7.4.3 Invasive Species

Japanese Knotweed, Himalayan balsam, and Gunnera are listed as invasive plants under the EC (Birds and Natural Habitats) Regulations 2011 (S.1. 477/2011). These regulations prohibit the introduction or dispersal of invasive species and appropriate measures should be undertaken in the proposed scheme development. Therefore, any works occurring in areas where invasive species are present must use appropriate measures. An Invasive Alien Species Action Plan will be required for the proposed project.

8 Cultural Heritage and Archaeology

8.1 Introduction

This section assesses and evaluates the potential cultural heritage and archaeology (consisting archaeological and build heritage) constraints of the study area.

For the purposes of this report, the constraints study area is defined as the area outlined in Figure 8-1. All the cultural heritage constraints within a 300m radius of the proposed works were examined. Further focus was given to the designated heritage assets which are present within 100m of the river, as this area is most likely to be potentially physically affected by the proposed works.

Figure 8-1 Study area boundary for Cultural Heritage and Archaeology

8.2 Methodology

Constraints were determined through a desk study and a preliminary field inspection. The assessment involved the compilation and mapping of available cultural heritage data sets. This forms a permanent renewable database that can be utilised by multiple specialist users to provide information for the project design and EIA process.

A review of the following information took place in order to inform the cultural heritage report:

- UNESCO World Heritage Sites (WHS) and Tentative World Heritage Sites and those monuments on the tentative list;
- National Monuments in State care, as listed by the National Monuments Service (NMS) of the Department of Culture, Heritage and the Gaeltacht (DCHG);
- National Monuments Sites with Preservation Orders Sites;
- Sites listed in the Register of Historic Monuments;
- Record of Monuments and Places (RMP) and the Sites and Monuments Record (SMR) from the Archaeological Survey of Ireland;
- National Inventory of Architectural Heritage (NIAH) Building Survey (NIAH ratings are international, national, regional, local and record, and those of regional and above are recommended for inclusion in RPS;
- National Inventory of Architectural Heritage (NIAH) Garden Survey (paper survey only);
- A review of artefactual material held in the National Museum of Ireland;
- The Dublin City Development Plan (2016-2022), Dún Laoghaire-Rathdown County Development Plan 2016-2022, and draft South Dublin County Development Plan;
- Development Plan was consulted for the record of Protected Structures (RPS) and was consulted for the record of Conservation Areas and Architectural Conservation Areas (ACA's);
- Dublin City Industrial Heritage Record (DCIHR) is a comprehensive documentary inventory of sites of industrial heritage. It was commissioned by Dublin City Council in partnership with the Heritage Council;
- Cartographical Sources, OSI Historic Mapping Archive, including early editions of the Ordnance Survey including historical mapping (such as Down Survey 1656 Map); Historical maps including the Down
- Survey, Rocque's map of County Dublin, Mallet's Report on Proposed Reservoirs, and the first and revised editions of 6 Inch and 25 Inch Ordnance Survey maps;

- The Irish archaeological excavations catalogue i.e. Excavations bulletin and Excavations Database;
- Dublin County Heritage Archaeology Excavations;
- The County Dublin Archaeology Data viewer at www.heritagemaps.ie which holds unpublished excavation reports for County Dublin;
- Place names; Townland names and toponomy (loganim.ie);
- National Folklore Collection (Duchas.ie);
- A review and interpretation of aerial imagery (Google earth 2001–2019, Digital Globe 2011-2013, Bing 2019) to be used in combination with historic mapping to map potential cultural heritage assets;
- Collation of information from similar or other infrastructure projects in proximity to the proposed wind farms, for example EISs, SEAs, conservation plans, archaeological test assessments and excavations; and
- A review of existing guidelines and best practice approaches.

A field inspection was carried out along the River Dodder on the 23rd September 2020 to assess present topography and land use along the river banks and to identify potential low-visibility cultural heritage or archaeological features within the surviving greenfield areas in the study area.

8.3 Baseline / Receiving Environment

8.3.1 Historic Culture of the Study Area

The study area constitutes a rich and varied historical landscape. The River Dodder has long been associated with the milling industry (from at least 1316 at Clonskeagh) and the development of the milling industry in the post medieval period in the 18th and 19th century had a profound impact on the River Dodder well into the mid-20th century. In its industrial heyday the stretch of the river in within the study area would have been a busy and noisy manufacturing centre, it was socially and economically important in the area providing employment and homes for the people in the locality. This industrial character has completely changed, the river and its environs is now a serene public amenity, the relict remains of industrial its industrial heritage past enhancing the experience and the aesthetic enjoyment of the parks along it i.e. the modest stone and metal footbridges, stone and concrete weirs and walls contribute to this character.

8.3.2 Archaeological Heritage

8.3.2.1 World Heritage Site

There are no World Heritage Sites in the study area nor are there any sites contained in the tentative list of candidate Sites.

8.3.2.2 National Monuments in State Care

None of the recorded archaeological monuments or sites along or in the vicinity of the River Dodder (including bridges) are designated as National Monuments.

8.3.2.3 Record of Monuments and Places and Sites and Monuments Record Sites (RMP / SMR sites) and designated Zones of Archaeological Potential (ZAP)

There are 11 recorded archaeological monuments within 100m of the river Dodder from Clonskeagh Bridge to Orwell Road Bridge (Figure 8-2) (one is a redundant record and is not included in this count). The majority of the sites are associated with the river comprising bridges and watermills that relate to the known industrial activity along the Dodder. Locations of RMP sites within c. 100m of the River Dodder are provided in Table 8-1.

Table 8-1 RMP sites within c. 100 m of the River Dodder

Map No.	RMP / SMR Number	Number	Site Type	Co-ordinate ITM
01	DU022-096002	Mill - unclassified	Rathmines South	715759, 729890
02	DU022-096001-	Mill - unclassified	Rathmines South	715827, 729953
03	DU022-097—	Bridge	Rathmines South	716322, 730041
04	DU022-004001-	Bridge	Milltown (Uppercross By.)	716730, 730245
05	DU022-004002-	Water mill - unclassified	Milltown (Newcastle By.)	716732, 730241
06	DU022-004003-	Water mill - unclassified	Milltown (Newcastle By.)	716731, 730238
07	DU022-004006-	Mill - unclassified	Milltown (Newcastle By.)	716770, 730232
08	DU022-098—	Water mill - unclassified	Dublin South City	716694, 730360
09	DU022-092—	House - 18th/19th century	Milltown (Uppercross By.)	716778, 730454
10	DU022-093—	Ford	Milltown (Uppercross By.)	716917, 730438
11	DU022-090—	Bridge	Clonskeagh (Dublin By.)	717367, 730686
NOTE: The castle site (DU022-088), and Ringfort (DU022-089) site in Clonskeagh are not included because they do not have the potential to be impacted by the scheme, a redundant record (DU022-094) has also been excluded from the list (their location is shown on Figure 8-2).				

Zones of archaeological potential (ZAP) for RMP sites with increased archaeological potential include:

- Area encompassing ZAP DU022-004001–006, extending from Milltown Bridge to Orwell Park, Milltown (Uppercross By.); and
- Area encompassing ZAP DU018-096, at Packhorse Bridge, Rathmines South.

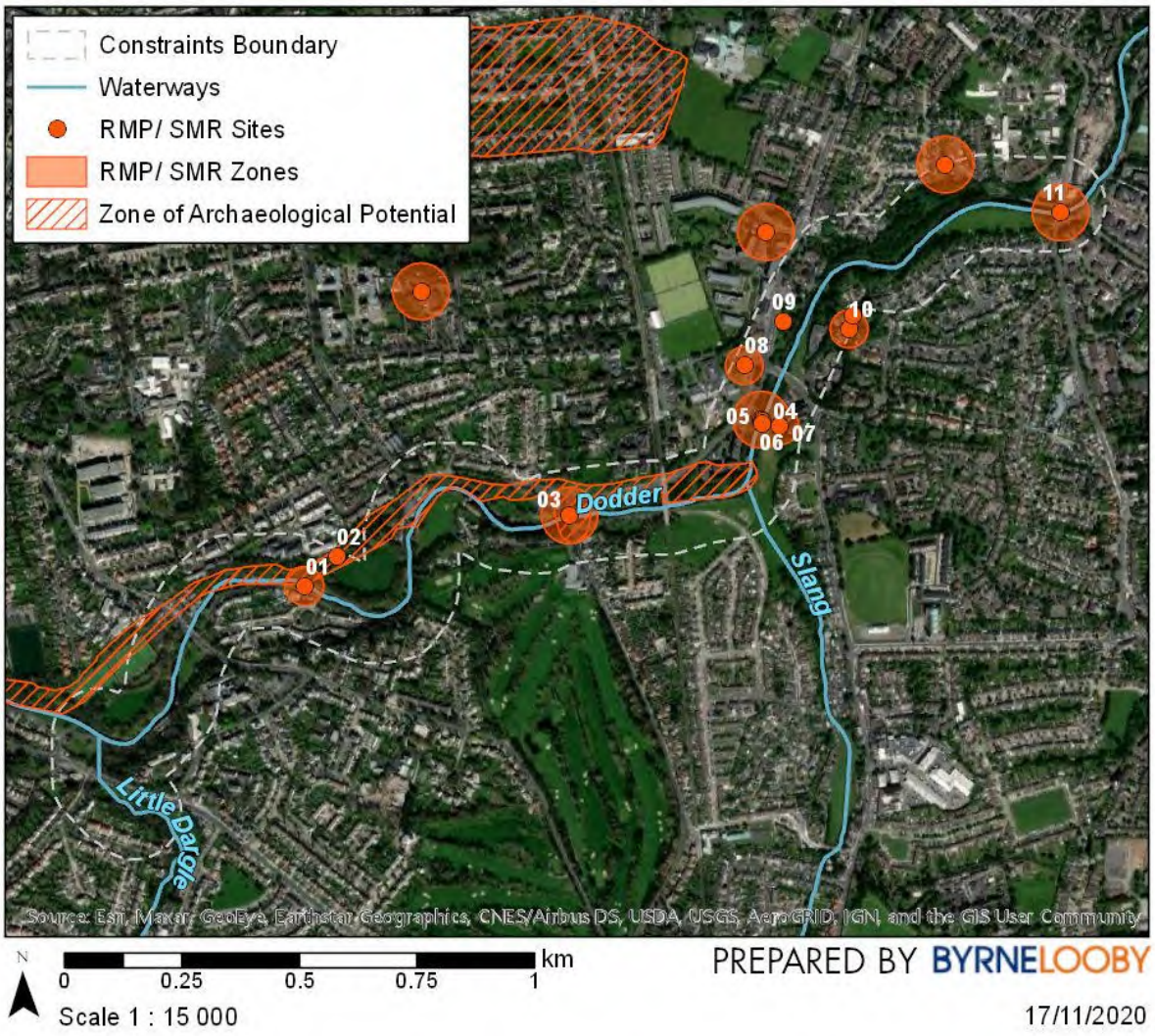

Figure 8-2 11 RMP / SMR sites within 100 m of the River Dodder
Data source: Historic Environment Viewer (National Monuments Service, n.d.)Topographical Files, National Museum of Ireland

There have been no stray finds recorded within the study area or the immediate vicinity. The only find in remote proximity to the proposed development area is a stone axehead (NMI ref: 1935:38) that was found c.600m south in either Farranboley or Windy Arbor (the exact location of the find is unclear).

8.3.2.4 Excavations

Recorded excavations have not been undertaken within the study area.

8.3.2.5 Areas of Archaeological Sensitivity (AAS)

Written and cartographic sources and the field inspection has identified specific areas of archaeological sensitivity (AAS), these the parkland areas adjacent to the river. These areas have a particularly high level of archaeological potential to reveal structural remains associated with milling activity carried out adjacent to the river which are likely to survive below the ground surface. Archaeological monitoring at the former Clonskeagh paper mill, north of Clonskeagh

Bridge, identified mill walls surviving immediately beneath the ground slab at the site, despite many years of redevelopment at the site.

The assessment identified five greenfield areas of archaeological sensitivity (AAS) along the river:

- Clonskeagh Bridge Park (AAS 1) -potential for mill buildings and mill dam.
- Milltown Bridge Park (AAS 2)- early and post medieval milling activity.
- Dartry Park East (AAS 3)- vicinity of mill pond and culverted mill race.
- Dartry Park West (AAS 4) -vicinity of mill pond and mill race.
- Orwell Park (AAS 5) -vicinity of mill pond and mill race.

8.3.2.6 Sites Subject to Preservation Orders

There are no Sites Subject to Preservation Orders located within the study area at the time of writing.

8.3.3 Architectural Heritage

8.3.3.1 Architectural Conservation Area (ACA)

There are no Architectural Conservation Areas located within the study area at the time of writing.

8.3.3.2 Record of Protected Structures (RPS)

There are seven protected structures listed in the Record of Protected Structures (RPS) in the Development Plans for Dublin City and Dun Laoghaire Rathdown Councils in the immediate vicinity of the River Dodder. The protected structures are listed as follows in Table 8-2, their location is shown on Figure 8-3 (note that DCC Protected Structures listed below in Table 8-2 are not shown on Figure 8-2 as GIS data was unavailable at time of writing).

Table 8-2 Protected Structures in the immediate vicinity of the River Dodder constraints area

RPS Reference	Name	Location
DCC 892	Packhorse Bridge	Packhorse Bridge, Milltown Road
DCC 5254	Laundry stack	Milltown Road, Dublin 6
DLR 20/ DCC886	Nine Arches bridge -Railway Viaduct	Milltown Road, Patrick Doyle Road, Dublin 6
DCC 2237	Former Dartry Dye Works	Dartry Road, Dublin 6
DLR 7	Clonskeagh Castle	80 Whitebeam Road, Dundrum, Dublin 14.
DLR 93	Landore Hall	7 Landore, Churchtown, Dublin 14
DLR92	Beechmount	165 Orwell Road, Dublin 14

RPS Reference	Name	Location
DLR135	Church of Ireland Theological College (Note: Entrance Gates and Railings also Protected Structures)	80 Whitebeam Road, Dundrum, Dublin 14.

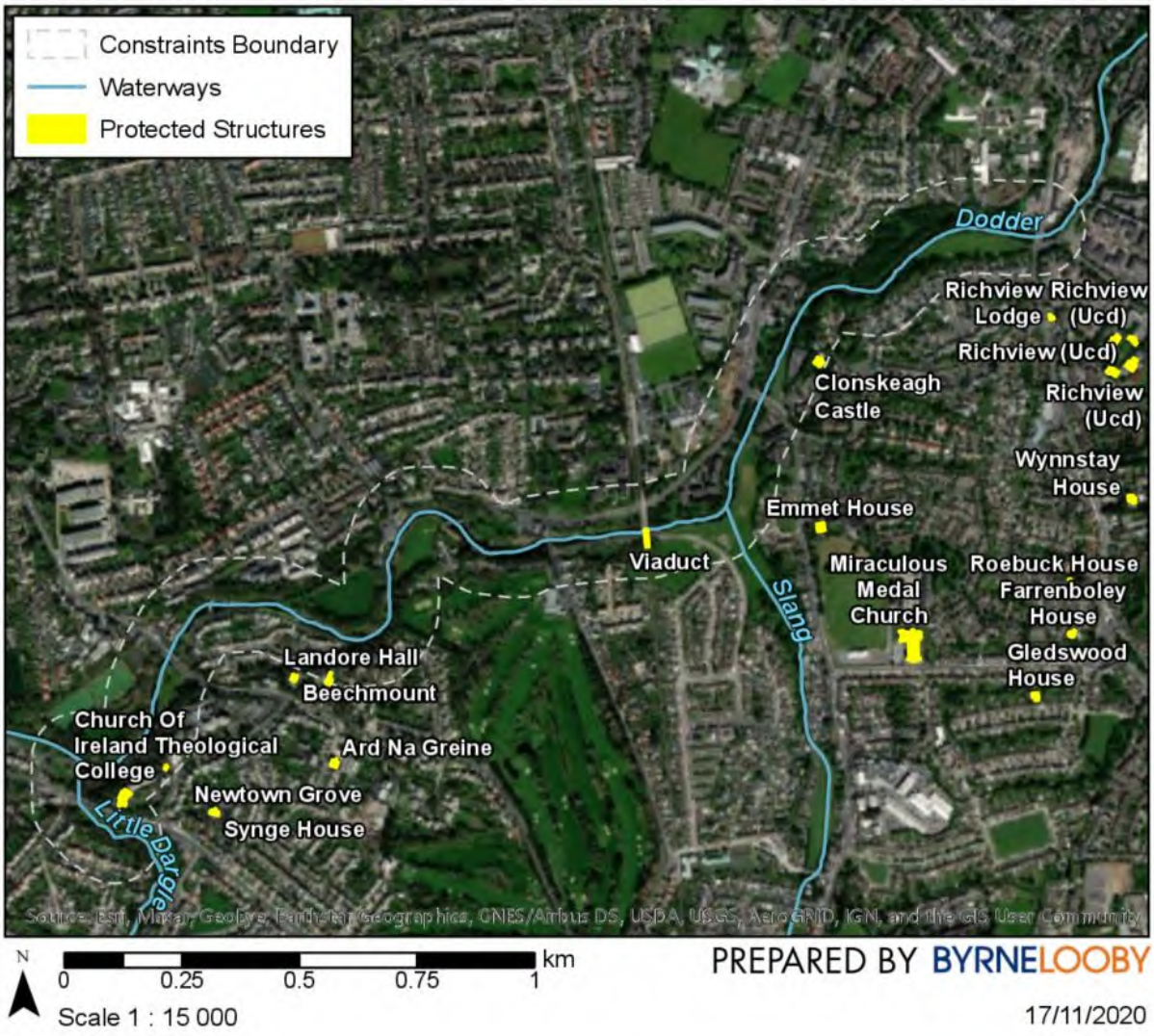

Figure 8-3 Protected structures in the vicinity of the River Dodder

8.3.3.3 Dublin City Industrial Heritage Record

There are 22 Dublin City Industrial Heritage Record (DCIHR) sites within proximity to the proposed development site (Table 8-3). The DCIHR is a record of features of industrial heritage including related artefacts, buildings, and ancillary features. Many of the milling activities and the overarching industrial character of the River Dodder are reflected and recorded within this inventory. Two of the sites are also listed in the Dun Laoghaire Rathdown development plan. Note that GiS data for the DCIHR sites listed below in Table 8-3 was unavailable at time of writing.

Table 8-3 DCIHR sites in the vicinity of the proposed scheme

DCIHR/ DLR number	Name	Description
22-03-017	Rathgar Calico Printing Factory	Saw Mill.
NA (not available)	Waldrons Bridge	Wooden Bridge.
22-03-015	Dartry Dye Works	Dye Works, Mill & Cloth Mill; built c. 1895 as part of a larger cloth- milling/dyeing operation on the site. Recently renovated for use as commercial offices with addition of upper storey to original single-storey block.
22-03-011	Tram Depot	Former tramway depot, opened in 1905, comprising tram sheds and lodge/ticket office. Now converted to offices.
22-03-013	Laundry (Flour Mill)	Former laundry, built c.1888 on site of earlier flour mill, now comprising chimney and weir.
22-03-014	Classon's Bridge	Triple-arch masonry road bridge, built c.1790, carrying road over River Dodder. Widened to both upstream and downstream5428 sides in 1928.
22-03-007, 22-03-008, 22-03-009	Bridge at Nine Arch Viaduct	Railway viaduct originally built for the Dublin and Wicklow Railway which opened in 1854.
NA	Quarry	Site was disused by 1910.
22-03-018	Foot Bridge	Original footbridge was replaced however it present operates as part of the Milltown LUAS stop.
22-03-006	Miltown Station	Site of the original 19th century Milltown Railway Station, which was part of the Harcourt Street railway line that ran from Harcourt Street to Bray. Is presently part of the Milltown LUAS stop.
22-03-005	Level Crossing	Original crossing was replaced however it present operates as part of the Milltown LUAS stop.
22-03-004	Signal Box	Original signal box was replaced however it present operates as part of the Milltown LUAS stop.
22-03-001	Great Southern Railways (Dublin & SE Railway)	This railway line was built to serve the Dublin and Wicklow Railway, which opened in 1854. The line was renamed the Dublin, Wicklow and Wexford Railway in 1860 and Dublin and South-Eastern Railway in 1907. The line was closed in 1958 and the railway line has been replaced and reused as part of the LUAS.
22-04-013	Iron Works	Former iron works, built. c.1850, now demolished, however weir, sluice and part of mill race survive to southwest.
22-04-015	Packhorse Bridge	Double-arch masonry former packhorse bridge, built c. 1650, as part of commercial route between Dublin and Wicklow, now used as pedestrian bridge.
22-04-007	Milltown Bridge	Single-arch masonry road bridge, built c.1840, carrying Milltown Road over the River Dodder and replacing a previous ford. Bridge widened c.2000.

DCIHR/ DLR number	Name	Description
22-04-016	Quarry	No remains of site.
22-04-017	Engine House	Site partially visible, though original has been replaced.
22-04-005	Clonskeagh Bridge	Single-arch masonry bridge, built c.1850, to carry road over the River Dodder, extended to west with west elevation rebuilt c.2000.
22-04-014	Iron Works (Mill Dam, Weir, Sluice Gates)	Former iron works, built c.1850, replaced by paper mill c.1950, which is currently derelict. Single-stage weir built c.1840 and spanning the River Dodder to south of former iron works and associated with a mill dam and sluice gates to its north.

8.3.3.4 National Inventory of Architectural Heritage (NIAH)

Ely's Arch (11211012) located within the heritage study area (shown on Figure 8-4). The arch is a detached former gate lodge, c.1780, built in the form of a triumphal arch, with flanking quadrant screen walls. It is currently unused. It acts as a landmark at the Braemar Road junction, which it dominates.

Figure 8-4 Map showing NIAH sites in the vicinity of the River Dodder
Data source: https://maps.archaeology.ie/HistoricEnvironment/

8.4 Key Constraints

For the purpose of this report an assessment is given of the perceived importance of the various Cultural Heritage sites within the study area. The assessment of perceived importance is based on professional judgement of the information to hand, framed within the confines of the study. On a site-by-site basis, the levels of perceived cultural heritage importance are liable to future revision where new information is brought to light, either through more detailed investigations, surveys or research. The classification of levels of perceived importance is therefore based on an appraisal of current information and an assessment of importance probability. It is noted that recommendations made in this report are subject to approval of the City Archaeologist, the National Monuments Service, Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland.

Any work carried out in close proximity to areas of archaeological, cultural heritage and built heritage importance must follow appropriate measures or guidelines to ensure the conservation and maintenance of the area. There are no World Heritage Sites, National Monuments or Sites with a Preservation Order within the archaeological study area. Sites to be considered as key constraints include:

- All archaeological sites and structures considered to be of international, national or regional importance;
- All buildings or structures listed in the Record of Protected Structures;
- Areas of Archaeological Potential.

9 Landscape and Visual

9.1 Introduction

This section of the Constraints Study Report provides a review of the landscape and visual constraints that have been identified within the study area.

For the purposes of this report, the study is defined as the area outlined in Figure 9-1. The landscape and visual constraints study area/ Zone of Theoretical Influence has been established based on the local topography, locations of sensitive receptors and views. The 2 km inner line represents the most sensitive zone and the outer line captures potential long range views/receptors as far as 5 km from the scheme. It is likely that the visual impacts will be confined within this first 2 km zone due to the local topography and urban setting of the study area.

Figure 9-1 Constraints study area boundary for Landscape and Visual

9.2 Methodology

9.2.1 National Planning Policy

The procedure used for the landscape and visual constraints study entailed a desk top study of the site in relation to its overall context both locally and regionally and including a review of the relevant planning polices and publications, including the following:

- Dublin City Development Plan 2016-2022;
- National Parks & Wildlife Service–location of SPAs, SACs and NHAs;
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, July 2017);
- Guidelines for Landscape and Visual Impact Assessment (Landscape Institute & I.E.M.A., UK 2013);
- National Landscape Strategy for Ireland 2015-2025.

A site visit was completed in October 2020 to assess the quality and type of views of the area, the character and quality of the site area and the surrounding landscape.

9.3 Baseline / Receiving Environment

9.3.1 Regional Planning Policy

The character of the study area and surrounding lands is generally suburban with a mixture of land uses and contains significant features indicating the industrial past of the River Dodder valley, resulting it its designation as a Conservation Area and Zone of Archaeological Interest withing the Dublin City Development Plan (2016-2022). There are a number of well-established and more contemporary residential, commercial and institutional developments and public parks, within or in close proximity of the study area. The main residential areas:

- Orwell Gardens, Orwell Park Gardens and Orwell Woods
- Thorncliffe Park
- South Hill
- Shanagarry Apartments
- Milltown Grove Apartments
- Dodderbank Apartments
- Whitebeam Road residential area
- Ramleh Park

There are several mature parkland areas along the banks of the river which also contain structures signifying the industrial past of this are a such as the mill and chimney, mill ponds, weirs and bridges. The following are main public parks and amenity areas within or in close proximity to the study area:

- Orwell Park (while located to the west of study area, impacts on this amenity would still need to be considered as park of this assessment)
- Dodder Park
- Temple Park
- Milltown Golf Club (private)
- Windy Arbour Playground
- Scully's Field (between Milltown and Clonskeagh)
- Walking/ cycling pathways along much of the length of the river

There are four public vehicular bridges over the river within the study area:

- Orwell Road
- Churchtown Road Lower
- Dundrum Road
- Clonskeagh Road

There are also two publicly accessible footbridges:

- pedestrian bridge linking at Dodder Park and the Orwell Gardens residential area
- Packhorse Bridge near the Bankside Cottages at Farranboley

The LUAS line crosses the river at the Nine Arches Bridge with stops at Milltown (north of the river) and Windy Arbour (south of the river).

9.3.2 Existing Trees and Hedgerows

There are areas of mature tree planting and parklands along both sides of the river banks within the study area. While there are no Tree Preservation Orders within the study area, the trees, woodland planting and parklands provide significant residential and visual amenity within the surrounding area and wider community.

The Dublin City Development Plan 2016-2022 contains the following polices in relation to trees:

"GI28: To support the implementation of the Dublin City Tree Strategy, which provides the vision for the long-term planting, protection and maintenance of trees, hedgerows and woodlands within Dublin City.

GI29: To adopt a pro-active and systematic good practice approach to tree management with the aim of promoting good tree health, condition, diversity, public amenity and a balanced age-profile.

GI30: To encourage and promote tree planting in the planning and development of urban spaces, streets, roads and infrastructure projects."

9.3.3 Planning Policy Context and Designations

9.3.3.1 Land Use Zoning

The majority of the study area is zoned as Z9 with the Dublin City Development Plan (DCDP) 2016-2022.

"Land-Use Zoning Objective Z9:

To preserve, provide and improve recreational amenity and open space and green networks. This zoning includes all amenity open space lands which can be divided into three broad categories as follows:

- *Public open space*
- *Private open space*
- *Sports facilities in private ownership*

The provision of public open space is essential to the development of a strategic green network.

Permissible Uses

Cemetery, club house and associated facilities, municipal golf course, open space, public service installation which would not be detrimental to the amenity of Z9 zoned lands.

Open for Consideration Uses

Car park for recreational purposes, caravan park/ camp site (holiday), community facility, craft centre/ craft shop, crèche, cultural/recreational building and uses, golf course and clubhouse, kiosk, neighbourhood retail (in accordance with highly exceptional circumstances above), tea room, café/restaurant."

9.3.4 Landscape and Green Infrastructure

The Dublin City Development Plan 2016-2022 contains the following policies and objectives that are relevant to the study area outlined in Figure 9-2:

"GI6: To support and implement the objectives of the National Landscape Strategy.

GI7: To continue to protect and enhance landscape, including existing green spaces through sustainable planning and design for both existing community and for future generations in accordance with the principles of the European Landscape Convention.

GIO7: To promote the city landscapes, including rivers, canals and bay, as a major resource for the city and forming core areas of green infrastructure network.

GIO9: To maximise managed access to key landscape and amenity areas of Dublin city. The parks of Dublin City include historic parks and squares. Some of the city's green spaces provide settings for nationally important buildings, national monuments and protected structures. Parks and open spaces form part of the green infrastructure network. Dublin City Council has been implementing the Accessibility Strategy for Dublin City Parks (2008) to ensure equality of access for all citizens to green infrastructure network and facilities within it. This includes re-design of park entrances, refurbishment of changing rooms, and provision of specialised play equipment, accessible park furniture and access to angling facilities."

GI15: To protect, maintain, and enhance the natural and organic character of the watercourses in the city, including opening up to daylight where safe and feasible. The creation and/or enhancement of riparian buffer zones will be required where possible. It is the policy of Dublin City Council to maintain and enhance the safety of the public in its use and enjoyment of the many public parks, open spaces, waterways and linkages within the city, including the River Dodder between Ringsend and Orwell (Waldron's) bridge, and the area known as Scully's Field between Clonskeagh and Milltown.

GI16: To protect and improve the unique natural character and ecological value of all rivers within and forming boundaries to the administrative area of Dublin City Council, in accordance with the Eastern River Basin District management plan.

GIO21: To co-operate with the relevant adjoining local authorities of Dún Laoghaire–Rathdown and South Dublin Councils in developing a strategy for the preparation and graduated implementation of an integrated Maintenance, Improvement and Environmental Management Plan for the entire length of the River Dodder and to support the establishment of a co-ordinating River Dodder Authority or equivalent body to implement that strategy. This plan should reflect the relevant recommendations of the Eastern Catchment Flood Risk Assessment and Management and associated Unit of Measurement Flood Risk Management Plan(s) and associated Environmental Reports."

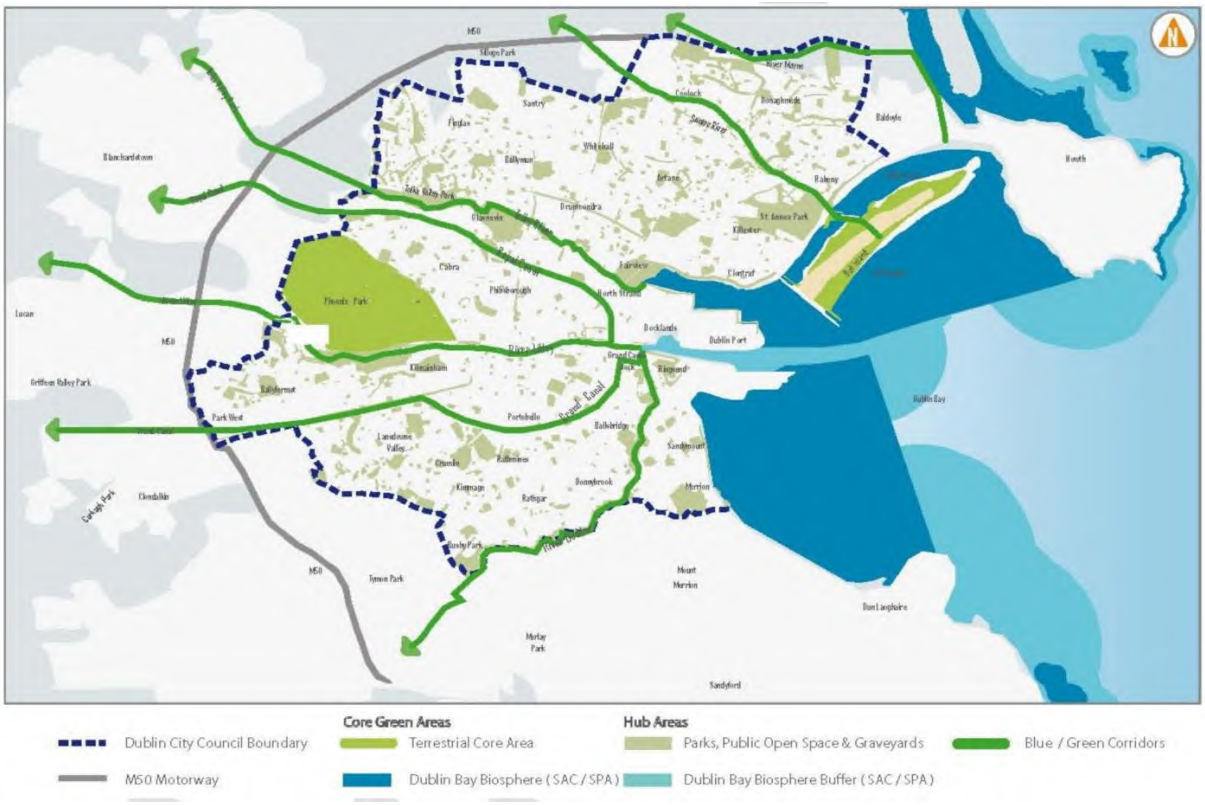

Figure 9-2 Strategic Green Network (DCDP 2016-2022)

9.3.5 Views and Prospects

9.3.5.1 Protected Views, Corridors and Prospects

There are no protected views, corridors or prospects directly affecting the subject site.

9.3.5.2 Landscape Character Assessment (LCA)

DCC have not yet carried out a Landscape Character Assessment of this area at the time of writing.

9.3.5.3 Historic Landscape Characterisation (HLC)

No Historic Landscape Characterisation has been undertaken for the vicinity in which the study area is located at the time of writing.

9.4 Key Constraints

Existing Trees and Hedgerows

The study area contains several public parks, matures stand of trees and small woodlands and tree lined recreational pathways along both sides of the River Dodder. The retention and protection of trees and woodlands within Dublin is emphasised with the DCDP (2016-2022).

The existing trees and planting within the study area provides both visual and recreational amenity for the residential areas within the study area and the wider district.

Landscape Character

The proposed development of the subject site will result in a change to the landscape character which will be most noticeable locally, such as from the adjacent residential areas e.g. Orwell Gardens, several public parks and public pathways (along the river banks and bridges). The potential magnitude of this change will be assessed when the details, scale and extent of the proposed interventions have been finalised.

Historical landscape character and cultural heritage within the study area:

Within the study area there are several designations (as defined by the DCDP (2106-2022) and Protected Structures of national interest that need to be considered such as:

- Land use zoning objective Z9: To preserve, provide and improve recreational amenity and open space and green networks.
- Conservation Area.
- Zone of Archaeological Interest.
- Sites of Archaeological Interest.

A number of protected structures are also located within the study area (refer to section 8.3of this report for more details).

Recreational amenity value

There are several recreational amenities within the study area that need to be considered in relation to possible impacts on their accessibility, recreational and visual values:

- Orwell Park (while located to the west of study area, impacts on this amenity would still need to be considered as park of this assessment).
- Dodder Park.
- Temple Park.
- Milltown Golf Club (private).
- Windy Arbour Playground.
- Scully's Field (between Milltown and Clonskeagh).
- Walking/ cycling pathways along much of the length of the river.

Views & Visual Amenity Value

Key viewpoints will be selected when the details, scale and extent of the proposed interventions have been defined, these shall include views into and out of the study area and those that demonstrate the visual amenity value within the locality.

There is a need to protect:

- Residential views towards the river.
- Recreational views – towards to and from the river (e.g. public pathways and parks).

Construction Phase & Operational Phase

During the construction phase, the following elements of the proposed development have the potential to cause visual impacts, they will however be short to medium term in duration:

- Temporary site works – hoarding, lighting, cranes, car parking, storage areas
- Construction traffic – dust and emissions
- Tree and vegetation clearance
- Groundworks – cut and fill excavations
- Laying of foundations

The principal elements which are likely to give rise to landscape and visual impact visual impact in the long term/operational phase are:

- Removal of some existing trees
- Height of proposed structures/ interventions
- New structures/ interventions
- Change of character – dependent on proposed interventions type and scale
- Proposed tree and shrub planting

Appropriate design, siting and mitigation measures are required to integrate the proposed scheme within the landscape.

10 Air Quality

10.1 Introduction

This section describes the existing air quality and existing noise environment in the scheme study area and identifies possible issues which have the potential to constrain the flood relief scheme design.

For the purposes of this report, the study is defined as an area approximately 500m in radius from the centre point of the River Dodder where works are proposed.

Figure 10-1 Constraints study area boundary for air quality

10.2 Methodology

A desktop study was undertaken to identify the key air quality constraints within the study area, specifically the areas surrounding the river Dodder from Clonskeagh Road Bridge to Orwell Road Bridge.

The following sources of information were used in the preparation of this section:

- Dublin City Development Plan 2016-2022.
- Dún Laoghaire-Rathdown County Development Plan 2016-2022.
- EPA Air quality index for health (AQIH).

10.3 Baseline / Receiving Environment

Under the Clean Air for Europe Directive, EU member states must designate "Zones" for the purpose of managing air quality. For Ireland, four zones were defined in the Air Quality Standards Regulations (2011). The zones were amended on 1 January 2013 to take account of population counts from the 2011 CSO Census and to align with the coal restricted areas in the 2012 Regulations (S.I. No. 326 of 2012).

Ireland is divided into zones (Zones A, B C and D) for the assessment and management of air quality, in compliance with EU legislation. The scheme study area is located in Zone A: Dublin.

According to the EPA Air quality index for health (AQIH) (Environmental Protection Agency, 2018) the air quality of that zone was '1- Good'.

Sensitive receptors within the scheme study area with respect to air quality and climate are predominantly people. This includes homes, schools, hospitals, businesses, and places of worship.

There may be short-term impacts to air quality during the construction phase of the proposed Scheme caused by increased construction traffic and excavation and stockpiling activities. Management measures will be implemented to control potential impacts.

The operational phase will not result in any impacts in relation to air and will have will be beneficial to the surrounding property owners in alleviating flooding which may increase in frequency due to climate change.

10.4 Key Constraints

The key constraints in relation to air quality and climate are the sensitive receptors in proximity to the location of construction works. The scheme design should take into consideration any air/climate/noise/vibration sensitive receptors such as residences, schools, businesses, and medical facilities located in proximity to works associated with the flood relief scheme. The potential impacts of climate change will need to be considered in the design of the proposed scheme.

11 Noise and Vibration

11.1 Introduction

The Dodder river environs are a mix of urban parkland, residential and mixed-use developments, and urban roadways (see section 3.3.4 for a description of land use and zoning).

For the purposes of this report, the study is defined as an area approximately 500m in radius from the section of the River Dodder where works are proposed.

Figure 11-1 Constraints study area boundary for noise and vibration

11.2 Methodology

A high-level desktop review of the scheme has been completed in order to identify potential noise and vibration constraints from the works and also to identify sensitive receivers in proximity to the scheme.

11.3 Baseline / Receiving Environment

Existing sources of noise observed during surveys included road, light rail and air traffic noise, noise from the River Dodder and tributaries (weirs etc.), birdsong, and local activity. Potential receptors are people, including residents, schools, places of worship, amenities users, and wildlife.

11.4 Key Constraints

Noise and vibration effects are expected to occur during the construction phase only and would be expected to include:

- Construction traffic.
- Earthmoving plant and equipment.
- Sheet piling.
- Power tools and generators.

Construction noise is temporary in nature, and therefore the normal way of minimising the impact is to limit the working hours. For larger infrastructure projects the Local Authority may place noise limits on the construction works.

The project CEMP will include measures to avoid or minimise the potential impacts of noise on sensitive receptors during construction. The following noise control measures may be employed to limit noise impacts from the scheme:

- Install site hoarding 2.4 m high around site boundaries.
- Install local noise barriers with absorptive linings near to specific sources, during construction works.
- Provide enclosures around generators.
- Provide local screening.
- Implement appropriate noise management measures.

Ground-borne vibration attenuates rapidly with distance. People are very sensitive to vibration and can feel vibration long before it becomes an issue in terms of cosmetic damage or structural damage to buildings. Assessment of potential for damage due to vibration should be carried out where vulnerable structures are located in close proximity to works such as sheet piling.

12 Summary of Constraints

A summary of the key constraints identified for each of the environmental disciplines considered as part of the baseline environmental constraints identification exercise is described below. They include:

- Resources and Materials;
- Population and Human Health;
- Hydrology;
- Soils, Geology and Hydrogeology;
- Ecology and Biodiversity;
- Cultural Heritage and Archaeology;
- Landscape and Visual;
- Air Quality;
- Noise and Vibration.

Constraints have been further designated as follows to identify the environmental constraints that may delay the project, change the design of the project or influence the cost of the scheme:

- Programme constraints;
- Engineering/Design constraints;
- Legal constraints

12.1 Discipline Constraints

12.1.1 Resources and Materials

Impacts on services and utilities such as watermains, gas mains, underground powerlines etc. will all need to be considered during the design process. The possible interruption of these services and utilities should be minimised, where possible. Furthermore, impacts on road and rail infrastructure and land ownership will need to be considered.

Additional general and site-specific constraints will need to be considered as the scheme progresses, including:

- During planning, development, and construction, the utilities infrastructure must be fully considered to ensure that disruptions to the utilities infrastructure are avoided.

- During the construction stage, measures may have to be taken in order to ensure the construction does not interfere in any of the underground or overground utilities services.
- Contacting ESB/GNI/Irish Water if there is a need for lines to be turned off for a period of time (e.g. for works or relocation of infrastructure) and to determine if the affected residences could be back fed from elsewhere.
- Consideration to any design, construction or operations risks in areas where electricity lines and gas network pipes (and associated infrastructure) are located in close proximity.
- Consideration of the designs effect on sewerage capacity in the event of hydrological changes or flooding.
- Impacts on road and rail infrastructure and land ownership will need to be considered.
- Impacts on public rights of way, footpaths and cycle paths will need to be considered. The proposed scheme design should ensure continuity of the public walkways within its footprint.
- The scheme design and schedule will need to take into consideration the development of third party 'green' projects in the vicinity of the scheme area, including potential impacts to utilities and infrastructure. This includes the section of Dodder Greenway Project likely to be located within the vicinity of the scheme. This project will be considered as appropriate within the cumulative impacts assessment section of the EIAR.

12.1.2 Population and Human Health

Constraints on population and human health will depend on the final nature and extent of the scheme, as well as the duration and nature of the construction phase.

In developing the scheme, the following must be considered:

- That areas of commercial or tourist potential maintain their aesthetic and public attractiveness both during construction and operation of the scheme.
- Development of the proposed scheme must take into consideration ways to complement and enhance public amenities including green spaces in the proposed scheme footprint. Measures to protect extant parks, recreational areas, and green public spaces should be developed within the proposed scheme. The proposed scheme design should ensure continuity of the public walkways within its footprint.
- National roads in the project are considered to be congested. Access to the River Dodder has access and movement limited by urban development in some areas. During construction of the scheme the traffic could pose problems for deliveries and site access and traffic management measures will be considered as part of the environmental impact assessment process.

- There is a potential for construction to make traffic more congested in the study area and vicinity. A traffic management plan will be required with the CEMP.
- Construction works will have to be mindful of maintaining access for both pedestrians and cyclists. A traffic management plan will be required during construction works.
- The traffic associated with construction works will need to be mindful of the tourist and retail trades.
- Sensitive receptors e.g. homes, schools and medical facilities should be considered key constraints in the design of the flood relief scheme. The scheme design should take into account the value (both cultural and economic) of any buildings (residential, retail, etc.) close to the rivers' edges or likely to be adversely affected by the scheme within the scheme study area. Hospitals and medical facilities in the scheme study area are sensitive receptors and must be given due consideration. Flooding events can cause devastation to homes, businesses and local facilities, with social and human health impacts. Their specific protection through adequate flood defences should be considered in the design of the scheme. The local community's access to private property insurance should be considered a key constraint when progressing with the scheme.
- Any design proposals should ensure that any bridges over watercourses are maintained where feasible so that temporary or permanent disruption of local transport links and access to homes and businesses in the study area are minimised.
- Public and tourist amenities and facilities should also be considered key constraints. Impacts on public amenity areas adjacent to and requiring access to the rivers such as riverside walks, parks and playgrounds should be considered, with replacement mitigation proposed if necessary. Impacts on tourist facilities, recreation and amenity facilities in the area should be considered constraints, especially those requiring access to the watercourses in the area.

Other impacts to population that are also concerned with human health, including material assets such as water supply, wastewater treatment, and utilities should also be given due consideration.

12.1.3 Hydrology

The surface water bodies in the study area recently failed the chemical status assessment due to the presence of priority and priority hazard substances.

Given the recent status of the waterbody, the development of the scheme should incorporate measures not to worsen its status and to improve it where reasonable. All possible risks of point source pollution or runoff during construction and operation should be assessed and prevented. Works during the construction of the scheme could pose a threat to the water quality of water bodies within and downstream of the study area though various mechanism, chiefly:

(1) Increasing suspended solids in the water bodies through release or run-off of significant amounts of suspended solids during enabling works and construction; and

(2) Unplanned events such as leaks/spills/runoff/accidental release or escape of fuels, oils and lubricants, bulk liquid cement, contaminated leachate, etc.

Measures to protect surface water from leaks/spills, contamination, increased turbidity or input of suspended solid, etc, should be considered.

Contamination potentially present on site from historical land use must also be considered. The CEMP for the scheme will include measures to avoid mobilising and/or creating pathways for any contaminants present on site to the surface where surface runoff can introduce contaminants to surface water during enabling and construction works.

Measures to protect EPA surface water monitoring station and avoid impacting their data collection process should be considered during design and construction phases.

There is limited publicly available surface water quality data for some of the waterbodies in the area (pond, lakes, and reservoirs). Baseline survey data (including ecological water quality data) should be collected for these water bodies if measures developed for the scheme could interact or impact upon these waterbodies.

The scheme design and schedule will need to take into consideration the development of third party 'WFD' projects in the vicinity of the scheme area, including potential impacts to utilities and infrastructure. These projects comprise two Water Framework Directive (WFD) projects (including one located at Milltown) led by DCC. These third-party projects have not yet completed the options assessment process and a programme of works was not available at the time of writing. Third-party projects will be considered within the cumulative impact assessment section of the EIAR.

12.1.4 Soils, Geology and Hydrogeology

Key constraints requiring consideration include:

- Made ground and/or contaminated ground: Depending on the scheme design and type of works, for areas where made ground is uncompacted and/or highly variable it may require to excavate and place this material and replace with suitable founding material. This material may also be a possible a source of contamination. As this material will be excavated during construction, it may require contamination testing be undertaken during the detailed site investigation.
- Soils and groundwater. Poor draining soils occurring within the scheme footprint are potentially soft and compressible and will likely require a detailed site investigation (SI) in order to design a suitable flood defence scheme. Appropriate environmental controls and management measures will be implemented for any advance SI works, this may include a requirement for AA screening, or an application/notification to NPWS for approval. A CEMP will be developed for construction activities. The CEMP will identify

appropriate equipment and construction techniques that should be used in circumstances where there is a potential impact to the environment. Engineering design should minimise the impacts of the flood relief scheme on the sections of river within the study areas and the wide catchment.

- Groundwater vulnerability to contamination: Depending on the design of the scheme, works may occur adjacent or within areas where groundwater is classified by the GSI as 'extremely vulnerable' to contamination. Appropriate environmental controls and management measures will be implemented for any advance SI works. A CEMP will be developed for construction activities. A CEMP will be developed for all site investigation works, construction activities and traffic management

- Karst features: GSI data indicated that there are no recorded karst features in the study area. However, considering the underlying geology it is prudent to consider that karst features such as caves, swallow holes, weathered rock and dolines can lead to ground instability and are a constraint to be considered in the engineering design of the scheme.

- Geoheritage: Bedrock outcrop is relatively rare in Dublin and considered a valuable resource for geological data collection. It is good practice to inform the Geological Survey Ireland (GSI) (contact: Beatriz.Mozon@gsi.ie) where:

    - construction works temporarily or permanently uncover significant outcrop;

    - were reports detailing any site investigations can be made available to the GSI;

    - a digital photographic record of any significant new excavation can be produced and provided to the GSI.

12.1.5 Ecology and Biodiversity

Key constraints requiring consideration include:

12.1.5.1.1 Protected Sites

There are two European sites within the ecological study area. There is the potential for these sites to be impacted by the proposed scheme. In-river works have the potential to re-suspend sediments which will then be transport downstream to enter the sea *via* the River Liffey. All such works must be designed to minimise this potential impact. Similarly, all work that is to be carried out on the river bank must be carried out in such a way as to minimise the potential for events such as diesel or concrete spillages, run off of water with suspended sediment loadings or any accidental spillages. If it considered necessary to re-build weirs or sluices, the same sort of construction approach should be designed in to minimise resuspension and loss of concrete to the river.

Appropriate Assessment under Articles 6(3) and 6(4) of the EU Habitats Directive (Directive 92/43/EEC) will be required for the proposed scheme.

12.1.5.1.2 Protected/notable Species

In ecological terms, the river corridor (including the river itself) supports a number of protected and/or notable species including three species of lamprey, salmon, eel, sea and brown trout, otter, bats, badger, hedgehog, pygmy shrew, common frog, kingfisher, sand martin, and little egret. Pine martin is found further upstream in the catchment.

Any in-river and bankside works have to be designed to minimise potential impacts on these (and all other) species.

All works should be planned wherever possible to be carried out at times of the year that are ecologically least sensitive *e.g.* outside bird nesting (March – September) and fish migration periods (Spring/Summer, depending on species).

Should works be undertaken during the nesting season, a survey should be undertaken prior to works to identify any active nests, including ground-nesting bird burrows (e.g. kingfisher, sand martin), in the vicinity of works.

Otter

The ecological study area contains suitable commuting, foraging, breeding and resting habitats for otter, although it should be noted that no holts or field signs of otter were recorded during the ecological walkover survey. As a European protected species, the otter is fully protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Any scheme option that may have the potential to disturb otters must be assessed. A full otter survey will be completed once the scheme extents are known. If otters are found to be present and disturbance is likely then DCC must apply for a licence to allow proposed development works that might affect otters to proceed legally. The potential impacts on otter will be assessed and reported in the EIA.

Otter mitigation works can potentially be conducted at any time of year but must avoid the breeding season (usually Spring but can be any time of year) if holts are present on site.

Badger

Although badgers have been recorded in the study area, no setts or field sign were recorded during the site visit. Should a badger sett be recorded within the scheme extents prior to construction works then appropriate mitigation and a licence for works will be required. Construction of new setts must be completed in Spring/Summer with blocking and destruction of existing setts completed in Autumn/early winter.

Birds

All works should be planned wherever possible to be carried out at times of the year that are ecologically least sensitive e.g. outside bird nesting (March – September). Should works be undertaken during the nesting season, a survey should be undertaken prior to works to identify any active nests, including ground-nesting bird burrows (e.g. kingfisher, sand martin), in the vicinity of works

Bats

The scattered mature trees, bridges, architecture (churches, masonry) and areas of low water flow provide good foraging, roosting and commuting routes for bat species in the area. Options that require the removal of mature trees or works to bridges or other riverine structures with the potential to support roosting bats shall be assessed for bat potential. Bat surveys shall be conducted on any features with medium or high potential for roosting bats. The optimal time to conduct map surveys are May and August, when bats are most active. If bats are found, they should not be disturbed during hibernation period (October to March) or maternity period (June to August). If a bat roost requires removal then a licence would be required. Removal of roosts should be carried out during the summer months for hibernation roosts and during the winter months for maternity roosts.

Freshwater Fish

Fish present in the Rover Dodder include sea, brook and river lamprey (*Lampetra planeri* and *L. fluviatilis*) (River Dodder Habitats Management plan, 2008), brown trout (*Salmo trutta*), sea trout (*Salmo trutta morpha trutta*), stone loach (*Barbatula barbatula*), three-spined stickleback (*Gasterosteus aculeatus*) and eel (*Anguilla anguilla*). Salmon (*Salmo salar*) have been recorded in the river's lower course. Further surveys are currently being competed on site to establish the presence/absence/abundance of the fish species listed above. This will involve netting and electrofishing surveys.

In terms of the construction programme, it should be noted that in salmonid catchments, in-stream works are not permitted between the months of January to April (migration) and October to December (spawning). This corresponds with guidance from Inland Fisheries Ireland (Murphy, 2016).

Lamprey (both species) spawning takes place in the spring and early summer period in often the same habitats where salmon and trout spawn (O'Connor, 2017). The spawning season for brown and sea trout is November to February. If spawning grounds are found to be present in the construction zone for the scheme then this period should be avoided.

A full impact assessment and management plan for these fish species will be produced as part of the EIA report once full scheme details (including construction methods) are known.

Invasive Species

Japanese Knotweed, Himalayan balsam, and Gunnera are listed as invasive plants under the EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011). These regulations prohibit the introduction or dispersal of invasive species and appropriate measures should be undertaken in the proposed scheme development. Therefore, any works occurring in areas where invasive species are present must use appropriate measures. Mink, a legally designated invasive alien species found along the length of the Dodder. DCC Parks has previously initiated mink control programmes with NPWS, IFI and adjoining local authorities. South Dublin County Council are currently controlling mink in the upper catchment. Grey squirrel, another legally designated

invasive alien species, is widespread in the Dodder catchment. An Invasive Alien Species Action Plan will be required for the proposed project.

12.1.6 Cultural Heritage and Archaeology

Any work carried out in close proximity to areas of archaeological, cultural heritage and built heritage importance must follow appropriate measures or guidelines to ensure the conservation and maintenance of the area. There are no World Heritage Sites, National Monuments or Sites with a Preservation Order within the archaeological study area. Sites to be considered as key constraints include:

- All sites listed in the Record of Monuments and Places (RMP) or the Sites and Monuments Record (SMR):
    - DU022-096002, Mill – unclassified, Rathmines South;
    - DU022-096001, Mill – unclassified, Rathmines South;
    - DU022-097, Bridge, Rathmines South;
    - DU022-004001, Bridge, Milltown (Uppercross By.);
    - DU022-004002, Water mill – unclassified, Milltown (Newcastle By.);
    - DU022-004003, Water mill – unclassified, Milltown (Newcastle By.);
    - DU022-004006, Mill – unclassified, Milltown (Newcastle By.);
    - DU022-098, Water mill – unclassified, Dublin South City;
    - DU022-092, House - 18th/19th century, Milltown (Uppercross By.);
    - DU022-093, Ford, Milltown (Uppercross By.);
    - DU022-090, Bridge, Clonskeagh (Dublin By.)
- Zones of archaeological potential (ZAP) for RMP sites with increased archaeological potential:
    - Area encompassing ZAP DU022-004001–006, extending from Milltown Bridge to Orwell Park, Milltown (Uppercross By.);
    - Area encompassing ZAP DU018-096, at Packhorse Bridge, Rathmines South.
- Areas of Archaeological Potential:
    - Five areas of archaeological sensitivity at Clonskeagh Bridge Park (AAS 1), Milltown Bridge Park (AAS 2), Dartry Park East (AAS 3),Dartry Park West (AAS 4) and Orwell Park (AAS 5) which are likely to reveal industrial heritage activity;

- All buildings or structures listed in the Record of Protected Structures:
    - Packhorse Bridge, Milltown Road;
    - Laundry stack, Milltown Road, Dublin 6;
    - Nine Arches bridge -Railway Viaduct, Milltown Road, Patrick Doyle Road, Dublin 6;
    - Former Dartry Dye Works, Dartry Road, Dublin 6;
    - Clonskeagh Castle, Whitebeam Road, Dundrum, Dublin 14;
    - Landore Hall, Churchtown, Dublin 14;
    - Beechmount, Orwell Road, Dublin 14.
- All sites listed in the National Inventory of Architectural Heritage (NIAH):
- The Gate Lodge known as Ely's Arch (11211012).

12.1.7 Landscape and Visual

Existing Trees and Hedgerows

The study area contains several public parks, matures stand of trees and small woodlands and tree lined recreational pathways along both sides of the River Dodder. The retention and protection of trees and woodlands within Dublin is emphasised with the DCDP (2016-2022). The existing trees and planting within the study area provides both visual and recreational amenity for the residential areas within the study area and the wider district.

Landscape Character

The proposed development of the subject site will result in a change to the landscape character which will be most noticeable locally, such as from the adjacent residential areas e.g. Orwell Gardens, several public parks and public pathways (along the river banks and bridges). The potential magnitude of this change will be assessed when the details, scale and extent of the proposed interventions have been finalised.

Historical landscape character and cultural heritage within the study area:

Within the study area there are several designations (as defined by the DCDP (2106-2022) and Protected Structures of national interest that need to be considered such as:

- Land use zoning objective Z9: To preserve, provide and improve recreational amenity and open space and green networks.
- Conservation Area.
- Zone of Archaeological Interest.

- Sites of Archaeological Interest.

A number of protected structures are also located within the study area (refer to section 8.3 of this report for more details).

Recreational amenity value

There are several recreational amenities within the study area that need to be considered in relation to possible impacts on their accessibility, recreational and visual values:

- Orwell Park (while located to the west of study area, impacts on this amenity would still need to be considered as park of this assessment).
- Dodder Park.
- Temple Park.
- Milltown Golf Club (private).
- Windy Arbour Playground.
- Scully's Field (between Milltown and Clonskeagh).
- Walking/ cycling pathways along much of the length of the river.

Views & Visual Amenity Value

Key viewpoints will be selected when the details, scale and extent of the proposed interventions have been defined, these shall include views into and out of the study area and those that demonstrate the visual amenity value within the locality.

There is a need to protect:

- Residential views towards the river.
- Recreational views – towards to and from the river (e.g. public pathways and parks).

Construction Phase & Operational Phase

During the construction phase, the following elements of the proposed development have the potential to cause visual impacts, they will however be short to medium term in duration:

- Temporary site works – hoarding, lighting, cranes, car parking, storage areas
- Construction traffic – dust and emissions
- Tree and vegetation clearance
- Groundworks – cut and fill excavations
- Laying of foundations

The principal elements which are likely to give rise to landscape and visual impact visual impact in the long term/operational phase are:

- Removal of some existing trees
- Height of proposed structures/ interventions
- New structures/ interventions
- Change of character – dependent on proposed interventions type and scale
- Proposed tree and shrub planting

Appropriate design, siting and mitigation measures are required to integrate the proposed scheme within the landscape.

12.1.8 Air Quality

The key constraints in relation to air quality and climate are the sensitive receptors in proximity to the location of construction works. The scheme design should take into consideration any air/climate/noise/vibration sensitive receptors such as residences, schools, businesses, and medical facilities located in proximity to works associated with the flood relief scheme. The potential impacts of climate change will need to be considered in the design of the proposed scheme.

12.1.9 Noise and Vibration

Noise and vibration effects are expected to occur during the construction phase only and would be expected to include:

- Construction traffic.
- Earthmoving plant and equipment.
- Sheet piling.
- Power tools and generators.

Construction noise is temporary in nature, and therefore the normal way of minimising the impact is to limit the working hours. For larger infrastructure projects the Local Authority may place noise limits on the construction works.

The project CEMP will include measures to avoid or minimise the potential impacts of noise on sensitive receptors during construction. The following noise control measures may be employed to limit noise impacts from the scheme:

- Install site hoarding 2.4 m high around site boundaries.
- Install local noise barriers with absorptive linings near to specific sources, during construction works.

- Provide enclosures around generators.
- Provide local screening.
- Implement appropriate noise management measures.

Ground-borne vibration attenuates rapidly with distance. People are very sensitive to vibration and can feel vibration long before it becomes an issue in terms of cosmetic damage or structural damage to buildings. Assessment of potential for damage due to vibration should be carried out where vulnerable structures are located in close proximity to works such as sheet piling.

12.2 Programme Constraints

- Protected/notable Species. All works should be planned wherever possible to be carried out at times of the year that are ecologically least sensitive e.g. outside bird nesting (March – September) and fish migration periods (Spring/Summer, depending on species (see below)).
- Otter. If otters are found to be present and disturbance is likely then DCC must apply for a licence to allow proposed development works that might affect otters to proceed legally. The potential impacts on otter will be assessed and reported in the EIA. Otter mitigation works can potentially be conducted at any time of year but must avoid the breeding season (usually Spring but can be any time of year) if holts are present on site.
- Badger. Although badgers have been recorded in the study area, no setts or field sign were recorded during the site visit. Should a badger sett be recorded within the scheme extents prior to construction works then appropriate mitigation and a licence for works will be required. Construction of new setts must be completed in Spring/Summer with blocking and destruction of existing setts completed in Autumn/early winter.
- Bats. The scattered mature trees, bridges, architecture (churches, masonry) and areas of low water flow provide good foraging, roosting and commuting routes for bat species in the area. Options that require the removal of mature trees or works to bridges or other riverine structures with the potential to support roosting bats shall be assessed for bat potential. Bat surveys shall be conducted on any features with medium or high potential for roosting bats. The optimal time to conduct map surveys are May and August, when bats are most active. If bats are found, they should not be disturbed during hibernation period (October to March) or maternity period (June to August). If a bat roost requires removal then a licence would be required. Removal of roosts should be carried out during the summer months for hibernation roosts and during the winter months for maternity roosts.
- Freshwater Fish. Fish present in the river include both brook and river lamprey (*Lampetra planeri* and *L. fluviatilis*) (River Dodder Habitats Management plan, 2008), brown trout (*Salmo trutta*), sea trout (*Salmo trutta morpha trutta*), stone loach (*Barbatula barbatula*), three-spined stickleback (*Gasterosteus aculeatus*) and eel (*Anguilla anguilla*). Salmon (*Salmo salar*) have been recorded in the river's lower course. In terms of the construction

programme, it should be noted that in salmonid catchments, in-stream works are not permitted between the months of January to April (migration) and October to December (spawning). This corresponds with guidance from Inland Fisheries Ireland.

- Lamprey (both species) spawning takes place in the spring and early summer period in often the same habitats where salmon and trout spawn. The spawning season for brown and sea trout is November to February. If spawning grounds are found to be present in the construction zone for the scheme then this period should be avoided.
- Japanese Knotweed, Himalayan balsam, and Gunnera are listed as invasive plants under the EC (Birds and Natural Habitats) Regulations 2011 (S.1. 477/2011). These regulations prohibit the introduction or dispersal of invasive species and appropriate measures should be undertaken in the proposed scheme development. Therefore, any works occurring in areas where invasive species are present must use appropriate measures.
- Any in-river works will need to ensure compliance with the WFD.
- Co-ordination of any in-river works with the IFI and adherence to any IFI requirements.
- The presence of previously un-recorded underwater archaeological artefacts may significantly slow down the construction programme.
- The application for derogation licences should be applied for in advance of any works which may disrupt any protected species.
- Replies to requests for further information/clarification from An Bord Pleanála.

12.3 Engineering/Design Constraints

- The design of the final scheme may be subject to a number of site investigations and may change depending on the findings of these investigations.
- The made ground is uncompacted and highly variable may require excavation and replacement with suitable founding material.

12.4 Legal Constraints

- A 3rd party challenge to the application to An Bord Pleanála and a request for an oral hearing.
- All works must comply with all national and international laws and treaties as mentioned in the relevant sections of this report as well as the environmental reports.

13 References

BirdLife International, 2016. *Alcedo atthis. The IUCN Red List of Threatened Species 2016: e.T22683027A89575948.* [Online] Available at: https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22683027A89575948.en [Accessed 5 February 2021].

BirdLife International, 2019. *Riparia riparia (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2019: e.T103815961A155536007.* [Online] Available at: https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T103815961A155536007.en [Accessed 5 Feburary 2021].

ByrneLooby and McCloy Consulting, 2020. *Hydrology Report Dodder FAS Phase 3. report no W3394-W-R012,* s.l.: s.n.

ByrneLooby, 2020. *Public Consultation Report 01, Report no. W3394-PID-001,* s.l.: s.n.

City Populations, 2020. *Ireland Dublin.* [Online] Available at: https://www.citypopulation.de/en/ireland/dublin/ [Accessed October 2020].

Colhoun, K. & Cummins, S., 2013. Birds of Conservation Concern in Ireland 2014-2019. *Irish Birds,* Volume 9, pp. 523-544.

Commission for Communications Regulation, 2020. *Outdoor Mobile Coverage Map.* [Online] Available at: https://coveragemap.comreg.ie/map [Accessed October 2020].

Council, D. C., 2008. *Dublin City Biodiversity Action Plan 2008–2012,* Dublin City Council: s.n.

Department of Communications, Climate Action & Environment, 2020. *High Speed Broadband Map.* [Online] Available at: https://www.dccae.gov.ie/en-ie/communications/topics/Broadband/national-broadband-plan/high-speed-broadband-map/Pages/NBP-Map.aspx [Accessed October 2020].

Department of Environment, Heritage and Local Government , 2010. *Circular NPW1/10 & PSSP 2/10 Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities,* Dublin: DEHLG.

Department of Housing, Local Government and Heritage, 2020. *Myplan.ie Zoning Map Viewer.* [Online] Available at: https://myplan.ie/zoning-map-viewer/ [Accessed 2020].

Department of the Environment, Heritage and Local Government , 2010. *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities,* Dublin: DEHLG .

Dublin City Council Website, 2020. *Bottle Banks / Textile Banks.* [Online] Available at: https://www.dublincity.ie/residential/environment/waste-and-recycling/recycling-dublin-city/bottle-and-textile-recycling [Accessed 2020].

Dublin City Council, 2015. *Dublin City Biodiversity Action Plan 2015–2020,* s.l.: Dublin City Council.

Dublin City Council, 2016. *Dublin City Development Plan 2016-2022,* Dublin: DCC.

Dublin City Council, 2020. *Bring Centres - North City.* [Online] Available at: https://www.dublincity.ie/sites/default/files/content/WaterWasteEnvironment/Waste/RecyclingServices/Documents/Bring%20Centres%20information%20leaflet%20Sept%202020.pdf [Accessed October 2020].

Dublin City Council, 2020. *List of Bottle Banks in the Dublin City Council Area.* [Online] Available at: https://www.dublincity.ie/sites/default/files/content/WaterWasteEnvironment/Waste/RecyclingServices/Documents/List%20of%20Bottle%20Banks.pdf [Accessed October 2020].

Dublin City Council, 2020. *Where does my water come from?.* [Online] Available at: http://www.dublincity.ie/main-menu-services-water-waste-and-environment-your-drinking-water-managing-our-water-supplies

Dún Laoghaire-Rathdown County Council, 2016. *Dún Laoghaire-Rathdown County Development Plan 2016-2022,* s.l.: DLRCOCO.

Environmental Protection Agency , 2017. *Guidelines on the information to be contained in Environmental Impact Statements,* s.l.: EPA.

Environmental Protection Agency , 2020. *Irish Soil Information System.* [Online] Available at: http://gis.teagasc.ie/soils/ [Accessed October 2020].

Environmental Protection Agency, 2006. *EU Water Framework Directive Monitoring Programme - EPA.* [Online] Available at: https://www.epa.ie/pubs/reports/water/other/wfd/ [Accessed October 2020].

Environmental Protection Agency, 2011. *Air Quality Standards Regulations,* Ireland: EPA.

Environmental Protection Agency, 2015. *Advice Notes on the Current Practice in the Preparation of Environmental Impact Statements,* s.l.: EPA.

Environmental Protection Agency, 2018. *Air Quality in Ireland 2017- Indicators of Air Quality,* Johnstown Castle Estate: Environmental Protection Agency.

Environmental Protection Agency, 2020. *Air Quality Index for Health - EPA.* [Online] Available at: https://www.epa.ie/air/quality/pro/ [Accessed October 2020].

Environmental Protection Agency, 2020. *EPA Geo portal, EPA Licensed Facilities.* [Online] Available at: https://gis.epa.ie/GetData/Download [Accessed 2020].

Environmental Protection Agency, 2020. *EPA Geo portal, Water Quality and Monitoring.* [Online] Available at: https://gis.epa.ie/GetData/Download [Accessed 2020].

Environmental Protection Agency, 2020. *EPA Interactive Maps.* [Online] Available at: https://gis.epa.ie/SeeMaps [Accessed October 2020].

ESRI, 2020. *Exploration And Mining.* [Online] Available at: http://spatial.dcenr.gov.ie/ExplorationAndMining/SpatialViewer/index.html [Accessed October 2020].

European Union, 2007. *Directive 2007/60/EC of the European Parliament and of the Council on the Assessment and Management of Flood Risks.* [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007L0060&from=EN [Accessed October 2020].

European Union, 2014. *Directive 2014/52/EU of the European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment.,* s.l.: EU.

Eurpean Communities, 2000. *Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC,* Luxembourg: EEC.

Fossitt, J., 2000. *A Guide to Habitats in Ireland,* Dublin : The Heritage Council.

Geological Survey Ireland, 2020. *Data and Maps.* [Online] Available at: https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx [Accessed October 2020].

Inland Fisheries Ireland, 2018. *Factsheet 2018/2. River Dodder Catchment..* [Online] Available at: https://www.fisheriesireland.ie/ [Accessed July 2020].

Lucey, J. et al., 1999. *Water Quality in Ireland 1995-1997,* Wexford: Environmental Protection Agency.

Marnell, F., Looney, D. & Lawton, C., 2019. *Ireland Red List No. 12: Terrestrial Mammals,* Dublin, Ireland: National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht.

Murphy, D. F., 2016. *Fisheries Protection Guidelines,* Blackrock: Eastern Regional Fisheries Board.

National Biodiversity Data Centre, 2021. *Biodiversity maps.* [Online] Available at: https://www.biodiversityireland.ie/ [Accessed Feburary 2021].

National Parks & Wildlife Service, 2019. *Protected Site Boundary Data (December 2019).* [Online]
Available at: https://www.npws.ie/maps-and-data/designated-site-data/download-boundary-data
[Accessed October 2020].

O'Connor, W., 2017. *Introduction to lampreys and issues they face in Ireland.* [Online] Available at: https://lampreysurveys.com/2017/09/26/lampreys-in-ireland/ [Accessed October 2020].

open eir , 2020. *Fiber Rollout Map.* [Online] Available at: https://fibrerollout.ie/rollout-map/ [Accessed October 2020].

Oxford Brookes University, 2001. *EC Environment Directorate-General (2000) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.,* Luxembourg: European Communities.

Roughan and O'Donovan Consulting Engineers, 2020. *The Dodder Greenway Updated Ecological Impact Assessment (EcIA),* s.l.: s.n.

Royal Haskoningdhv, 2020. *Ireland - Dublin Ringsend WwTP Process Proving Step 1 and 2.* [Online]
Available at: https://www.royalhaskoningdhv.com/en-gb/nereda/nereda-plants/ireland-dublin-ringsend-wwtp-process-proving-step-1-and-2/5885

RPS, 2007. *Project Inception Report Dodder,* s.l.: RPS.

RPS, 2008. *River Dodder CFRAM Hydrological Analysis Report,* West Pier: RPS.

RPS, 2009. *River Dodder CFRAM Option Development Process Preliminary Screening of Measures* , Belfast: RPS.

RPS, 2010. *Habitats Directive Article 6 Assessment for the Dodder Catchment Appropriate Assessment Report,* Limerick: RPS.

RPS, 2010. *Natura 2000 Appropriate Assessment for the River Dodder Flood Risk Assessment Management Study,* Dublin: RPS.

RPS, 2012. *Dodder Catchment Flood Risk Assessment and Management Plan* , Belfast: RPS.

RPS, 2014. *Dodder Catchment Flood Risk Assessment and Management Plan Strategic Environmental Assessment Statement,* Belfast: RPS.

Wyse Jackson, M. F. Ú. C. E. J. M. M. D. S. S. M. &. W. M., 2016. *Ireland Red List No. 10: Vascular Plants,* Dublin: National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

14 Appendices

Appendix A Figures of Study Extent and Proposed Options from Dodder CFRAM Study)

W3394-ENVR001-FG001 – Study Extent

W3394-ENVR001-FG002 – Dodder CFRAM study

Appendix B Existing foul and storm water sewers layout of the scheme area

W3394- SK12

Appendix C Surface water physio-chemistry data (2019)

Monitoring Station: Beaver Row Footbridge (code: RS09D010900)

Waterbody Name: DODDER_050; Waterbody Code IE_EA_09D010900

			Date													
Parameter	**Units**	**Limit of detection**	**22/01/19**	**19/02/19**	**27/02/19**	**12/03/19**	**09/04/19**	**07/05/19**	**25/06/19**	**30/07/19**	**06/08/19**	**25/09/19**	**23/10/19**	**12/11/19**	**20/11/19**	**03/12/19**
True Colour	mg/litre Pt Co (*Hazen)	5 (mg/litre Pt Co)	43	18	45*	75	56	27	41	21	24	233	53	98	26*	29
Suspended Solids	mg/l	4	6	<4	NR	20	<4	<4	<4	<4	<4	<4	<4	<4	NR	<4
Temperature	°C	-	4.8	7	7.8	6.9	8.8	10.4	14.7	16.4	16.8	15.2	10.2	6.9	11.7	6
Conductivity @25°C	µS/cm	15	429	454	297	305	365	436	414	466	448	239	396	296	390	416
pH	-	2	8.2	8.3	8.4	8	8.2	8.4	8.3	8.4	8.4	8	8.2	8.1	8.3	8.1
Alkalinity-total (as CaCO3)	mg/l	10	133	159	123	98	131	157	105	173	161	82	141	105	131	153
Total Phosphorus (as P)	mg/l	0.01	0.044	0.025	NR	0.073	0.012	0.023	0.055	0.047	0.072	0.036	0.02	0.016	NR	0.02
Total Oxidised Nitrogen (as N)	mg/l	0.2	1.5	1.8	1.05	1.1	1.4	1.4	1.2	1.2	1.2	0.66	1.5	1.4	1.43	1.9
Total Nitrogen	mg/l	0.5	1.7	2.1	NR	1.7	1.3	1.5	1.7	1.6	1.6	1.1	1.7	1.6	NR	1.9
Total Hardness (as CaCO3)	mg/l	10	172	206	150	129	169	201	230	212	207	110	184	135	162	186
Sulphate	mg/l	NR	NR	NR	NR	20	NR	NR	NR	NR	NR	NR	NR	NR	25	NR
ortho-Phosphate (as P) - unspecified	mg/l	0.01	0.018	0.022	0.03	0.025	<0.01	<0.01	0.018	0.039	0.049	0.026	0.023	0.014	0.03	0.017
Nitrite (as N)	µg/l	4	14.1	10.8	0.005	6.44	15.8	8.48	15.5	10.4	12.9	<4	11	<4	0.011	20.9
Nitrate (as N)	mg/l	0.2	1.5	1.8	1.04	1.1	1.4	1.4	1.2	1.2	1.2	0.66	1.5	1.4	1.42	1.9
Dissolved Oxygen	mg/l	0.1	12.9	15.3	12.3	11.2	11.7	11.8	10.7	11.1	10.5	9.9	11.5	12.4	11.7	12.6
Dissolved Oxygen	% Saturation	1	101	125	102	94	102	106	104	114	110	97	102	103	104	100
Dissolved Organic Carbon	mg/l	2	5.1	3	NR	6.7	4.8	3.4	6.4	3.5	4	16	4.2	5.6	NR	3.1
Chloride	mg/l	2	53.8	26.5	19	24.9	20.7	24.5	22.3	28	23.8	14.1	22.1	16.6	43	21.8
BOD - 5 days (Total)	mg/l	1	1.1	<1	<1	<1	<1	<1	1.4	1.7	1.1	1.4	<1	<1	2	<1
Ammonia-Total (as N)	mg/l	0.02	0.033	0.028	0.02	0.096	0.03	<0.02	0.058	0.025	0.034	NR	0.025	0.042	0.08	0.089

Note: rounding of numerical results is directly imported from the publicly available dataset

NR = Not reported

- = Not applicable

Appendix D Bat Report