewatering if required), roller, compacting plates, mats (for excavators), lorries, low loader, dump trucks, dumpers, tractors and trailers, signage and traffic lights, hand held equipment and tools, scaffolding, shuttering and formwork, lighting, generators, concrete mixers, power washers, fencing equipment, road saw, asphalt paver, road sweeper	Construction of reinforced concrete walls Installation of temporary haul roads in the channel or compound areas. Installation of temporary works cofferdams Construction of flood walls Reinstatement works to road pavements and pedestrian paths Demolition of existing redundant structures and general site clearance activities including clearing of vegetation Creation of new access tracks. Temporary traffic controls. Fencing for health and safety maintenance.

Site Security arrangements and public health and safety

The following section details plans to ensure the general public is adequately protected from activities occurring within the site during construction. The OPW will implement documented strategies in compliance with Safety and Health Regulations to provide a safe and secure site. The works area will be maintained in such condition so as to ensure public safety.

Permits / Approvals

Permits / approvals which may be applicable to the works include:

- Permits for openings to public roads, footpaths and grassed areas; and
- Permits for abnormal loads.

The requirement of these permits will be reviewed by the OPW Engineer with the SDCC Resident Engineer prior to construction and regularly thereafter to ensure that the programme is achieved and any new consent requirements are identified as early as possible.

Safety and Security

Only authorised persons will be allowed on site. The site areas will be secured by suitable fencing or hoarding complete with appropriate signage which will advise against unauthorised entry. Before and during construction work, all excavations will be fenced so they do not pose a danger to life or property.

- Adequate lighting, safety signage and traffic controls will be provided at all times. Traffic controls and the Traffic Management Plan will comply with Chapter 8 of the “Traffic Signs

Manual" published by the Department of the Environment, Heritage and Local Government (DoEHLG) and/ and specific SDCC requirements.

- Security measures will be in place at all times when the site is not in operation. Security measures will be provided to safeguard site materials and equipment. The site compounds will be under the remote surveillance of Netwatch.
- All chemicals will be properly stored in secure areas. Required quantities of chemicals will be nominated and procedures will be put in place for the location of storage facilities, secure access and spillage procedures.

General Site Management and Upkeep

All works and potential impacts of construction will largely be contained within the confines of the works area. All precautions for public protection within the street/public domain will comply with the Building Regulations, local law and Safety, Health and Welfare requirements. Raw materials stored on the site will be adequately secured to prevent unnecessary and unsightly dispersal of the materials around the site and public areas. Trees/vegetation that is to remain will be protected where they are near the proposed demolition, excavation and construction works.

Trucks leaving the site will be adequately cleaned to ensure soil, mud and other site debris is prevented from spilling onto adjoining roads and footpaths. Roads and footpaths will be cleaned on a regular basis as required.

Emergency Plan

The project Emergency Response Plan will be included in the Health & Safety Plan and relevant details will be communicated to all site personnel as part of the induction process. This emergency plan has been prepared in compliance with relevant Safety and Health in Construction Regulations. The Emergency Plan will be activated in the event of flood events, fire, chemical spillage, cement spillage, collapse of structures, failure of equipment etc. The Emergency Plan must include contact names and telephone numbers for; Ambulance; Fire Brigade and the Garda Authorities.

Site Access and Egress

The various site road types will be constructed in accordance with the following specifications:

- If required temporary access/haul roads will be designed and constructed to accommodate the existing ground conditions. This will reduce consolidation and avoid any permanent damage to the land;
- On completion of the construction activities, all temporary access roads will be removed and the land and/or channel reinstated.

Note: Temporary haul roads are unlikely to be needed due to the restricted nature of the works, however some improvement works may be required within St. Enda's Park where existing walking tracks are required to accommodate construction traffic. In addition access improvement works may be required in the Capri Site to enable access to the left bank of the river along the site.

Material Disposal / Reuse

Material will be reused as far as possible. Excavated material is to be incorporated into the embankments and final landscaping of the works area or spread locally. This will depend however on the suitability of the excavated material, and unsuitable material will be removed off site for disposal in permitted facilities.

Any material requiring disposal offsite will be disposed of at an appropriate permitted or licensed facility based on Waste Management Acts 1996 as amended. If low levels of contamination are encountered during the construction works, soil testing and a risk assessment of material shall be undertaken to assess its potential for use. In the event that disposal offsite is required, the material shall be tested for disposal at an appropriate waste management facility in accordance with the Waste management Act 1996 as amended.

Construction Restoration

The commitments to restoration and aftercare are as follows:

- During all stages of construction within the site, all reasonable measures will be adopted to confine workings to within as defined a construction corridor as possible, so as to minimise impacts on the surrounding environment;
- The excavation programme will be designed to take cognisance of the ground conditions existing within parts of the site;
- The construction programme and measures will also take account of the environmental sensitivities existing within the site;
- On cessation of works, the lands within the works footprint will be landscaped, sympathetic to the surrounding landscape character;
- All exposed soil surfaces will be seeded; and
- If required the OPW will implement a package of fishery rehabilitation works in the channel on the completion of sections of flood defence.

Environmental Control Measures

Noise and Vibration

Objectives

The following section details plans to minimise the impact of noise on the immediate environs due to construction activities associated with the Whitechurch Stream Flood Alleviation Scheme.

Operating Hours

It is proposed that working hours during the construction phase will be confined to the day time period, between at 0730 and 1630, Monday to Friday. No work shall be planned for outside these hours including weekends or Public Holidays. It should be noted that in some instances, approval to vary the prescribed hours may be sought based on the following considerations:

- Nature, location and extent of work to limit potential nuisance;
- Location of the site in relation to 'sensitive' zones;
- The urgency or emergency nature of the works;
- Safety requirements such as risk to the public/workers;
- Sequential/timing issues;
- Traffic management considerations;
- Noise reduction measures;
- Measures taken to address any potential complaints;
- Requirements of other authorities (e.g. ESB, Eircom); and
- Public interest.
- Emergency flood response/forecast activities.

Noise Controls

Measures will be implemented to minimise the impact of noise emissions at sensitive locations during the construction phase. Such measures will include the following:

- The OPW and their subcontractors will be required to comply with the requirements of the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations and the Safety, Health and Welfare at Work (Control of Noise at Work) Regulations;
- All plant items used during the construction phase should comply with standards outlined in the 'Safety, Health and Welfare at Work (Control of Noise at Work) Regulations' and the 'European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations'. Reference will be made to BS 5228: Part 1: 2009 (Noise Control on Construction

and Open Sites - Part 1. Code of Practice for Basic Information and Procedures for Noise Control) and will include the following mitigation measures:

- Training of site staff in the proper use and maintenance of tools and equipment;
- The positioning of machinery on site to reduce the emission of noise and to site personnel;
- Sources of significant noise will be enclosed where practicable;
- Machines that could be in intermittent use will be shut down between work periods or will be throttled down to a minimum;
- Plant known to emit noise strongly in one direction will, when possible, be orientated so that the noise is directed away from noise sensitive areas; and
- Plant and/or methods of work causing significant levels of vibration at sensitive premises will be replaced by other less intrusive plant and/or methods of working where practicable.

– Inherently quiet plant will be selected where appropriate particularly in the case of pump sets which will invariably be required to run continuously throughout the working shift.
– Screening and enclosures will be utilised in areas where construction works are continuing in one area for a long period of time or around items such as generators or high duty compressors. For maximum effectiveness, a screen will be positioned as close as possible to either the noise source or receiver. The screen will be constructed of material with a mass of >7kg/m^2 and should have no gaps or joints in the barrier material. This can be used to limit noise impact to any noise sensitive receptors;
– Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery and mobile equipment will be throttled down or switched off when not in use;
– Accordingly, where possible all construction traffic to be used on site will have effective well-maintained silencers; and
– All mobile plant will be maintained to a high standard to reduce any tonal or impulsive sounds.

Vibration Controls

Any construction works that have the potential to cause vibration at sensitive receptors will be carried out in accordance with the below limit values at the various residential and business properties. Monitoring using a Vibrock vibration monitor will be implemented prior to and throughout the works so as to obtain baseline and construction stage results.

(NRA recommended figures) Allowable vibration velocity (Peak Particle Velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of:		
Less than 10Hz	10 to 50Hz	50 to 100Hz and above

8mm/s	12.5mm/s	20mm/s

Management of Dust during construction

Objectives

The following section details plans to ensure that air quality (airborne dust and pollutants) within the environs of the Whitechurch Stream Flood Alleviation Scheme are maintained at acceptable levels throughout the construction period.

Identification of Dust Sources

The main activities that may give rise to dust emissions during construction include the following:

- Materials handling and storage; and
- Movement of vehicles (particularly Heavy Goods Vehicles) and mobile plant.
- Cutting of masonry elements

Dust Mitigation Measures

The following mitigation measures will be implemented on site during the construction phase, as required:

- Site roads shall be regularly cleaned and maintained as appropriate;
- Hard surface roads shall be swept to remove mud and aggregate materials from their surface as a result of the development works;
- Any un-surfaced roads shall be restricted to essential site traffic only;
- Any road that has the potential to give rise to fugitive dust may be regularly watered, as appropriate, during extended dry and/or windy conditions;
- On-site speed limits will be stipulated to prevent unnecessary generation of fugitive dust emissions;
- Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind;
- A complaints register will be maintained on-site and any complaints relating to dust emissions will be immediately dealt with;
- In periods of dry weather when dust emissions would be greatest, a road sweeper, which would also dampen the road, will be employed in order to prevent the generation of dust;
- Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods; and

- If appropriate, dust monitoring will be carried out during the construction phase of the scheme. If the level of dust is found to exceed 350mg/m^{2}day in the vicinity of the site, further mitigation measures will be incorporated into the construction of the proposed flood relief scheme.

Soils and Water Management

Objectives

The following section details measures to ensure soil and water resources are protected during the construction of the proposed flood relief scheme.

Soil Management Controls

- Works will be undertaken in accordance with CIRIA 650 'Environmental good practice on site'.
- To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within specially constructed dedicated temporary bunded areas.
- Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area, away from surface water gullies or drains. Plant used on haul roads within the channel shall be moved to the top of bank to a designated refuelling location.
- Spill kits and hydrocarbon adsorbent packs will be stored in a designated area and operators will be fully trained in the use of this equipment.
- Biodegradable hydraulic fluid will be used on all OPW owned and hired plant.
- Where excavation are undertaken <5m from existing structures, the design may require a number of measures to provide stability of the excavations including sheet piling or propping to existing structures. In some cases, it may be necessary to underpin the foundations of existing structures where excavations are in close proximity and to a level which is lower than that of the existing foundation. A detailed condition survey should be conducted on properties within 5m of the works prior to and post construction.

Water Management Controls

- Any raw materials, fuels and chemicals, will be stored within bunded areas to guard against potential accidental spills or leakages.
- All equipment and machinery will have regular checking for leakages and quality of performance and will also be maintained in accordance with the manufacturer's instructions (including preventative maintenance)..
- Biodegradable hydraulic fluid will be used in all OPW owned and hired plant.
- Measures to be used to protect the water environment during the construction works will follow the relevant section of the NRA's documents 'Guidelines for the Crossing of

Watercourses during the Construction of National Road Schemes' (NRA, 2005). The fisheries board documents "Maintenance and protection of the inland fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board" (Kilfeather, 2007) and 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' (Murphy, 2004) and Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016) would also be followed where relevant.

- The river in-channel works will be carried out during dry weather and halted during heavy rainfall events to reduce suspended solids in the river. Equally, works will not be carried out on submerged haul roads during times of elevated river levels/flows.
- Spoil and removed vegetation material from the river is to be stored no less than 5m back from the river and vegetation within this 5m buffer zone is to be retained, in order to reduce the run-off of suspended solids back into the watercourse. Where this is not practicable due to space constraints, suitable bunding shall be put in place.
- All in-stream works must be carried out in accordance with an approved method statement and under the direction of Inland Fisheries Ireland personnel.

Relevant OPW Environmental Procedures

- EP10 Silt Management Procedure
- EP16 Machinery related Procedure

Web link for these provided: https://www.opw.ie/en/media/environmental-guidance-drainage-maintenance-and-construction-2019.pdf

Waste and materials reuse management

Objectives

The following section details plans to maximise the re-use and/or recycling of construction materials throughout the construction of the proposed flood relief scheme.

Permits/Approvals

In relation to waste and materials reuse management, only approved waste collection permit holders will be contracted for the collection of waste from the site during the construction phase of the Whitechurch Stream Flood Alleviation Scheme.

General Waste Management

To effectively manage waste on site, the following measures will be adopted:

Waste Minimisation

- Reduce waste or surplus materials on site by avoiding over-estimation of purchasing requirements, minimising packaging materials and buying environmentally approved and recycled content products;
- Ensure materials are not delivered to site damaged and unusable;
- Where possible, establish a 'take back' system with suppliers;
- Where possible, purchase environmentally approved and recycled content products; and
- Limit the amount waste going to landfill by reusing and recycling where possible.

Waste Storage & Segregation

- Ensure all wastes are handled and stored correctly;
- All wastes will be segregated and labelled appropriately;
- Provisions will be made for collection of rubbish from canteens, offices etc.;
- Waste will be stored in appropriate containers which take into consideration the physical properties, chemical composition, quantities and hazardous nature of the waste;
- Waste containers will be secure to prevent the uncontrolled release of waste and stored in designated areas, with necessary containment and protection measures to prevent uncontrolled releases; and
- Storage and collection provisions will be made for recyclable materials including cardboard, glass, metal, plastic, green waste and other materials.

Reuse & Recycling

- Provisions will be made for the re-use or recycling of any timber, paper, cardboard, glass and other materials, where appropriate.

Waste Removal & Disposal

- All waste (materials that cannot be reused or recycled) from the site will be removed off site by a suitably approved and licensed waste contractor to a licensed waste disposal facility.

Traffic management

Objectives

The following section details plans during the construction phase to ensure that the impacts to the public road network during the construction phase of the project are minimised and that transport

related activities are carried out as safely as possible and with the minimum disruption to other road users.

Traffic Management Plan

The Principal Contractor shall prepare a Traffic Management Plan for approval by the OPW and South Dublin County Council once detailed project designs are available and in advance of any construction works commencing.

Road network/ Site Access

The Whitechurch Stream Flood Alleviation scheme is accessible by several major routes. All deliveries to site should be co-ordinated via the above major routes and this will be briefed to the OPW's own delivery/transport operators as well as the supply chain.

Training and Awareness

All construction personnel, subcontractors and consultants will receive training during the site induction and toolbox talks. This will include a traffic management component to reinforce the importance of traffic management issues and the measures that will be implemented to protect the environment and community.

Site inductions and toolbox talks will highlight the specific environmental requirements for activities being undertaken at each worksite, which will include relevant traffic management matters. All drivers associated with the project are to abide by the relevant driver behaviour requirements and laws including speed restrictions, observation, fatigue management, vehicle maintenance and the onsite drugs and alcohol policy.

Matters for consideration

The below listed construction activities will impact on local traffic within the area.

- Access to and from the site compounds and satellite construction sites.
- Works along Whitechurch Road.

Deliveries to and from the site

There will be deliveries required to and from site throughout the programme of works which will include construction plant, ready mixed concrete, reinforcement steel, granular material and the removal of waste materials from the site.

Construction of the proposed scheme will require the delivery to site of significant quantities of construction materials. The bulk of these materials will be engineering fill for concrete for retaining walls. Material will be excavated and disposed off-site to permitted licensed disposal sites. Material will

be removed by heavy goods vehicles (HGV) with a capacity of approximately 10m^3 capacity. HGV movements will normally be scheduled for between the hours of 1000 and 1530hrs to avoid impacting on times of peak traffic.

Traffic Management Signage

All signage shall be provided in accordance with the Department of Transports Traffic Signs Manual, November 2010 – Chapter 8- Temporary Traffic Measures and Signs for Roadworks.

Traffic Speed Limits

Adherence to posted/legal speed limited will be emphasised to all staff and contractors during the induction training.

Road Cleaning

Regular visual cleaning surveys of the road network in the vicinity of the site will also be carried out. Where identified/ required, the OPW will carry out road sweeping operations, employing a suction sweeper, to remove any project related dirt and material deposited on the road network by construction related vehicles.

Traffic Management Mitigation Measures

The OPW will ensure that traffic management mitigation measures detailed within the Environmental Report are considered, including those listed below.

- The deliveries to and from site will be undertaken to minimise disruption to the roads network particularly during times of peak traffic flow.
- Where possible, measures will be adopted to ensure that construction traffic travels minimal distances along sensitive routes (residential or congested roads) and those vehicles will be kept clean when on public highways.
- The OPW will liaise with SDCC with sufficient advanced notice before any road closures take place.

Flora and fauna

Objectives

The following section details plans to manage the impact on the terrestrial and aquatic ecology during the construction of the proposed flood relief scheme.

Matters for consideration

Several ecological receptors may be present within the study area. Matters, with regards to flora and fauna that are to be considered during the construction phase are as follows:

- In-channel works;
- Bankside Works
- Birds
- Bat Protection
- Invasive Species

In-Channel Works

The following mitigation measures will be implemented on site during the construction phase, as required:

- Construction method statements to include details of all constraints and mitigation measures which are to be implemented during the course of the works. All such method statements should be reviewed and accepted by IFI prior to the associated works commencing.
- To protect salmon and trout it will be necessary to time works which require access into the channel (excludes haul roads) outside the window of October to May. The appropriate season for in-channel works for Whitechurch Stream will be determined in consultation with Inland Fisheries Ireland.
- During pumping operations, all pumped water is to pass through suitably sized settlement tank(s) and a silt removal bag. The system is to be regularly reviewed during the working shift to monitor its effectiveness.
- Works to be carried out off haul roads constructed from imported granular material free from contamination such as building waste. Therefore all material must be crushed virgin material and suitable for supporting heavy construction plant.
- If it is necessary to construct a damned area within the channel, the area should be kept to a minimum and the plant should be positioned on a suitable platform or on the riverbank. Prior to dewatering a damned section of the channel, prior approval of IFI must be sought as well as advice and attendance requirements for fish rescue operations. Before any area is de-watered, suitable juvenile lamprey habitat, and suitable salmonid nursery habitat in adjacent areas of river should be identified in consultation with IFI. Following installation of dams, the enclosed waters should be electrofished by an operator (licensed by NPWS and Department of the Marine). It should be noted that the optimum period for electrofishing is July – August. All lamprey and salmonids captured should be transferred to the selected nearby habitat. All other fish should be released to the river.
- Dedicated wash out stations shall be set up at each satellite site where it is planned to delivered ready mixed concrete. All such washout station shall be clearly signed and delivery drivers briefed.

- The timing of the works will be agreed in advance with the National Parks and Wildlife Service and Inland Fisheries Ireland.
- Measures to be used to protect aquatic ecology during the construction works will follow the relevant section of the NRA's documents 'Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes' (NRA, 2005)1 and 'Guidelines for the treatment of otters during the Construction of National Road Schemes' (NRA, 2006)2.
- Brook lampreys spawn in the spring and early summer months and the timing of works will also take this species into account.
- All necessary measures will be taken to prevent the release of oil, fuels or other pollutants into the River Dodder.
- The OPW will ensure that measures to be used to protect aquatic ecology during construction works will follow the relevant section of the NRA's documents 'Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes' (NRA, 2005). The fisheries board documents "Maintenance and protection of the inland fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board" (Kilfeather, 2007) and 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' (Murphy, 2004), and Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (IFI, 2016) will also be followed where relevant.
- The works will be carried out during low river flows off temporary haul roads and existing roads to reduce suspended solids in the river.
- If required a programme of Fishery Rehabilitation Works will be carried out following completion of flood defence works in a section of the channel.

Bankside Works

The following mitigation measures will be implemented on site during the construction phase, as required:

- Measures to be used to protect aquatic ecology during the construction works will follow the relevant section of the NRA's documents 'Guidelines for the Crossing of Watercourses during

[1] NRA (2005) Guidelines for the crossing of watercourses during the construction of national road schemes. National Roads Authority.

[1] NRA (2006b) Guidelines for the treatment of otters during the Construction of National Road Schemes. National Roads Authority.

the Construction of National Road Schemes' (NRA, 2005)3 and 'Guidelines for the treatment of otters during the Construction of National Road Schemes' (NRA, 2006)4.

- Refuelling of machinery will not take place at the river side.
- Runoff from wall or embankment will be prevented from entering the channel.
- Works will be carried out on a phased basis, disturbing only one river cell between bridges. This will give flora and fauna a better chance for recovery.
- River banks will be left intact where possible. Where it is necessary to disturb the bankside material, all practicable measures will be taken to prevent disturbed sediments from entering the river.

Birds

The following mitigation measures will be implemented on site during the construction phase, as required:

- An experienced Ecologist will be on site when required during construction works to provide ecological advice to avoid and/or minimize ecological impacts.
- It is recommended that woody vegetation removal be undertaken outside of the main bird nesting period which begins on March 1st and continues until August 31st. A licence is required from the National Parks and Wildlife Service under the Wildlife Acts 1976 and 2000 if any habitat (e.g. scrub, trees, hedgerows) to be removed is known to contain nesting birds. If this work is undertaken outside the breeding season (i.e. 1st March to 31st August), then such a licence would not be required and would ensure compliance with the Wildlife Act 1976 and Wildlife (Amendment) Act 2000.

Bat Protection

The following mitigation measures will be implemented on site during the construction phase, as required:

- An experienced Ecologist will be on site when required during construction works and site clearance of mature trees to provide ecological advice to avoid and/or minimize ecological impacts.

3 NRA (2005) Guidelines for the crossing of watercourses during the construction of national road schemes. National Roads Authority.

4 NRA (2006b) Guidelines for the treatment of otters during the Construction of National Road Schemes. National Roads Authority.

- The OPW shall liaise with SDCC regarding the requirement for an Ecologist to attend site for tree felling / site clearance works to facilitate the proposed permanent works on the Whitechurch Stream FAS.
- Trees and treelines should be retained where possible. Retained trees should be protected from root damage by machinery by an exclusion zone of at least equivalent to canopy cover. The storage of plant or materials within 5m of mature trees shall be prohibited.

- Mature trees, which are to be removed, should be felled in the period late August to late October, or early November, in order to avoid the disturbance of any roosting bats as per National Roads Authority Guidelines (NRA 2006a and 2006b). Tree felling should be completed by Mid-November at the latest because bats roosting in trees are very vulnerable to disturbance during their hibernation period (November – April). Ivy-covered trees, once felled, shall be left intact onsite for 24 hours prior to disposal to allow any bats beneath the foliage to escape overnight.

Invasive Species

The following mitigation measures will be implemented on site during the construction phase, as required:

- Japanese Knotweed is known to be found along the banks of the Whitechurch Stream and exist within the proposed construction zone.
- Pre-construction surveys of working areas will set out to identify any invasive species in the area. The timing of these surveys needs to be schedule at specific times of the year and therefore emphasises the need for forward planning of the works. The OPW will liaise with SDCC regarding pre-works surveys which need to be carried out by a competent Ecologist.
- In the case of Japanese Knotweed, should the OPW and / or Ecologist observe this specie in a proposed work zone the following actions will be taken.
    - The issue will be reported to SDCC and to RPS Consulting and the area fenced off and appropriately signed to prohibit unauthorised access.
    - Advice sought from the Ecologist regarding the options for managing the plant.
    - The OPW will prepare a detailed method statement and submit it to the Ecologist to support a License application.
    - Where practicable, The OPW will pursue the option of pesticide treatment by a competent company. However, due to programme constraints this option may not always be feasible.

- Burial or on site treatment of Japanese Knotweed will not normally be considered due to the space available and to avoid legacy issues.
- The OPW will engage the services of a waste management company licensed and experienced to transport, handle, treat and dispose of the excavated arising's.
- Where disturbance is required of material potentially contaminated with Japanese Knotweed, the material will be removed under License and the supervision of the Ecologist.
- All staff will be briefed using tool box talks regarding the rules and protocols around handling Japanese Knotweed.

– All tracked plant used on site shall be thoroughly cleaned prior to leaving site regardless of whether there was a known issue of an Invasive Species in the works area.

Relevant OPW Environmental Procedures

- EP7 Fishery Enhancement Procedure
- EP9 Tree Management Procedure
- EP10 Silt Management Procedure
- EP16 Machinery related Procedure
- EP 17A Spread of Invasive Plant (Low Biosecurity) Procedure
- EP 17B Spread of Invasive Plant (High Biosecurity) Procedure
- EP 17D Invasive Plants Treatment Procedure
- EP 18 Salmonid Procedure
- EP19 Otter Procedure
- EP20 Lamprey Procedure
- EP22 Badger Procedure
- EP24 Birds Procedure
- EP25 Bats Procedure

https://www.opw.ie/en/media/environmental-guidance-drainage-maintenance-and-construction-2019.pdf

LANDSCAPE MANGEMENT

Objectives

The following section details plans to manage the impact on the local landscape during the construction of the proposed flood relief scheme.

Matters for consideration

The impact of the works on the Landscape will be considered in terms of Character and Visual impact. The impacts of both of these can be mitigated to some extent during the construction phase of the

Whitechurch Stream Flood Alleviation Scheme. The impact on character, which is concerned with alterations to physical structure of landscape or townscape that may give rise to changes in how it is experienced or perceived. Visual impact is concerned with changes that arise in existing views and the overall effects on the visual amenity of the area. The proposed construction works are likely to have some short and long term impacts on the landscape and therefore the following mitigation works are proposed.

Landscape Mitigation Measures

The following mitigation measures will be implemented on site during the construction phase, as required:

- Works will proceed only on the basis of agreed Construction Method statements for each element of the proposed works.
- Vegetation removal (particularly mature trees and tree-lines) will be the minimum required for the construction works – but shall also include for the safe removal of trees where there removal has been recommended on safety grounds.
- Retained trees should be protected by fencing prior to other works commencing ideally to an exclusion zone of at least equivalent to canopy cover – elsewhere to the maximum possible.
- Trees in the vicinity of works (i.e. within root protection area (RPA) as per BS5837) shall be subject of a detailed pre-construction tree survey carried out a qualified Arborist. Any works recommended – including crown reduction/remediation measures – shall be undertaken and the survey shall be made available to the Client.
- Disturbance to private boundaries, gardens, etc. shall be avoided wherever possible and where impacted shall be reinstated prior to completion of the works.
- Machinery shall not enter the river unnecessarily unless it is on a purposely constructed haul road above the river level.
- River banks will be left intact and vegetated wherever possible. Coppicing and/or selective removal of trees may be considered where required in preference to total vegetation removal.
- Existing characteristic features shall be removed prior to other works commencing and set aside for reuse and / or alternative use.
- All landscape, footpath, roads etc., disturbed during the course of the works shall be fully reinstated prior to the completion of the construction works.
- Japanese Knotweed is particularly common along many stretches of the river. Works on river banks should seek to control/eradicate such invasive species. The OPW shall ensure that sufficient controls are in place to prevent the spread of such species within the works area.

- Restoration and improvement of river channel on completion of the works by implementing a package of enhancement works.

Relevant OPW Environmental Procedures

- EP7 Fishery Enhancement Procedure
- EP9 Tree Management Procedure
- EP 17A Spread of Invasive Plant (Low Biosecurity) Procedure
- EP 17B Spread of Invasive Plant (High Biosecurity) Procedure
- EP 17D Invasive Plants Treatment Procedure

https://www.opw.ie/en/media/environmental-guidance-drainage-maintenance-and-construction-2019.pdf

Inspection and Monitoring

Objectives

Inspection and monitoring of the environmental effects of construction activities will enable the effectiveness of environmental mitigation to be evaluated. It will also allow environmental problems to be identified and responded to an early stage. The following section outlines the monitoring activities proposed for implementation on site to optimise environmental performance during the construction phase of the development.

Matters for Consideration

Archaeological Monitoring

An experienced Project Archaeologist will be appointed by SDCC if required, prior to the commencement of works. Archaeological monitoring will be carried out in areas of moderate archaeological potential including all excavation locations associated with construction works and within the existing river channel.

All construction related excavation and ground disturbance works will be monitored in full by the appointed Project Archaeologist.

The OPW will be responsible for communicating a schedule of ground disturbance / excavation works with the appointed Project Archaeologist in a timely manner, such that monitoring may be coordinated with development works.

If archaeological features or potential archaeological features are found during the course of works, site personnel are required to stop work immediately and contact the OPW Foreman / Engineer and Project Archaeologist for instruction. The appointed Project Archaeologist has the authority to immediately

stop works in the area. All instructions/advice provided by the appointed Project Archaeologist must be adhered to unless there are overriding health and safety matters.

If newly recorded sites are detected they will be fenced off and excluded from construction works. In accordance with the requirements of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, satisfactory arrangements will be provided for the recording and removal of any archaeological material, which may be considered appropriate to remove in consultation with the relevant authorities.

Upon completion of works, the appointed Project Archaeologist will submit a written monitoring report to the OPW and the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. This report will comment on the degree to which works associated with the proposed flood relief scheme will affect any archaeological remains.

Archaeological Testing

Archaeological testing will be undertaken where required to ensure that any archaeological deposits are identified as early as possible, thereby ensuring that any loss from the archaeological record is minimised.

Under licence to the National Monuments Service of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, the Project Archaeologist will observe normal construction works in this area. Construction works in this area are to be undertaken using toothless grading bucket, thereby ensuring the early identification of archaeological deposits and minimal loss to the archaeological record.

If possible this testing should be undertaken preconstruction, to ensure that sufficient time can be allowed within the construction schedule for the excavation of any archaeological deposits discovered.

Ecological Monitoring/ Inspection

An experienced Ecologist will be appointed for the construction phase to ensure the ecological mitigation measures identified within the Environmental Report(s) are implemented.

In consultation with the OPW, authority will be given to the Project Ecologist to authorise, oversee and identify actions, including any temporary stoppage of works, to ensure satisfactory construction arrangements and any necessary mitigation for the protection of site ecology (terrestrial and aquatic). It is proposed that the Project Ecologist will also carry out or supervise the monitoring programmes relating to the protection of site habitats and species.

Site monitoring by the assigned Project Ecologist is required so as to advise the site staff regarding pollution controls, fish management, minimising localised tree clearance impacts, habitat reinstatement

(replanting) and conducting updated pre works otter, badger and bird surveys. Specific ecological monitoring required is discussed below.

Retained hedgerows/trees/woodland

The Project Ecologist will inspect works in areas where adjacent hedgerows, trees and woodland habitats are to be retained to ensure they are marked/ fenced off. This is to avoid indirect damage to these habitats. No materials should be stored within 5m of retained hedgerows/trees/woodland. Materials, especially soil and stones, can prevent air and water circulating to the roots of trees/shrubs.

Otter survey

Preconstruction survey may be required if a year has passed between grant of permission and commencement of works. During vegetation clearance along the Whitechurch Stream, the Project Ecologist will resurvey this area. If a holt is found, appropriate mitigation following NRA *Guidelines for treatment of otters prior to construction of road schemes* (NRA 2006) will be implemented. These surveys will include assessing breeding activity within the site and submission of a license application to the National Parks and Wildlife Service, if required.

Birds

If vegetation removal works are to be undertaken between the 1st March and 31st August (i.e. the bird breeding season), the Project Ecologist will inspect these habitats (trees/scrub/hedgerows) to determine if any nest sites are present. If a nest is present within any habitat to be removed, then a licence application to the National Parks and Wildlife Service will need to be submitted.

Translocation of fish

If necessary and in consultation with Inland Fisheries Ireland, the translocation of fish from the existing channel to the new channel will be undertaken using a specialist contractor engaged to do this work. This work will be supervised by an IFI representative to ensure approved methods, as per the provided and approved contractor method statement, are being used.

Water quality controls

The Project Ecologist / IFI representative will periodically inspect the silt removal system during the construction stage to ensure they are working effectively. The Project Ecologist / IFI representative will also carry out inspections on site to ensure that spoil and removed vegetation material from the river is to be stored no less than 5m back from the river and vegetation within this 5m buffer zone is to be retained. This is to reduce the run-off of suspended solids back into the water course.

Dust Monitoring

During long periods of construction work activity dust monitoring is recommended near site boundaries/sensitive receptors. The TA Luft/VDI 2119/Bergerhoff Method of dust emission monitoring will be employed. It is recommended that the TA Luft total dust deposition limit value (soluble and insoluble) of 350 milligram per square metre per day be adopted. If dust levels are found to be higher than 350 milligram per square metre per day, further mitigation measures will be required.

Traffic

Continuous monitoring by the OPW will be required to ensure that the Traffic Management Plan does not result in unnecessary delays to traffic using the surrounding road network. This will be done by visual inspection of traffic queues during peak times and then an adjustment of the plan if required.

Environmental Site Auditing/Inspections

The OPW will be required to demonstrate how the requirements of this CEMP are being complied with.

Environmental audits will be undertaken on site on a regular basis, to ensure that the mitigation measures proposed in the CEMP are implemented. The topics for environmental inspection and monitoring during and, where appropriate, following construction will include, but not limited to, the following:

- Sediment control and water quality;
- Construction traffic management;
- Construction waste management;
- Construction noise management;
- Construction Air & Dust;
- Protection of Site Ecology;
- Protection of Site Archaeology;
- Material and plant storage areas;
- Fuel storage and handling;
- Site Reinstatement; and
- Complaints Management.

All audits will be completed by a suitably qualified person. Written records of environmental site audits reports are to be maintained on site and any required corrective actions or recommendations will be circulated to all the Project Team, including the OPW for implementation.

In addition to Environmental Site Audits correction actions, any additional monitoring or maintenance requirements specified by regulatory authorities will be fully complied with.

Conclusions

The preferred option for flood alleviation within the study area will require a detailed Construction Environmental Management Plan (CEMP) which will be developed in Stage II of the project This construction methodology/preliminary CEMP has been developed to demonstrate the commitment to Environmental Management. It may be considered as a preliminary draft to the final CEMP at Stage I of this project.

The construction methodology/preliminary provides a high level overview of the preliminary construction methodology in order to inform the assessment of environmental impacts at the planning stage and inform the final CEMP. It considers possible environmental measures that are to be implemented and the procedures to be followed for the scope of constructions works to ensure that potential environmental impacts are effectively managed, minimised and / or eliminated.

This preliminary CEMP details the roles and responsibilities of the OPW, Engineer and other staff and how these controls are to be implemented. The final CEMP is an overarching document with a Construction Method Statement to be provided prior to commencement of each stage which will be required to accord with the requirements of the CEMP.

The final CEMP will require regular monitoring prior to the commencement of each stage of works and through the construction period to ensure potential risks are adequately managed throughout the construction works phase.

Appendix H

Outline Invasive Species Management Plan

WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME

Outline Invasive Species Management Plan

MDW0825
Outline Invasive Species Management Plan
F01
24 March 2020

rpsgroup.com

Document status

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Contents

Tables

1 INTRODUCTION

RPS Group was commissioned by South Dublin County Council to provide planning advice on the development of the proposed Whitechurch Stream Flood Alleviation Scheme (FAS) in South County Dublin. This included the provision of ecological services to undertake an ecological impact assessment and Appropriate Assessment (and all ancillary reports including this Outline Invasive Species Management Plan) with which to inform the planning submission for the proposed development.

1.1 Background

The Whitechurch Stream[1] rises in the foothills of the Dublin Mountains at an elevation of approximately 480m OD between Tibradden and Kilmashogue. The river is approximately 7.8km in length before it discharges into the Owendoher River which itself flows into the Dodder River.

The Whitechurch river is characterised as a spate river which is prone to rapid fluctuation in water levels. Features which contribute to the flashy nature of the watercourse include:

- Large rainfall events in the upper sections of the watercourse releasing water to the lower catchment;
- Topographical changes from mountainous reaches to the downstream area in a relatively short distance; and
- The urbanised nature of the lower catchment and highly modified constrained nature of the watercourse.

The River Dodder Catchment Flood Risk Management Plan (2014) identified an Area of Potential Significant Risk (APSR) relating to Tara Hill and St Enda's. This is now referred to as the Whitechurch FAS.

1.2 Summary Project Description

The study area considered for the purposes of the current flood alleviation scheme extends from the South western corner of St Enda's Park (Taylors Lane) downstream to the confluence with the Owendoher River – where Whitechurch road merges onto Willbrook Road. Owing to the nature of the watercourse, which is a spate river subject to rapid changes in water levels and owing to its location in a highly urbanised setting, it is highly modified. The watercourse is relatively narrow, constrained by adjoining developments – houses, roads and the man-made river structures rather than natural sediments.

The preliminary options report, prepared by the OPW, provided a hydrological assessment and modelling for a range of potential options in relation to providing flood relief to the area. The proposed development comprises a series of flood alleviation measures including debris management and the introduction of direct defences at various locations along Whitechurch Stream between St Enda's park and the tie-in of the Whitechurch Stream to the Owendoher River.

A full project description is provided in the EcIA (RPS 2020).

1.3 Invasive Alien Plant Species in Ireland & the Legislative Framework

Invasive alien species are plants and animals that are introduced accidently or deliberately into a natural environment where they are not normally found, with serious negative consequences for their new

[1] For the purposes of this report, the watercourse will be referred to as the Whitechurch Stream, although it is recognised that it is also known locally as the River Glynn and as the Kilmashogue river on the EPA database.

environment. They represent a major threat to native plants and animals on a global scale and are considered as one of the most significant drivers of ecological change.

Action 28 of the first National Biodiversity Plan (2002) required Ireland to prepare strategies, in consultation with Northern Ireland, to control introduced species and to prevent, or minimise future (accidental or deliberate) introduction of alien species, which might threaten biodiversity both within and outside protected areas. The National Biodiversity Action Plan 2017-2021[2], Ireland's 3rd National Biodiversity Plan builds on this and Target 4.4 of Objective 4 Conserve and restore biodiversity and ecosystem services in the wider countryside aims to ensure *"Harmful invasive alien species are controlled and there is reduced risk of spread of new species".*

There are many invasive species that can be found in Ireland including terrestrial plants, aquatic plants and animal species which can cause damage to native ecosystem functions and their services. The control of invasive alien species in Ireland is regulated through the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), specifically Regulations 49 and 50 as follows;

Regulation 49

'*a person shall be guilty of an offence if they: plant; disperse; allow or cause to disperse; spread or cause to grow the plant in the Republic of Ireland'.*

Regulation 50

'an offence to or intend to; import; buy; sell; breed; reproduce or propagate; offer or expose for sale; advertise; publish a price list; transport; and distribute any plant species or vector material listed in the Third Schedule'.

The Third Schedule of the Birds and Natural Habitats Regulations lists those invasive species to which Regulation 49 and 50 apply. Japanese knotweed (*Fallopia japonica*) and Giant Rhubarb (*Gunnera tinctoria*), and Three-cornered garlic (*Allium triquetrum*) are identified on the NBDC online database[3] as occurring within the study area alongside the Whitechurch Stream and are listed on the Third Schedule of the Birds and Natural Habitats Regulations.

In a circular letter (2/08) the National Parks and Wildlife Service highlighted the specific requirements of Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, which places restrictions on the destruction of vegetation on uncultivated land during the period from 1st March to 31st August in any year. The Circular was prompted by extensive poorly-targeted spraying of herbicide particularly on road verges by local authorities and others in an effort to control noxious weeds. The Circular highlights that while control of noxious weeds (and invasive species) is permitted under legislation, it does not authorise the destruction of adjacent vegetation and extensive, untargeted spraying of road verges with herbicide is, *prima facie*, an offence under Section 40 of the Wildlife Acts.

1.4 Objectives and Scope

Following on from the confirmation of the presence of Japanese knotweed (*Fallopia japonica*) during the deskstudy and preliminary walkover, the ecological surveys, described in the Ecological Impact Assessment Report (Issued under separate cover) included a search for all Invasive Alien Plant Species (IAPS) to confirm and update the presence/absence of IAPS from the project footprint.

Of the species identified, the presence of Japanese knotweed and Three corner garlic (*Allium triquetrum*) both third schedule species, within the works corridor means that there is a legal requirement that treatment measures are prepared and enacted in advance of works commencing.

[2] DCHG (2017) National Biodiversity Action Plan 2017-2021 - https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf

[3] http://www.biodiversityireland.ie/

1.4.1 Survey Methodology

As described in the EcIA report (RPS 2020), the survey included all the lands within the project corridor and included the temporary works compound proposed for St. Enda's Park.

2 RESULTS

2.1 Survey Dates

A number of site visits to inform the Ecological Impact Assessment of the scheme have been undertaken. These are detailed in **Section 4.1.17** of the Ecological Impact Assessment (EcIA) report (RPS 2020). The principal IAPS survey was carried out on 9th April 2019. This was seasonally appropriate to capture likely growth of IAPS, although follow on

2.2 Survey

The survey (and the recommendations arising out of it) which is described in full within the EcIA (submitted under separate cover) was conducted with cognisance of a suite of recent guidance and best practice:

- Booy, O., Wade, M. And White, V. (2008). Invasive species management for infrastructure managers and the construction industry. Guide (C649). CIRIA.
- Invasive Species Ireland guidance (http://invasivespeciesireland.com).
- Inland Fisheries Ireland guidance regarding aquatic invasive species control (http://www.fisheriesireland.ie/Research/invasive-species).
- Kelly, J., Maguire, C.M. and Cosgrove, P.J., Muir, R.A. (2015). *Best Practice Management Guidelines Japanese knotweed Fallopia japonica*. Prepared for NIEA and NPWS as part of Invasive Species Ireland.
- National Roads Authority, (2010). Guidelines on The Management of Noxious Weeds and Non-native, Invasive Plant Species on National Roads. Produced by EirEco Consultants.
- DCHG, (2017). National Biodiversity Action Plan 2017-2021. Department of Culture, Heritage and the Gaeltacht.
- UK Environment Agency (2013) The Knotweed Code of Practice: Managing Japanese knotweed on development sites Version 3. UKEA, Bristol.

2.2.1 Description of IAPS recorded

A summary description of the locations in which the third schedule IAPS occur is provided below. A full description of the study area and the habitats is provided in the EcIA (**RPS 2019**) and their indicative locations are illustrated in **Appendix E** of the ECIA report to which this outline ISMP is appended**.** The IAPS represent areas of immediate concern for the project owing to:

1) the potential delays and associated cost associated with their management;
2) the potential for the further spread as a result of improper biosecurity measures being implemented; and
3) The potential for its spread downstream.

2.2.1.1 Japanese knotweed (*Fallopia japonica*)

The presence of Japanese knotweed is well documented along the Whitechurch Stream (Tubridy *et al*. 2013) as well as data from the NBDC, and discussions with OPW Parks department and SDCC Public Realm department. Within the study area, its presence was confirmed in late 2018 when winter-brown canes were noted at a number of locations (some of which are subject to Local Authority treatment as evidenced by adjacent signage). The IAPS had been stem-injected (Shane Lombard SDCC, pers. comm.) and in places, the dead canes cut. Fresh growth was noted in December 2018 and this was confirmed when the full extent of the infestation with the proposed works area was surveyed in April 2019.

The locations of the mapped Japanese knotweed are described below.

- A single stand is located at the pond in St Enda's Park. It was subject to stem injection in 2018;
- Rathfarnham Ford Garage – Immediately downstream of the garage forecourt, a derelict house and its grounds. A population of the Japanese knotweed on the left-hand side of the river has been subject to disturbance owing to site clearance works sometime between the October walkover and December Otter survey. Knotweed remains under the site hoarding overlooking the watercourse downstream side of the derelict pedestrian bridge;
- Discrete small clumps on the right hand side bank, approximately 70 metres upstream of Funeral parlour; and
- A large treated stand approximately 100 metres long occurs on the right-hand side bank of the watercourse immediately upstream of the Funeral parlour.

2.2.1.2 Giant Rhubarb (*Gunnera tinctoria*)

An historical record of Chilean rhubarb is known from around the pond in St Enda's Park. Earlier walkovers did not locate the species, although it was late in the season and many plants had died back. The April 2019 survey did not relocate the plant, which had previously been planted at the location. The area has become heavily overgrown with Cherry laurel (*Prunus laurocerasus*) to the landward side of the wet ground surrounding the pond in St. Enda's Park. A similar but smaller species that was noted was Butterbur (*Petasites fragrans*). It is possible that the Giant rhubarb may have died owing to a combination of overshadowing from maturing woodland vegetation and changes in the ground hydrological conditions where it was planted.

There are no works planned for the area in which the Giant rhubarb was previously recorded and as such it is not further considered.

2.2.1.3 Three cornered Garlic (*Allium triquetrum*)

This species is characterised by distinctive 3 side stem and was occasionally noted as clumps in undergrowth or in planted garden verges. It was not fully mapped owing to the small nature of the clumps, although the bulk of it is found upstream of the Funeral parlour. As a third schedule species, it is a species for which further consideration is required.

2.2.1.4 Other Invasive Alien Plant Species

A number of other IAPS or non-native species, none of which are included on the third schedule, were noted from the proposed development footprint. With the exception of Cherry Laurel (*Prunus laurocerasus*) which is a High impact species but is noted outside the areas where works are proposed, the bulk of the species are considered medium impact species. These include:

- Butterfly bush (*Buddliea davidii*);
- Old mans Beard (*Clematis vitalba*);
- Sycamore (*Acer pseudoplatanus*).

3 ASSESSMENT OF OPTIONS & RECOMMENDATIONS

3.1 Limitations

At present the Japanese knotweed is being managed by the Local Authority through chemical treatment and as identified by signage placed alongside to inform public and SDCC staff of same. This has been ongoing for a number of years. The treatment area extends further upstream of St. Enda's Park. Local Authority staff treated the Japanese knotweed in St Enda's Park in 2018, but thus far, no formal management regime has been implemented for the park (OPW, pers. comm.)

Based on the design requirements to install new flood relief walls and/or enter the watercourse to undertake works associated with maintaining the conveyancing capacity, it cannot be guaranteed that chemical treatment itself will ensure that the project implementation will not result in disturbance and spread of IAPS, particularly, Japanese knotweed.

The proposed ISMP is applicable to the works area only, although it is acknowledged that a catchment wide management plan would be preferable.

The full extent of the three cornered garlic is problematical by virtue of the underground bulb. Works in areas may result in the unwitting spread of this bulb, which readily hybridises with native bluebells.

3.2 Biosecurity

3.2.1 General Site Preparation and Management

It is an offence to plant or encourage the spread of third schedule listed IAPS by moving contaminated soil from one place to another, or incorrectly handling and transporting contaminated material or plant cuttings. Persons must therefore take all reasonable steps and exercise due diligence to avoid committing an offence under the Birds and Natural Habitats Regulations 2011 (as amended).

The appointed contractor will be obliged to update this outline ISMP to identify the approved management/treatment regime to be employed on this site.

In terms of best practice, the following should be put in place in advance of commencement of construction:

- Erect signs at the site entrances to alert site users that the area is contaminated with Japanese knotweed. Currently, signage confirming the presence of and ongoing treatment of Japanese knotweed is displayed at the bridge alongside the Funeral parlour on Whitechurch road.
- Before any site activities take place (including site offices, facilities, machinery or vehicles being brought on site) an 'exclusion zone' should be clearly demarcated, as appropriate.
- In effect this will include the site entrance and other areas where works are planned to take place. It should include a visible cordon, including on all visible stands of Japanese knotweed or other third schedule, with a precautionary buffer, which can extend up to 7m depending on site conditions, to take account of underground spread to prevent further spread on site or until such time that a treatment specialist can confirm that the treatment regime has been successful. This could include PVC windbreak mesh or similar material to prevent accidental spread by damage or dislodgement. This will not be possible along public roads unless these roads are partially closed to facilitate the works. Where the road remains open, fencing along the existing wall should be provided for to prevent access to and disturbance of the Japanese knotweed;
- Dedicated exclusion zone entry and exit points should be created for operators on foot and for mobile equipment. The appointed contractor and suitably qualified person shall agree the working area required to allow for the works to commence unhindered.

- Biosecurity facilities must be installed on-site prior to site works commencing. This must include facilities for wheel washing if appropriate, washing down of vehicle and cleaning of footwear prior to arrival on site and on leaving site to prevent the spread of IAPS. It must also include an area where washings can be directed into a dedicated and contained area. A sign-off sheet must be maintained by the contractor to confirm cleaning.
- Vehicles leaving the site should be inspected for any plant material and cleaned down in the biosecurity containment area.
- Loose or dislodged material should be gathered in the dedicated and contained quarantine/clean down area will need to be appropriately treated as contaminated material. This can include plant material, contaminated soil etc.
- Any potential IAPS-contaminated material being transported off-site will require licences from NPWS, separate of waste collection permit and/or licenced/permitted waste acceptance facility. It will be the responsibility of the appointed Contractor, in this case the OPW, to arrange for same;
- For any material entering the site, particularly soils, the supplier must provide an assurance that it is free of non-native invasive species;
- All contractors and site operatives working on-site should receive training on identification of Japanese knotweed and all potential third schedule IAPS that they might encounter; and site practices immediately on commencement on-site.
- The appointed contractor must ensure all site users are aware of the finalised IAPS Management Plan and treatment methodologies. This can be achieved through “toolbox talks” before works begin on the site.

3.2.2 Site Compound/Storage of Materials

- The proposed location of the site offices/temporary compounds by the appointed contractor is cognisant of known IAPS locations and the management guidance of the outline ISMP. It is located, removed from any IAPS stand in a screened section of the public carpark at the front entrance to St. Enda’s Park.
- Given the necessity to excavate soil to allow foundations for new flood walls to be emplaced, it will be necessary to install a root barrier membrane (specification to be agreed if necessary). An underlay of a protective material may be required to limit the potential for the membrane puncturing, such materials as sand or hardcore. The membrane should also be overlain by suitable material to ensure it doesn’t puncture such as hardcore, sleepers or bog mats in the site compound area. This shall be decided with the contractor and a suitably qualified environmental specialist.
- It should be noted that any overlain material (clause 804 or similar) used to prepare for new construction could potentially become contaminated with Japanese knotweed and or other Third schedule IAPS therefore on completion of construction works it will have to be disposed of off-site to a licenced waste facility. This is unless it can be ensured through biosecurity measures that it is not contaminated with IAPS.

3.3 Options for Treatment

Typically, the options to treat IAPS revolve around chemical and/or physical/mechanical treatment. Currently, South Dublin County Council carry out annual chemical treatments of known third schedule IAPS along the Whitechurch Stream within their administrative boundary.

A number of potential options in respect of Japanese knotweed are described in this outline IMSP. Most have been ruled out on the basis of the methodology and the duration of the treatment, coupled with the need to work in areas infested by IAPS. Other options might be considered as part of a holistic solution. However, the primary treatment option is dependent on a number of factors, all of which are described below for each option.

Given the requirement to construct new flood relief walls, the effective use of chemical treatment is not as a viable option into the future, unless there is a time lag of between three to five years and the contractor treating the IAPS is confident that the treatment process has been successful in eradicating the aboveground and below-ground components of Japanese knotweed.

The disposal options that might be considered are presented in the next section. It should be noted that the choice of methodology is limited by virtue of the nature of the project and the availability of land with which to carry out some of the options. The demolition of existing retaining walls and the excavation of the surrounding soils in which IAPS occur shall be treated as contaminated/hazardous waste rather than Construction and Demolition Waste (CDW). The final solution will be dependent on the appointed contractor drawing up a programme and finalising the methodology to the satisfaction of South Dublin County Council.

Given the requirement to gain access to, and work in close proximity to the Japanese Knotweed infestations in particularly, a number of overlapping treatment options identified as being potentially viable (**Table 3.1**). The preliminary recommendations are cognisant of best practice guidance, but also of the recent chemical treatment works undertaken along the Whitechurch Stream. These are further described in **Section 3.3.1**.

Table 3-1: Summary of Potential Options

	Treatment Option	Applicable	Reasoning*
Mechanical/Physical	Excavation & Treatment *in-situ*: Soil Screening	No	• While this is a possibility for Japanese knotweed only, its use is dependent on availability of land with which to undertake the activity. • The use of this treatment option could require the input of and services of specialist environmental contractors. • There would likely be a need to remove screened material off-site under licence, unless a suitable onsite disposal area (bunding/deep burial) could be identified.
	Excavation & Treatment *in-situ*: Bunding	No	• This is not a possibility for Japanese knotweed as it is dependent on availability of suitable land within the works area. • Excavated material would require bunding in a dedicated area. This is dependent on the volume of material to be excavated (to be confirmed by appointed contractor). • A follow up monitoring of the bund would be necessary to ensure any shallow growth could be (most likely) chemically treated over a number of years.
	Excavation & Treatment *in-situ*: Deep burial	Unlikely	• This is not a possibility for Japanese Knotweed as it is dependent on availability of suitable land within the works area. • It is a solution that can be sometimes be accommodated in projects where sizable embankments such as in major road schemes are being constructed or in specially excavated and prepared contained waste cells within the project lands, where further development could not be permitted by the Local Authority. • Follow up monitoring is required to ensure that no unwitting shallow growth would become established.
	Excavation and Disposal Off-site	Required	• As no likely suitable land exists within the works area, there will be a requirement to remove all contaminated waste from the site (under licence from National Parks and Wildlife Service). • This is the appropriate, albeit expensive method of treatment and disposal for Japanese knotweed. • All contaminated material - infected soil material, loose IAPS cuttings or barrier membranes on which material has been stored, should be disposed of to a licenced waste

			facility, which can accept such waste. The possibility for incineration might also be considered.
	Vertical and Horizontal Root Barriers	Required	• Horizontal root barrier membrane will likely be required as a base layer over excavated ground. • Vertical root barrier membrane will also be required in and around the foundations of excavated land, particularly those that might be required to be located within the 7m exclusion zone. The purpose would be to protect the area including the adjacent local road from reestablishment from deeply buried plant fragments. • The installation of such barriers could require specialist contractors.
Chemical	Foliar Spraying	Possibly, in combination	• This is often the most widespread treatment option for managing large stands of Japanese knotweed and is currently part of the Local Authority regime. • However, its effective use at eradicating the infestation would require repeat applications over a number of years. Ideally foliar spraying is a widely used treatment method for up to 2-5 years following completion of the works to eradicate the Japanese knotweed from the site. • Its use could be required prior to cutting and removal of above ground material in preparation for bunding, onsite deep burial or removal to landfill/incineration. • Given the project timeframe and the need to construct flood relief measures in known IAPS areas alongside the watercourse, this is not considered a suitable primary or standalone treatment option.
	Stem Injection	Possibly, In combination	• This is the methodology currently undertaken by the Local Authority in treating Japanese knotweed infestation along the Whitechurch Stream. However, it requires between 2-5 years to be considered effective and as such the current programme would not satisfy that criteria. • For this reason, it is not considered a suitable standalone option given the likely disturbance of areas infested by Japanese knotweed and the need to carry works in in them.
	Cut Fill	Possibly, In combination	• Not deemed a suitable standalone method of treatment for this site given the need to construct new flood relief walls in infested areas.
	Spot Wipe	Possibly, in combination	• Not deemed a suitable standalone method of treatment for this site, given the need to construct new flood relief walls in infested areas.
Manual	Handpulling	No	• This is not a viable option for the treatment of deep rooting or well-established populations such as Japanese knotweed.
	Mowing	No	• Not deemed a suitable standalone method for treatment at this site as Japanese knotweed is readily spread by small fragments.

* Any information provided on the use of chemicals provided for in this report is given on the understanding that it is a recognised treatment option, dependant on a number of criteria. Under the provisions of Directive 2009/128/EC of the European Parliament and of the European Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides, advice on the use of particular pesticides and their applications must only be delivered by a qualified Pesticide Advisor, appropriately trained and registered with the Department of Agriculture, Food and the Marine.

3.3.1 Japanese knotweed

In areas where Japanese knotweed has been confirmed, it is likely that some soil material between the existing road and the watercourse is further contaminated as there is likely to be root/rhizome material in it. Given the potential subterranean spread of knotweed, it may also be present under some existing walls separating the watercourse and riparian zone from the local path and road.

The use of chemical treatments, whilst useful in controlling the aboveground biomass, will unlikely provide the full primary treatment option given the project timeframe and need to construct the flood relief measures coupled with the unknown with regards to the actual subterranean spread of the knotweed. For this reason, a combination of chemical and thereafter physical options is recommended. The following steps are steps comprising the recommended treatment option for the Japanese knotweed associated with the Whitechurch Stream flood alleviation scheme.

3.3.1.1 Specialist Environmental Contractor

From the outset of the project, it is recommended that the appointed contractor, if not already qualified to do so, engage the services of a specialist environmental contractor to assess the nature of the infestation and update the outline Invasive Species Management Plan. They should follow the plan which, will would require approval of the Local Authority, from its preparation to the works and ideally follow up monitoring surveys, although it is possible that the Local Authority might as part of its wider remit undertake this.

In advance of any works in or around the stand of Japanese knotweed, the appointed contractor will be required to implement a strict biosecurity protocol as prepared by the specialist environmental contractor. The contents of the biosecurity protocol will be dependent on the approved solution to deal with the knotweed infestation and will be cognisant of the following:

- Clear demarcation of exclusion zone – this may require traffic management measures to be enacted along the existing Whitechurch road, if the road is kept open during the works;
- Disinfection of plant and operators in the exclusion zone; and
- All excavated material to be removed in a timely manner to its final destination with no temporary or overnight storage of demolished/excavated waste in the exclusion zone.

3.3.1.2 Excavation/Disposal

As outlined in **Table 3.1**, there are a number of potential options in respect of effective treatment of the Japanese knotweed. There is limited, albeit uncertain, potential, of the availability of lands with which to excavate and dispose of contaminated material on-site. The off-site removal of material is a viable option, although there would be a need for an NPWS licences in respect of its movement (separate from any waste permit/licence). The exact nature of the solution will be dependent on the project timeframe, and the fact that there is no available land within the project envelope with which to treat and dispose of IAPS onsite. Thus, its removal offsite to a facility licenced to accept such waste is recommended.

3.3.1.3 Root Barrier Membrane

Once all contaminated material has been appropriately disposed of, it is recommended that an *impermeable root barrier membrane*, certified for use with Japanese knotweed be employed to protect the excavated ground within the CPO and ensure that Japanese knotweed rhizomes that may extend beyond the CPO (e.g. underneath the public road) could not further penetrate/undermine the proposed flood relief works. The installation of such a membrane should be undertaken by specialist environmental contractor who is proficient in its use and can provide guarantees as to the quality of its installation.

3.3.1.4 Monitoring

The efficacy of the selected measures should be monitored post completion – during the active growing season to map any new growth outside, but connected to the project lands, and that could result in potential

spread back into the lands along the Whitechurch Stream or other suitable residential garden. The monitoring should be undertaken by a person qualified to identify the species.

3.3.2 Three cornered garlic

There is no proscribed management strategy for this relatively inauspicious species. Ordinarily, treatment entails both physical (removal of bulbs) and/or chemical control (this can take a number of years to be effective). The bulk of the works in which the garlic has bene located will lad to the potential disturbance of and potential further spread of this species. Thus, all removed bulbs and or soil containing the bulbs should not be reused. It is recommended that bulbs and vegetative material should be disposed of in a similar manner as Japanese knotweed, at a licenced waste facility that can accept such waste. Alternatively, excavated plant material and bulbs can be burned and soil screened to ensure no remaining material.

4 PROGRAMME FOR IMPLEMENTATION

The specifics of the outline ISMP will be dependent on when site works commence. It is important to note that site preparation will be required in advance of the actual site works commencing e.g. installation of biosecurity measures, chemical treatment (if required) of IAPS, and preparation of the working area including the excavation of soils containing IAPS material. The key tasks, but no dates, are shown in **Table 4.1.**

Table 4-1: Indicative programme

Schedule	Dates*
Resurvey by Appointed contractor/specialist environmental contractor	A preconstruction survey is recommended so that expansion and or new establishment of IAPS can be confirmed, allowing finalisation of the control programme.
Biosecurity Measures	Measures to be put in place immediately upon commencement of project.
Mechanical and Chemical Control	• It is likely that a combination of treatment options will be necessary to control the IAPS. The dates will be dependent on the selected options and the works programme to be developed by the appointed contractor. • There may be seasonal and permitting constraints for which the appointed contractor may need to clearly identify so that they can be included into the works programme.
Monitoring and Follow Up Treatment	Annually from completion of works. Site re-survey for IAPS recommended during period May – August. Chemical treatment annually, timing dependent on the herbicide being used on the site.

*The programme is wholly dependent on the client and appointed contractor; and subsequent management regime that is put in place to deal with IAPS.

5 CONCLUSIONS

This outline Invasive Species Management Plan (ISMP) provides the basis for the treatment/eradication of, and disposal of contaminated material. The measures/recommendations contained in it will form the basis for the appointed contractor to develop their management protocol for written approval of the Planning Authority.

6 REFERENCES

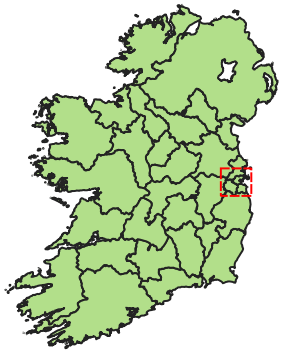
NRA (2010) Rev.1. *Guidelines on the Management of Noxious Weeds and non-Native Invasive Plant Species on National Roads.* National Roads Authority (Now TII), Dublin.

RPS (2019). *Whitechurch Flood Alleviation Scheme Ecological Impact Assessment.* Planning report prepared for South Dublin County Council.

Appendix I

Bat Survey Results

Legend



Bat activity transect

Bat Record

Listening Point

Client

Comhairle Contae Átha Cliath Theas
South Dublin County Council

Project **Whitechurch stream Flood Alleviation Scheme**

Title

APPENDIX I

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Issue Details

Drawn:	JMM	**Project:**	MDW0825
Checked:	TR	**File Ref:**	MDW0825QG0007F01
Approved:	MD		
Scale:	1:5,000 @ A4	**Projection:**	
Date:	08/05/2019		IRENET95 / ITM

Notes

1. This drawing is the property of RPS Group Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.

SURVEY NOTES

Project: MDW0825 Whitechurch Stream Flood Alleviation Scheme	
Location: St. Enda's Park and Whitechurch Road	
Date: 23/4/19	**Cloud Cover%:** 80%, hanging cloud in places
Surveyors: Miles Newman & Tim Ryle	**Survey Type:** Dusk
Survey Number: 1 of 2	**Precipitation:** 0
Survey Start: 20.40pm	**Wind (0-7)[1]:** 0
Sunset: 20.55pm	**Temperature °C:** 12 to 11
Survey Finish: 22.43pm	**Weather Description:** Calm
Transect Start: Sarah Curran Avenue/Grange Road	**Transect End:** Sarah Curran Avenue/ Grnage Road
Detectors/Devices used: Petterson D200 Handheld Detector Bat Box Duo handheld Detector (connected to Tascam DR05 recorder) Bat Scan, Version 9, Analysis software for Batbox Duet	

ID[2]	Time	Frequency	Species	No. of Bats	Activity[3]	Comment[3]
B1	20.45	N/A	Leisler	1	C	SNH
B2	20.49	55	Leisler	1	C	S&H
LP1	20.52-20.57	-	-	-	-	No Activity Noted
LP2	21.00-21.05	55.2	Soprano Pipistrelle	1	C	HNS
		55.2	Soprano Pipistrelle	1	C	HNS
B3	9.07	53.5	Soprano Pipistrelle	1	C	HNS
B4	9.10	43.6	Common Pipistrelle	1	C	HNS
LP3	21.13-21.18	-	-	-	-	No Activity Noted
B5	21.22	39	Common Pipistrelle	≤ 1	F	
LP4	21.26-21.36	54	Soprano Pipistrelle	1	F/C	HNS
		56.1	Soprano Pipistrelle	1	F/C	HNS
		55	Soprano Pipistrelle	1	F/C	Seen circling
LP5	21.33-21.38	-	-	-	-	No Activity Noted
B6	21.39	39	Common Pipistrelle	1	F	HNS
B7	21.40	45	Common Pipistrelle	1	F/C	HNS
B8	21.41	45	Common Pipistrelle	1	F/C	HNS

NOTES

ID[2]	Time	Frequency	Species	No. of Bats	Activity[3]	Comment[3]
B9	21.42	44.7	Common Pipistrelle	-	F	Several Sweeps
LP6	21.46-21.51	52.8	Common/ Soprano Pipistrelle	-	C	HNS
		54	Common/ Soprano Pipistrelle	-	C	HNS
		49.4	Common/ Soprano Pipistrelle	-	C	HNS
Resurvey in reverse						
LP5	21.57-22.02	-	-	-	-	No Activity Noted
LP4	22.06-22.11	45	Common Pipistrelle		C	HNS
LP3	22.16-22.21	-	-	-	-	No Activity Noted
LP2	22.24-22.29	-	-	-	-	No Activity Noted
LP1	22.33-22.39	36	Daubento's	≤1 Possibly	F	S&H – repeated swooping over watercourse

1) **Beaufort Wind Force Scale:** 0=No Wind, 1=Light air, smoke drifts; 2= Light breeze, Leaves rustle; 3= Gentle Breeze, small twigs move; 4= Moderate breeze, small branches move; 5=Fresh Breeze, small trees way; 6=Strong Breeze, large branches move; 7= Moderate Gale, whole trees in motion.
2) **ID =** Bx=Point record; LPx= Timed listening point (5 minutes unless stated)
3) **Activity:** C=commuting; F=Foraging; HNS=Heard not Seen; SNH= Seen not heard; S&H= Seen and Heard; E=Emergence; R=Re-entry; S-Swarming

Project: **MDW0825 Whitechurch Stream Flood Alleviation Scheme**	
Location: **St Enda's Park and Whitechurch Road**	
Date: **2/5/19**	**Cloud Cover%:** **Dark**
Surveyors: **Miles Newman & Tim Ryle**	**Survey Type:** **Dawn**
Survey Number: **2 of 2**	**Precipitation:** **0**
Survey Start: **3.50am**	**Wind (0-7)[1]:** **2/3**
Sunset: **5.50am**	**Temperature °C:** **6-7**
Survey Finish: **5.50am**	**Weather Description:** **calm but slightly overcast**
Transect Start: **R115/Whitechurch Road**	**Transect End:** **R115/Whitechurch Road**
Detectors/Devices used: **Petterson D200 Handheld Detector** **Bat Box Duo handheld Detector** **Bat Scan, Version 9, Analysis software for Batbox Duet**	

NOTES

ID[2]	Time	Frequency	Species	No. of Bats	Activity[3]	Comment[3]
LP6	3.50-3.55	-	-	-	-	No Activity Noted
LP5	4.00-4.05	45	Common Pipistrelle	1	C	HNS
LP4	4.08-4.13	-	-	-	-	No Activity Noted
LP3	4.19-4.24	-	-	-	-	No Activity Noted
LP2	4.28-4.34	-	-	-	-	No Activity Noted
LP1	4.38-4.43	-	-	-	-	No Activity Noted
Resurvey in reverse						
LP1	4.53-4.58				-	No Activity Noted
B10	5.01	55	Soprano Pipistrelle	1	C/F	HNS
LP2	5.03-5.08	-	-	-	-	No Activity Noted
LP3	5.12-5.17	-	-	-	-	No Activity Noted
LP4	5.22-5.28	-	-	-	-	No Activity Noted
LP5	5.31-5.37	-	-	-	-	No Activity Noted
LP6	5.42-5.50	-	-	-	-	No Activity Noted