

# Ringsend Wastewater Treatment Plant Upgrade Project Environmental Impact Assessment Report



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## Volume 1 - Non Technical Summary

June 2018



# Preface

The structure of the Environmental Impact Assessment Report (EIAR) for the proposed Ringsend Wastewater Treatment Plant Upgrade Project (the Proposed Upgrade Project) is outlined in the preface at the start of each Volume of the EIAR for clarity. The Proposed Upgrade Project is located at two sites; the Wastewater Treatment Plant (WwTP) at Ringsend, Dublin 4 and a site proposed for the Regional Biosolids Storage Facility at Newtown, Dublin 11. Volume 1 and Volume 2 provide general information on the overall Proposed Upgrade Project. Volume 3 addresses the Ringsend WwTP component of the Proposed Upgrade Project and Volume 4 addresses the Regional Biosolids Storage Facility component of the Proposed Upgrade Project. Volume 5 provides drawings and large format images for both components. The volumes and sub-section titles are summarised as follows:

## **Volume 1: Non-Technical Summary**

Volume 1 provides a non-technical summary of the information contained in Volumes 2, 3 and 4.

## **Volume 2: Introduction**

### **Part A: Report**

Volume 2 Part A provides a general introduction, outlines the EIA process, describes the scope of the Proposed Upgrade Project and presents the consideration of alternatives.

### **Part B: Appendices**

Volume 2 Part B supplies data that is supplemental to the information in Volume 2 Part A and other volumes of the EIAR.

## **Volume 3: Ringsend Wastewater Treatment Plant**

### **Part A: Report**

Volume 3 Part A describes the environmental impacts specific to the Ringsend Wastewater Treatment Plant component of the Proposed Upgrade Project.

### **Part B: Appendices**

Volume 3 Part B supplies data that is supplemental to the information in Volume 3 Part A and is specific to the Ringsend Wastewater Treatment Plant component of the Proposed Upgrade Project.

## **Volume 4: Regional Biosolids Storage Facility**

### **Part A: Report**

Volume 4 Part A describes the environmental impacts specific to the Regional Biosolids Storage Facility component of the Proposed Upgrade Project.

### **Part B: Appendices**

Volume 4 Part B supplies data that is supplemental to the information in Volume 4 Part A and is specific to the Regional Biosolids Storage Facility component of the Proposed Upgrade Project.

## **Volume 5: Drawings**

### **Part A: Ringsend Wastewater Treatment Plant Upgrade**

Volume 5 Part A illustrates the information detailed in Volume 3 and is specific to the Ringsend Wastewater Treatment Plant component of the Proposed Upgrade Project.

### **Part B: Regional Biosolids Storage Facility**

Volume 5 Part B illustrates the information detailed in Volume 4 and is specific to the Regional Biosolids Storage Facility component of the Proposed Upgrade Project.

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## Section 1: Introduction

### 1.1 Background to EIAR

The original Ringsend Wastewater Treatment Plant (WwTP) was built in 1906 and has continued to expand to serve Dublin and its environs and it is now one of the largest treatment plants in Europe. The need for additional wastewater treatment capacity has previously been identified to meet increased commercial, domestic and industrial demand together with a requirement to meet higher environmental standards in the Lower Liffey Estuary.

As a result, Irish Water is now applying for planning permission to upgrade the Ringsend WwTP using enhanced treatment technology to allow for improved environmental outcomes. It also intends to develop a Regional Biosolids Storage Facility (RBSF) at Newtown in Dublin 11 to provide for seasonal storage of biosolids generated by both the Ringsend WwTP and the proposed Greater Dublin Drainage (GDD) project, prior to its re-use as a fertiliser on agricultural lands. Both the Ringsend WwTP and the RBSF have been submitted under one planning application.

An Environmental Impact Assessment Report (EIAR) is an assessment and analysis of potential impacts on the receiving environment caused by a proposed project. A project of this scale requires an EIAR. This EIAR has been prepared on behalf of Irish Water (the Applicant) and supports the planning application made directly to An Bord Pleanála under the provisions of Section 37 (Strategic Infrastructure Development) of the Planning and Development Act 2000, as amended.

This Non-Technical Summary (NTS) describes the Project, Environmental Impact Assessment (EIA) process and summarises the key environmental impacts arising from each of the environmental assessments carried out by a panel of experts in accordance with best practice. The environmental assessments involved desktop studies, site visits, surveys and site-specific investigations. The NTS also outlines the mitigation and monitoring measures proposed along with a list of any residual impacts.

### 1.2 Overview of General Wastewater Treatment Processes

This section aims to assist the reader to understand basic wastewater treatment concepts. The description is a simplified version of typical treatment steps that are commonly found in modern Wastewater Treatment Plants (WwTPs).

Sewer networks collect wastewater from our homes, businesses, commercial premises and industries, and deliver it safely to wastewater plants for treatment. In older towns and cities, they often also collect a proportion of road or street runoff after rainfall.

WwTPs are designed to reduce pollution levels of wastewater so that it can be returned to the environment, i.e. the river or sea, without having negative effects on it. Larger and more complex WwTPs are required where there are large populations being served and where potential impacts on the river or sea are increased by the sensitivity of certain types of life in that area.

Some of the main wastewater treatment steps required to meet environmental standards are described simply below.

### 1.2.1 Preliminary Treatment

Preliminary treatment seeks to screen or separate out any untreatable matter or things that would damage the process. It normally takes out: grease; wet wipes; sanitary material; litter; grit; stones; branches, and, leaves. This prevents blockages and protects the equipment required for treatment.

### 1.2.2 Primary Treatment

After preliminary treatment, the wastewater still contains organic and inorganic matter along with other suspended solids. These solids are minute particles which are removed from sewage in a sedimentation tank. When the wastewater stream flows through these tanks, its speed reduces. In slower flowing wastewater, the suspended solids gradually sink to the bottom, where they form a concentrated solid/liquid mix known as a primary sludge. This sludge is continuously removed by mechanical scrapers for subsequent treatment. The primary treatment phase removes about a third of the polluting matter in the wastewater treatment process.

### 1.2.3 Secondary Treatment

The wastewater containing both soluble and suspended matter moves to the next stage of treatment where bacteria are added. The bacteria break down the organic matter creating activated sludge, which is separated from the treated wastewater. Excess sludge produced through the growth of the bacteria is continuously removed and treated prior to disposal.

In many cases the wastewater from secondary treatment can be suitable for discharge.

### 1.2.4 Advanced Secondary Treatment / Tertiary Treatment

In certain circumstances, additional treatment may be required to remove turbidity (particles that cause cloudiness), nutrients, or pathogens that could affect sensitive waters, such as bathing waters or shellfish waters. Treatment plants discharging to these sensitive waters must also remove suspended solids, nutrients, and disinfect the treated effluent prior to discharge. Ultraviolet light is also commonly used for disinfection to appropriate levels.

### 1.2.5 Treatment of Sludge

Prior to treatment, wastewater sludge is made up mostly of a water-solids mix that has been removed as part of the wastewater treatment process. Wastewater sludge treatment processes can be generally divided into three types, as follows:

- Sludge volume reduction – the reduction of sludge volumes is provided mainly by sludge thickening and dewatering processes;
- Sludge quantity reduction – breaking down the organic solids in the sludge using a biological process for example using digestion either with or without air. The latter can also produce biogas for reuse;
- Sludge biosolids production - biosolids are typically recovered materials that are biologically stable, nutrient rich and can be safely reused to improve land or as a fertiliser substitute.

The type and level of sludge treatment depends on the amount of wastewater sludge generated and the reuse or disposal options available.

### 1.2.6 Treated Effluent Standards

The recovered wastewater is then discharged to a river or sea as effluent in accordance with a Wastewater Discharge Authorisation (WWDA) issued by the Environmental Protection Agency (EPA). The EPA sets effluent discharge standards based on the condition of the river, lake or sea. These standards may exceed minimum quality standards set by European legislation. The standards are intended to define the characteristics that a water body, such as the Lower Liffey Estuary must have to support every form of life that depends on it.

Ringsend WwTP does not currently achieve some of these standards. The level of treatment needs to be increased to a higher standard (specifically involving nutrient removal) to comply with European legislation. Irish Water intends to upgrade Ringsend WwTP to meet legislative standards. The WWDA will be subject to a review process by the EPA following completion of the planning process.

### 1.2.7 Population Equivalent

Wastewater treatment plants are normally described in terms of capacity, which are estimates of the volume or quantity of pollution that can be collected, conveyed to the WwTP and treated. One population equivalent or 1 PE is the term used to describe the estimated volume or quantity of pollution produced by an average person in one day.

## 1.3 Project Background

The need for additional wastewater treatment capacity to serve Greater Dublin was identified in the Greater Dublin Strategic Drainage Study (GSDS) (2005) and was subsequently the subject of a Strategic Environmental Assessment (SEA) process. This study set out a vision for the future management of wastewater within Greater Dublin. The GSDS proposed that the capacity of the Ringsend facility be maximised, within the existing site. Irish Water estimates that the Ringsend WwTP will be maximised at an average daily capacity of 2.4 million PE. The second reason for the project is the designation of the Lower Liffey Estuary as a “sensitive” water body requiring higher treatment standards.

### 1.3.1 2012 Approval

In 2012, An Bord Pleanála granted approval to upgrade Ringsend WwTP to 2.4 million PE capacity. As well as the increased capacity, the proposed extension included development of a 9 kilometre Long Sea Outfall Tunnel (LSOT) and various supporting works. Two amendments to the 2012 Approval were also approved by An Bord Pleanála in respect of those supporting works:

- Removal of two areas of landscaping bunds located on the eastern perimeter and the provision of an internal circulation road and adjustment of the site boundary fence in the south east corner of the site.
- Omission of three previously approved construction site compounds and provision of three new temporary construction site compounds for three years.

In the context of this EIAR, these permitted works are referred to collectively as the “**2012 Approval**”.

### 1.3.2 The Proposed Development

Permission is now being sought from An Bord Pleanála for the development (**Proposed Development**) comprising two principal components, as follows: -

## Ringsend WwTP Component

Irish Water is progressing elements of the 2012 approval and this application seeks to make revisions to other parts of that approval. The project involves the expansion of the existing wastewater treatment plant to 2.4 million PE capacity as before but proposes using aerobic granular sludge (AGS) technology within the plant. AGS technology improves the secondary treatment process to produce a cleaner final effluent. The standard of nutrient removal improves the effluent quality so that it can continue to be discharged directly to the Lower Liffey Estuary and in compliance with European legislation. This improvement removes the need for a 9km Long Sea Outfall Tunnel and certain supporting works. Volume 3 of the EIAR focuses on the Ringsend WwTP component.

## Regional Biosolids Storage Facility (RBSF) Component

The purpose of the RBSF is to store biosolids that will be produced at the Ringsend WwTP and the proposed Greater Dublin Drainage (GDD) WwTP. The *National Wastewater Sludge Management Plan* (Irish Water, 2016) (NWSMP) identifies the preferred reuse of biosolids as a fertiliser on agricultural land in the short to medium term. Constraints on winter land spreading due to legislation and seasonality of demand for the product requires that biosolids must be stored during certain times of the year. The development of regional facilities to cater for storage of biosolids from wastewater treatment plants is recommended in the NWSMP.

The RBSF, which forms part of the Proposed Development, is at an 11-hectare site at Newtown, Dublin 11 and consists of two large biosolids storage buildings, including solar panels on the roof of one building and supporting buildings and works. Volume 4 of this EIAR focuses on this RBSF component.

### 1.3.3 The Proposed Upgrade Project

Figure 1-1 summarises the background above, in graphical form, and illustrates both the Ringsend WwTP Component and the RBSF Component of the Proposed Upgrade Project.

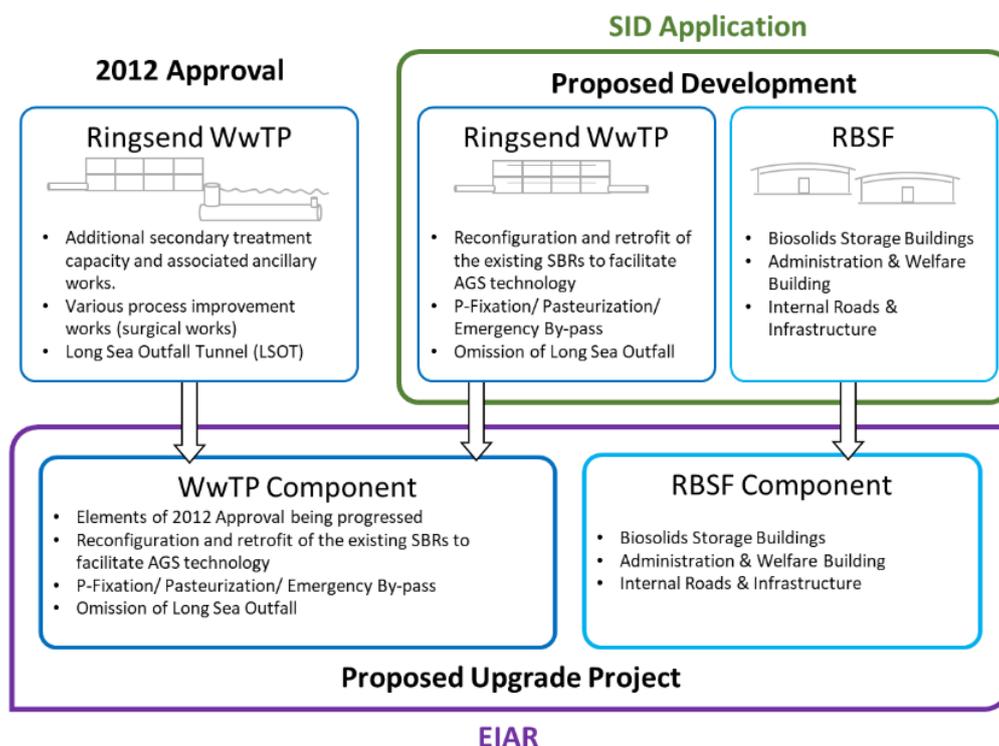


Figure 1-1: Project Background and approach to EIAR

The Proposed Upgrade Project includes elements of the 2012 Approval being progressed, amendments approved under section 146B of the Planning and Development Act, and the Proposed Development now being applied for under Section 37E.

## 1.4 Site Location

The site location must be considered with regard to the planning and environmental context. In this section, an overview is provided for illustrative purposes, of the major environmental designations and planning classification of both site locations.

Later in this document, each specialist considers the existing environment in more detail, as required from their particular expert viewpoint, and identifies potential environmental impacts arising from the project.

### 1.4.1 Ringsend WwTP – Location and Natura 2000 Sites

Ringsend WwTP has been the hub of wastewater treatment for the Dublin area since 1906. Various extensions and upgrade projects have taken place in the intervening period with the most recent major extensions being the completion of the current WwTP configuration in 2003. Ringsend WwTP is located on the Poolbeg peninsula in Dublin City, with a final effluent discharge into the Lower Liffey Estuary c.1 km to the east, adjacent to the ESB Poolbeg Power Station as shown in Figure 1-2



Figure 1-2: Location Overview

The Poolbeg peninsula is located along the southern bank of the River Liffey, at its eastern extremity, where the river enters Dublin Bay. The surrounding environment consists of Dublin City to the west, which is an urbanised landscape, and Dublin Bay to the east, which has several environmental designations, and is also an important recreational environment.

Certain sites known as Natura 2000 sites are designated for the protection of vulnerable habitats and species. Natura 2000 is a network of nature protection areas including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) as designated respectively under the Habitats Directive and Birds Directive. The Natura 2000 sites close to Ringsend WwTP are:

### Special Areas of Conservation (SAC)

- South Dublin Bay cSAC (Site Code: 000210);
- North Dublin Bay cSAC (Site Code: 000206);
- Howth Head cSAC (Site Code: 000202); and
- Rockabill to Dalkey Island cSAC (Site Code: 003000).

### Special Protection Areas (SPA)

- South Dublin Bay and River Tolka Estuary SPA (Site Code: 004024);
- North Bull Island SPA (004006);
- Howth Head Coast SPA (004113); and
- Dalkey Islands SPA (004172).

## 1.4.2 Ringsend WwTP – Water Quality Status and Land Use

The final effluent from the Ringsend WwTP discharges into the Lower Liffey Estuary, which, together with the Tolka Estuary, is designated as a sensitive water under the Urban Waste Water Treatment Directive (UWwTD). This designation requires the plant to include nutrient (nitrogen and phosphorous) removal in the treatment process, which is not currently the case.

The Proposed Upgrade Project will include nutrient removal to ensure compliance with the UWwTD. In addition, the improvements to the final effluent quality will also assist in the improvement of water quality status in the Lower Liffey and Tolka Estuaries. These two estuaries are currently designated as moderate under the Water Framework Directive, and the requirement is to achieve good status. The current nutrient levels were included as part of the assessment of the water quality status.

A number of other activities in Dublin Port have the potential to impact on water quality status. These activities are current or planned as set out below.



Figure 1-3: Poolbeg West SDZ

In 2015, Dublin Port received planning approval for a major development, known as the Alexandra Basin Redevelopment project. The project, which is underway, provides for new quays, jetties, dredging of the shipping channel, berthing area and completion of decontamination measures.

Poolbeg West is designated as a Strategic Development Zone (SDZ), see Figure 1-3. and is likely to include residential (3,000 – 3,500 units), commercial, or port related uses.

A draft SDZ Planning Scheme is progressing through the statutory planning process.

The Poolbeg Peninsula is dominated by utility, industrial and amenity uses and has active deep-water berthing and dockage facilities on the northern edge. The peninsula is a heavily industrialised environment, including some establishments designated and regulated for major accident hazard risks (e.g. Dublin Bay Power Ltd. and the National Oil Reserves Agency).

### 1.4.3 Regional Biosolids Storage Facility RBSF

The site is located at Newtown in Dublin11, 19 kilometres from Ringsend WwTP. The site is bounded to the east by the R135. There are three residential properties and five commercial premises along the R135 (as indicated in Figure 1-4). The Peter McVerry Trust received planning approval in 2015 for the demolition of existing buildings and the construction of six one-bedroom bungalows. To the north lies an area of semi-natural, dry meadow grassland with the N2 dual carriageway beyond. To the west, the site is bounded by the Huntstown Quarry and a tributary of the Huntstown Stream, which is a tributary of the River Ward. The south of the site is bounded by hedgerows and treelines that form a boundary with the Huntstown Power Station. Dublin Airport lies to the east.

The character of the area can be classified as primarily “industrial and employment”, although it retains some of its rural characteristics.

The more densely populated areas nearest the Proposed RBSF Component are located to the south of the M50 motorway.



Figure 1-4: RBSF Location

## Section 2: Planning Process and Environmental Impact Assessment Report

The Environmental Impact Assessment Report (EIAR) has been prepared in accordance with Article 1(2)(g) of the EIA Directive 2014/52/EU (the EIA Directive). The EIAR has been prepared by a team of environmental and engineering specialists, each an expert in their own discipline. The assessments have been conducted in accordance with relevant guidelines and advice notes for each environmental topic and in accordance with the EPA Draft Guidelines (2017) and EU Guidelines (2017).

This EIAR will be submitted as part of the overall planning application directly to An Bord Pleanála. The EIAR presents the results of the environmental impact assessment of the Proposed Upgrade Project.

The structure of the Environmental Impact Assessment Report for the Proposed Upgrade Project consists of the following five volumes:

- Volume 1 – Non-Technical Summary
- Volume 2 – Project Description and Overarching Documents
- Volume 3 – Ringsend Wastewater Treatment Plant (WwTP)
- Volume 4 – Regional Biosolids Storage Facility (RBSF)
- Volume 5 – Drawings

### 2.1 The Planning Process

This Proposed Development is being submitted in accordance with Section 37 of the Planning and Development Act 2000, as amended, which enables planning applications for developments of strategic, economic or social importance to the State to be submitted directly to An Bord Pleanála. Under Section 37B (1) of the Act, the prospective applicant is required to enter into pre-application consultation with An Bord Pleanála. A total of nine pre-application consultation meetings were held between An Bord Pleanála and the applicant. At the end of pre-application consultation process, An Bord Pleanála served notice to the Applicant on 26 March 2018, indicating that the Proposed Development is considered to be a Strategic Infrastructure Development within the meaning of the Act and the planning application should be made directly to An Bord Pleanála.

Public notices must be published in advance of the planning application, which state the times and places at which the application and the EIAR may be inspected. An Bord Pleanála specified a 7-week consultation period which invites the making of submissions and observations to An Bord Pleanála in relation to the:

- implications of the Proposed Development for proper planning and sustainable development; and,
- likely effects on the environment of the Proposed Upgrade Project, if carried out.

Submissions can be made on these matters to An Bord Pleanála over a seven-week period after the applicant formally submits the planning application. An Bord Pleanála will examine the EIAR and consider any submissions or observations made on the planning file and may hold an Oral Hearing on the application. Following consideration of all relevant information, An Bord Pleanála may then decide to grant permission (in whole or in part), to grant permission for a modified development, or to refuse permission.

## 2.2 Public Consultation

### 2.2.1 Ringsend WwTP Component

The non-statutory consultation for the Ringsend WwTP Component of the Proposed Upgrade Project commenced on 14 March 2016 and ended on 17 May 2016. The purpose of this consultation was two-fold:

1. to provide the public with information on the revised scope now being considered by Irish Water and to provide the public with an opportunity to raise queries and discuss concerns with Irish Water’s Project Team; and
2. to engage with and seek the assistance of the public and prescribed bodies in scoping the environmental issues to be considered and assessed in the EIAR and NIS.

Throughout the consultation period the project team welcomed written and oral feedback. Many issues were also addressed in publications, at open days and in direct responses to stakeholder queries. All issues raised were considered by the project team in developing and finalising its planning application and EIAR.

### 2.2.2 RBSF Component

Irish Water undertook a three-stage site selection process to identify a suitable location for a new Regional Biosolids Storage Facility. At each stage, a period of non-statutory public consultation was arranged as summarised in Table 2-1. A number of open days were held before and after the selection of the preferred site.

**Table 2-1: RBSF Site Selection Consultation Periods**

Site Selection Stage	Dates
Stage 1 - Site Selection Methodology	2 February to 2 March 2017
Stage 2 - Identification of Potential Sites	11 May to 15 June 2017
Stage 3 - Identification of Preferred Site	29 August to 10 October 2017

The ‘*Scoping Report for the EIAR and NIS*’ for the RBSF Component was published in conjunction with the *Stage 3 Report – Identification of Preferred Site* on the 29 August 2017. The Applicant asked for opinions on factors that should be considered and the methodology to be used in assessing the environmental impact of the project. The consultation period took place over six weeks from 29 August to 10 October 2017, at the same time as the Stage 3 site selection consultation. The Applicant issued a copy of the Scoping Report to both prescribed bodies and key stakeholders during the scoping stage of the project and a further public open day was held on 12 September 2017.

## Section 3: Description of the Proposed Upgrade Project

In this section, the goal is to summarise the works to be delivered in the Proposed Upgrade Project.

### 3.1 Ringsend WwTP Component

The Proposed Upgrade Project includes elements of the 2012 Approval being progressed, amendments approved under section 146B of the Planning and Development Act, and the Proposed Development now being applied for under Section 37E. These facilities are required to provide for an increased capacity of 2.4 million PE and to achieve the required effluent standards, without the need for the LSOT. Although the capacity is expressed as an annual average daily capacity, the WwTP will be designed to cater for significant daily, weekly and seasonal variations outside of this value. A breakdown of the works to be carried out under the 2012 approval is summarised in Section 3.1.1. The Proposed Development is then outlined in Section 3.1.2

#### 3.1.1 The 2012 Approval

The following works are being carried out under the 2012 approval at the Ringsend WwTP:

- Installation of increased pumping capacity arising from the additional effluent (W1);
- Increasing primary treatment capacity in existing settlement tanks (W2);
- Increase in secondary or biological treatment capacity (W3);
- Provision of a new pumping station (W3);
- New effluent fine screens to further improve final effluent quality (W5);
- Addition of sludge thickening facilities to cater for the future sludge loads (S1);
- New anaerobic sludge digester to ensure the digestion of all additional sludge (S3);
- Addition of new centrifuges to facilitate increased sludge loads (S5); and
- Provision of construction access onto Pigeon House Road and haul road (A2).

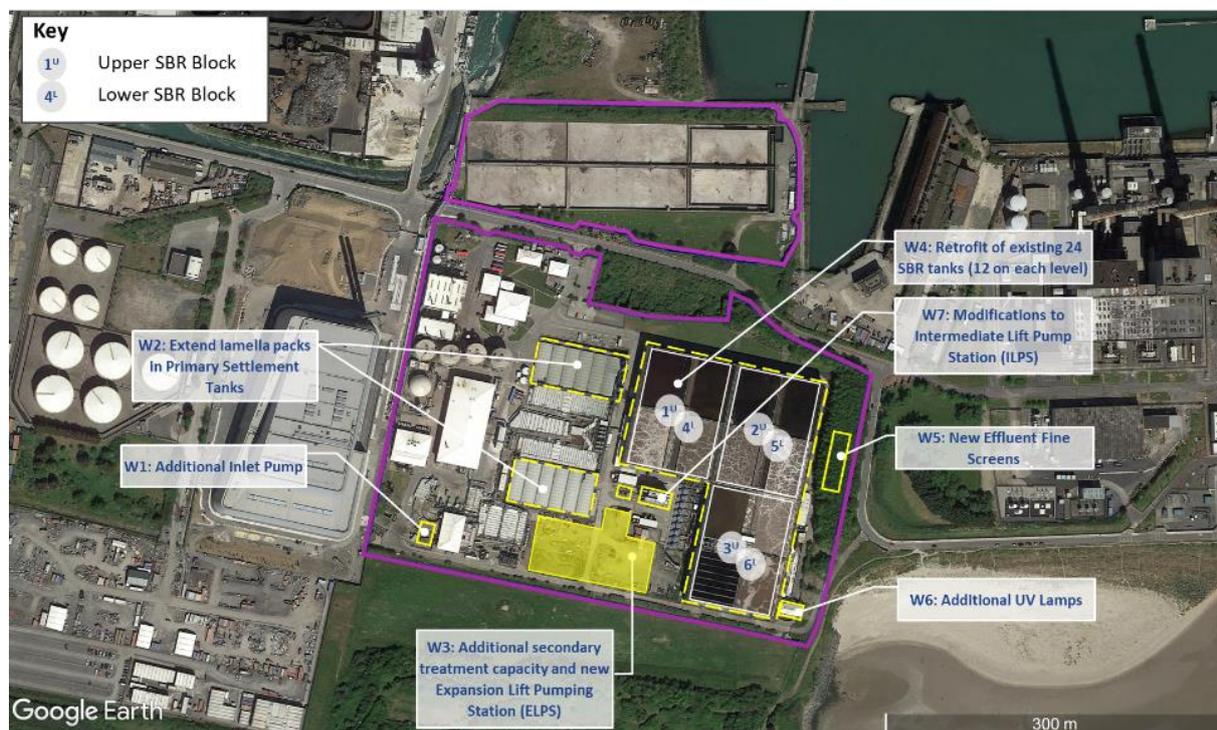


Figure 3-1: 2012 Approval Schematic

### 3.1.2 The Proposed Development at Ringsend WwTP

The following additional development works are now proposed as part of this planning application at Ringsend WwTP:

- Omission of a 9-kilometre tunnel, associated works including onshore inlet shaft and construction compound;
- Retrofit of existing secondary treatment tanks with AGS technology to increase biological treatment capacity thus reducing nitrogen and phosphorus levels (W4);
- Installation of new UV lamps to increase disinfection capacity (W6);
- Modifications to the pumping station to control and distribute flows (W7);
- Sludge pasteurisation building to thermally treat primary sludge to reduce pathogen levels (S2);
- New phosphorus recovery facility building to extract phosphorus from the sludge liquors (S4);
- Electrical upgrade which includes connection of existing ESB power cables to site and provision of additional diesel generators (A1);
- The use on a permanent basis of a vehicular entrance off Pigeon House Road, and associated landscaping (A2);
- New bypass connection from final effluent culvert to existing connection to storm tanks (A4);
- Modification to the fats, oils and grease (FOG) and sludge removal systems in the existing primary settlement tanks (A5);
- The continued use of two temporary construction compounds (C1 and C2) for 10-years; and
- The omission of two temporary construction compounds located west of the Ringsend WwTP.

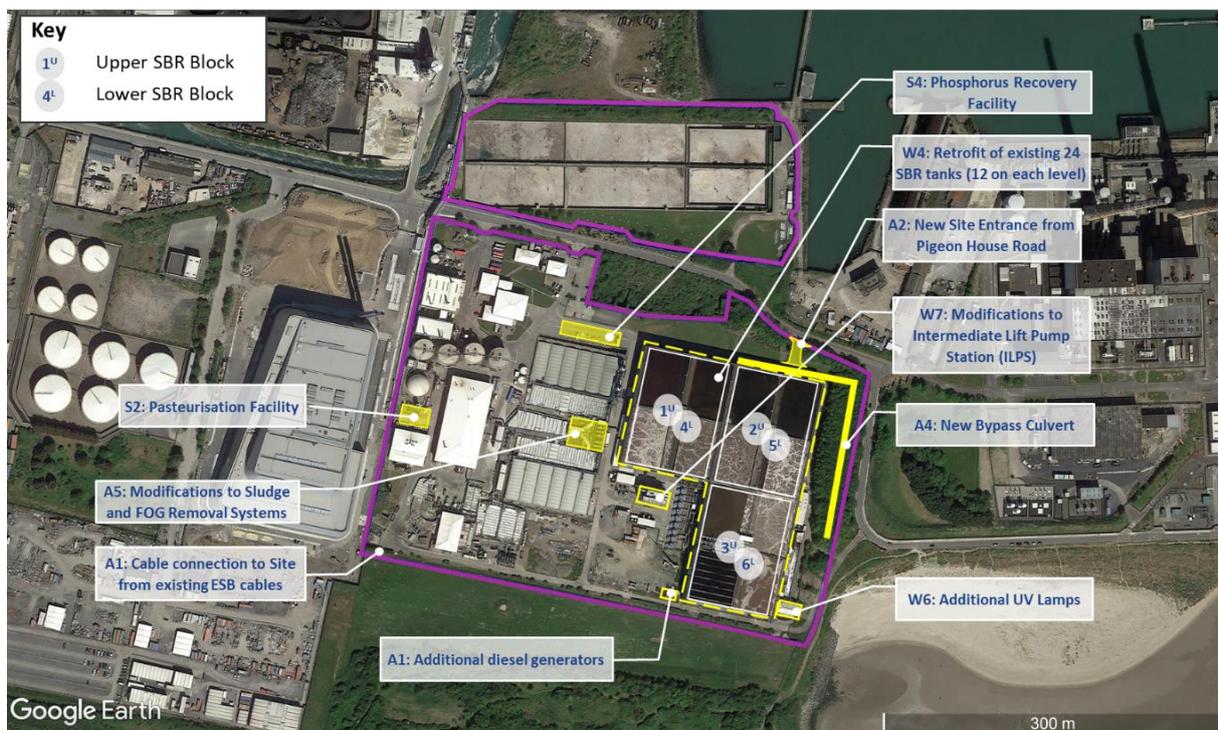


Figure 3-2: Layout of the Proposed Development at Ringsend WwTP

### 3.1.3 AGS Process Proving Programme

AGS technology was not commercially available when the 2012 Approval was granted. Subsequent reviews and studies identified the possibility of using AGS technology.

A “process proving programme” was implemented in two-steps as follows:

- **Process Proving Stage 1 (PPS1)**  
 PPS1 was primarily used to establish the performance of the AGS technology over a full calendar year, with particular reference to nutrient removal performance (nitrogen and phosphorus) and also to establish the extent of its seasonal variation. The PPS1 exercise was successfully completed in June 2016 and confirmed the suitability of the AGS technology for full implementation.
- **Process Proving Stage 2 (PPS2)**  
 PPS2 involved installing the AGS technology in one of the existing SBR tanks and the trial commenced in July 2017. The results of the test programme determined that AGS technology will achieve the required effluent standards. The PPS2 test results are also being used to optimize the design of the existing secondary treatment tanks.

This process proving programme confirmed the AGS technology as suitable for the Ringsend WwTP.

### 3.1.4 Compounds

Three construction compounds will be required. These were already approved for three years in the 2012 Approval (as amended). Permission is now sought to extend the duration of use for two (C1 and C2) of these to ten years. Figure 3-3 shows the location of compounds (labelled C1, C2 and C3).



Figure 3-3: Proposed Upgrade Project – WwTP Site Location

## 3.2 RBSF Component

### 3.2.1 Proposed Development at RBSF

In line with the adopted *National Wastewater Sludge Management Plan (NWSMP)*, the purpose of the RBSF is to store treated biosolids on a seasonal basis that will be produced at the Ringsend WwTP and the proposed Greater Dublin Drainage WwTP.

The RBSF is to be constructed at Newtown, Dublin 11. The site comprises approximately 11 hectares of partially developed land approximately 1.6 km north of Junction 5 (Finglas) on the M50 motorway. The facility is designed to meet a 2040 storage target, which requires two storage buildings, each 105 m long, 15.5 m in height, with some small stacks to 18 m, and 50 m wide.

The development will also require:

- Demolition of existing single storey structures on site, together with the partial removal of existing internal roads and the modification of existing drainage;
- Provision of solar panels on the roof of one building;
- Provision of odour control units, each with 18 m high discharge chimney flues;
- Provision of a control building, a single storey office-type building and associated staff car parking;
- Continued use of the existing vehicular access serving the local road (R135); and,
- Ancillary landscape and site development works.

The proposed site layout is indicated in Figure 3-4.



Figure 3-4: RBSF Proposed Site Layout

## Section 4: Consideration of Alternatives

This Section of the EIAR describes the reasonable alternatives considered for the Proposed Development and provides the main reasons for the final scheme choice, taking into account the effects on the environment and feedback from the public, An Bord Pleanála and Stakeholders. Consideration of alternatives is an EIA requirement to ensure that the optimum location and most appropriate technology are selected when designing projects.

### 4.1 Do-Nothing Scenario Ringsend WwTP

Currently Ringsend WwTP is not in compliance with either the Urban Waste Water Treatment Regulations or its discharge licence as granted by the Environmental Protection Agency (EPA). Accordingly, it follows that the 'Do-Nothing' scenario is not a viable option as Irish Water would be in breach of its statutory obligations under national and EU legislation.

### 4.2 Consideration of alternative location for siting of Ringsend WwTP

The Greater Dublin Strategic Drainage Study (GSDSDS), published in 2005, highlighted the need to maximise the capacity of Ringsend WwTP. The GSDSDS, was the culmination of a 3-year study of the main drainage needs of the Greater Dublin region. This study recommended that the capacity of the Ringsend WwTP should be maximised within the confines of the current site and that a new wastewater treatment facility (the Greater Dublin Drainage Project) be sited in north Dublin to cater for the additional requirements of the region. In 2008, the GSDSDS was the subject of a Strategic Environmental Assessment (SEA), a systematic evaluation of the environmental consequences of a proposed policy, plan or programme. In line with the GSDSDS, it is now proposed to upgrade Ringsend WwTP to an average daily design capacity of 2.4 million PE.

In effect, the GSDSDS and SEA constituted a comprehensive consideration of alternative locations for the additional wastewater treatment which is required in the region and concluded that Ringsend WwTP was the optimum location.

### 4.3 Use of alternative technologies and discharge locations within the existing Ringsend WwTP site

Appropriate combinations of technologies and discharge locations were compared on technical, environmental and cost parameters. The technologies considered included:

1. Sequencing Batch Reactors (SBR) and Capacity Upgrade (SBR + CU) utilising the Long Sea Outfall Tunnel (LSOT);
2. Deep Shaft Aeration (DSA) with SBR discharging to the Lower Liffey Estuary;
3. Integrated Fixed-Film Activated Sludge (IFAS) discharging to the Lower Liffey Estuary;
4. Membrane Bioreactor (MBR) discharging to the Lower Liffey Estuary; and
5. Aerated Granular Sludge (AGS) discharging to the Lower Liffey Estuary.

Table 4-1 scores those combinations against 15 parameters.

The EIAR Consideration of Alternatives ultimately focused on comparing the Long Sea Outfall Tunnel (LSOT); which was part of the 2012 Approval, and the new AGS technology. The conclusion was that the

AGS treatment option, with improved effluent quality discharging into the Lower Liffey Estuary at the existing discharge location, is the preferred option.

**Table 4-1: Comparison of Alternatives – Ringsend WwTP**

Outfall Options		LSOT	Liffey Estuary			
Treatment Process Options		SBR + CU	DSA (+SBR)	IFAS	MBR	AGS
Technical	Ease of Operation	●	▼	▼	▼	●
	Maintenance	●	▼	▼	▼	●
	Sludge Production	●	▼	●	●	●
	Robustness & Reliability	▼	▼	●	▲	▲
	Construction Risk	▼	▼	▼	▲	●
	Future Proofing	▼	▼	●	▲	▲
Environmental	Water Quality	●	▼	●	●	●
	Power Consumption	●	●	▼	▼	●
	Chemical Consumption	●	▼	▼	▼	●
	Greenhouse Gases	●	●	▼	▼	●
	Waste	▼	●	●	▲	▲
	Traffic	▼	●	●	▲	▲
Cost	Capital Cost	▼	●	▼	▼	●
	Operational Cost	●	▼	▼	▼	▲
	Whole Life Cost	▼	▼	▼	▼	▲

Legend: More Favourable Neutral Less Favourable

#### 4.4 Do-Nothing Scenario RBSF

Biosolids from Ringsend WwTP are currently reused as fertiliser on farms. The continuation of that practice has been recommended by Irish Water's National Wastewater Sludge Management Plan (NWSMP). Biosolids require seasonal storage as they cannot be landspread all year round. Biosolids from Ringsend WwTP are currently stored at a facility in Thornhill, Co. Carlow. This facility has insufficient capacity to cater for biosolids coming from the proposed Ringsend WwTP, and the proposed Greater Dublin Drainage WwTP. Accordingly, it is evident that the 'Do-Nothing Scenario' is not a viable option.

#### 4.5 Consideration of alternative locations for siting of RBSF

A wide ranging three-stage site selection process was undertaken within the GSDSDS region which led to the selection of the proposed Newtown site for siting the RBSF. A Stage 1 non-statutory consultation on the proposed RBSF site selection methodology was conducted in Q1 2017. A Stage 2 non-statutory consultation was conducted in Q2 2018. This resulted in 5 potential sites being shortlisted, as outlined

in Table 4-2. These five potential sites proceeded to a detailed assessment phase in accordance with four criteria as tabulated. Table 4-2 scores the relative attributes of the five shortlisted sites. The Stage 3 Report considered the observations included in the Stage 2 Report.

**Table 4-2: RBSF Location Assessment**

Criteria		Site	Bracetown / Gunnocks (Meath)	Gunnocks (Meath)	Greenogue (South Dublin)	Newtown / Kilshane (Dublin 11)	Kilshane (Dublin 11)
Environmental	Air Quality		●	●	●	●	●
	Odour		▼	▼	▼	●	●
	Noise		●	●	▼	▲	●
	Landscape & Visual		●	▼	●	▲	▼
	Geology & Hydrogeology		●	●	●	●	●
	Hydrology		●	●	▼	▲	▲
	Ecology		●	▼	●	▲	●
	Archaeology, Cultural & Architectural Heritage		●	▼	▼	▲	▼
Economic & Engineering	Traffic		●	●	▼	●	▼
	Road Safety		●	●	●	▲	▼
	Service & Utility Connections		▼	▼	●	▲	▼
	Geotechnical		●	●	●	▼	●
	Distance from Biosolids Source		●	●	●	▲	▲
	Capital & Operating Costs		●	▼	●	▲	●
Planning	Land Use Zoning		●	●	▲	▲	▲
	Planning Policies & Objectives		▼	▼	●	▲	●
	Planning History & Current Usage		●	●	●	▲	●
	Population & Sensitive Receptors		●	●	▼	●	●
	Adjacent Land Use		●	●	●	●	▲
Social & Community	Material Assets		●	●	●	●	▼
	Neighbourhood Character		●	●	●	●	●

Legend: More Favourable Neutral Less Favourable

The Newtown/Kilshane site (the site now known as Newtown and proposed for the RBSF component of the Proposed Upgrade Project) emerged as the preferred site based on a cumulative consideration of the classifications.

## Section 5: Population and Human Health

The EIAR describes the local population that live, work and visit areas that are close to the two sites and describes the wider population that may be affected by the Proposed Upgrade Project. It considers the various potential impacts that have been identified and described in other sections of the EIAR and considers their effects on the Population and Human Health. The assessment takes the findings from these sections and focuses on whether they have the potential to cause significant effects on the local and wider population - both from a population and employment perspective and from a human health and well-being perspective.

### 5.1 Ringsend WwTP Component

#### 5.1.1 Potential Impacts

An assessment of the potential impacts on human health has been undertaken for the proposed Ringsend WwTP Component. There are clear social, environmental and human health positives from having an operational and efficient wastewater treatment that is designed to serve the Dublin region population.

The construction phase will give rise to employment opportunities, which is considered positive. It is anticipated that up to 150 construction workers could be on site during the peak construction period.

The construction and operation of the Ringsend WwTP Component will give rise to emissions that have the potential to impact on human health. The main aspects of the Ringsend WwTP Component which have the potential to affect human health have been identified as follows:

- Discharge of treated effluent to the Lower Liffey Estuary;
- Odour arising from the operation of the facility;
- Noise arising from the construction and operation of the facility;
- Air quality impacts from the construction and operation phases of the site; and
- Traffic related emissions both during construction and operation phases of the site.

The predicted impact levels have been determined by the appropriate specialist and compared against relevant health-based standards currently in place to protect human health. For example, the quality of water discharge has been compared to the thresholds set by the EPA, which are put in place to protect water quality and human health.

#### 5.1.2 Mitigation Measures

When the mitigation measures proposed by the various specialists are implemented, the proposed Ringsend WwTP Component will comply with relevant thresholds and standards so that the facility will not give rise to harmful impacts on human health. The assessment concludes that the proposed Ringsend WwTP Component will not give rise to impacts that may result in significant adverse effects on the local and wider population.

The human health assessment also identified the need for a pest control plan to be implemented on the site during the construction phase to prevent impacts that could occur if rodents were disturbed during construction works.

### 5.1.3 Residual Impacts

The assessment also notes that there will be an overall beneficial impact, as it will mean that the greater Dublin region will be capable of growing to its target population levels over time due to the increased capacity of the Ringsend WwTP. This will enable national and regional objectives to be met. This is a significant indirect and positive impact of the proposed Ringsend WwTP Component.

## 5.2 RBSF Component

### 5.2.1 Potential Impacts

An assessment of the potential impacts on human health has been undertaken for the proposed RBSF Component in Newtown, Dublin 11. The population and human health assessment reviewed the environmental impacts as identified by the other specialist assessments and examined how they might also impact on the local and regional population, both in terms of economic and human health effects.

The construction and operation of the proposed RBSF Component will give rise to emissions that have the potential to impact on human health. The main aspects that have the potential to affect human health have been identified as follows:

- Odour arising from the operation of the facility;
- Noise arising from the construction and operation of the facility;
- Air quality impacts from the construction and operation phases of the facility; and
- Traffic related impacts both during construction and operation phases of the facility.

The predicted emissions and levels have been determined and compared against relevant health-based standards currently in place to protect human health e.g. predicted noise levels arising from proposed operation of plant and machinery have been against exposure levels that can harm human health.

In all aspects, the RBSF Component will comply with relevant thresholds and standards and the facility will not give rise to harmful impacts on human health, nor will it give rise to impacts that may result in significant adverse effects on the local and wider population.

The construction and operation of the proposed RBSF Component will give rise to emissions that have potential to impact on human health, such as, noise, odour, and air quality. Predicted emission levels have been determined and compared against relevant health-based standards that are in place to protect human health.

### 5.2.2 Mitigation Measures

The assessments confirm that no aspect of the proposed RBSF Component will give rise to exceedance of health-based standards or harmful impacts on human health. The human health assessment also identified the need for a pest control plan to be implemented on the site during the construction phase to prevent impacts that could occur if rodents were disturbed during construction works. There are no additional mitigation measures required from a Population or Human Health perspective.

### 5.2.3 Residual Impacts

Consequently, the proposed RBSF Component is not predicted to have any significant negative effects on the local and regional population.

## Section 6: Water

### 6.1 Ringsend WwTP Component

The scope of the water quality environmental impact assessment is concerned with the impact of the final effluent discharge on the local receiving waters. These comprise the Lower Liffey Estuary, which is where the final effluent discharges, together with the Upper Liffey Estuary, the Tolka Estuary and Dublin Bay as shown in Figure 6-1.

The assessment was based on an initial review of the available information in respect of the existing final effluent, and the quality status of the local receiving waters. This information was then supplemented by additional data gathered in respect of the future final effluent and the hydrodynamic characteristics of the receiving waters.



Figure 6-1: Aerial view of receiving waters

#### 6.1.1 Existing Environment

The existing water environment is subject to three central pieces of European legislation, in respect of water quality and the final effluent discharge, which have been transposed into Irish law, as follows:

- Water Framework Directive;
- Urban Waste Water Treatment Directive; and
- Bathing Water Directive.

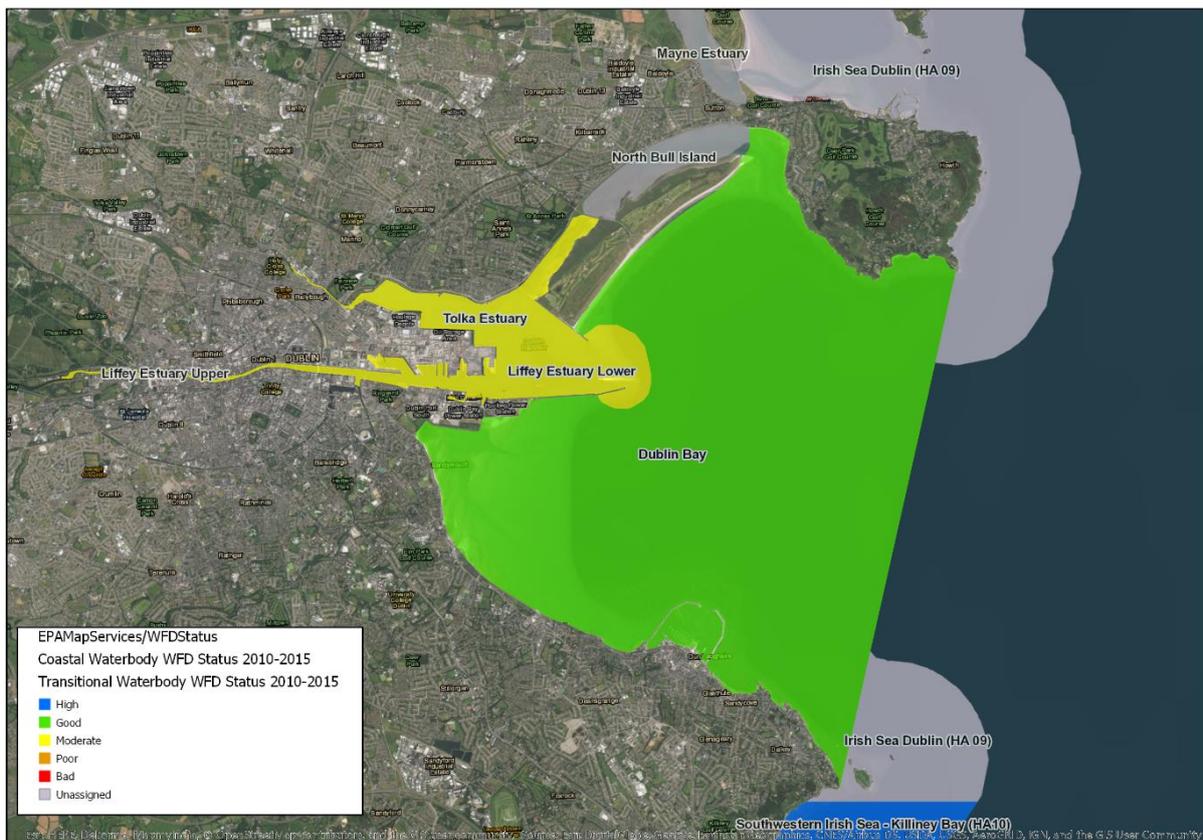
#### Water Framework Directive

The Water Framework Directive is concerned with the quality of the water bodies across a range of categories and parameters. The obligation for EU member states, arising from the directive, is to achieve good status for all water bodies. The current status of the individual water bodies is shown in Table 6-1.

**Table 6-1: Receiving Water Bodies Quality Status 2010 – 2015**

Water Body	Category	Sub-Category	Status
Liffey Estuary Upper	Transitional	Overall Status	Moderate
Liffey Estuary Lower	Transitional	Overall Status	Moderate
Tolka Estuary	Transitional	Overall Status	Moderate
Dublin Bay	Coastal	Overall Status	Good
North Bull Island	-	-	Unassigned

This is shown graphically in Figure 6-2.



**Figure 6-2: WFD Status of Coastal and Transitional Water Bodies  
(Green = “Good” status: Yellow = “Moderate” status)**

### Urban Waste Water Treatment Directive

The Urban Waste Water Treatment Directive is primarily concerned with requiring EU member states to provide wastewater treatment for cities and towns. However, it also requires member states to identify and classify water bodies, at risk of algal bloom, as sensitive. Final effluent discharges into waters designated as sensitive are required to include nitrogen and phosphorous standards.

The Irish authorities have classified the Tolka and Upper and Lower Liffey Estuaries as sensitive and consequently the Ringsend WwTP final effluent discharge must conform to standards for nitrogen (N) and phosphorous (P).

## Bathing Water Directive

The Bathing Water Directive is concerned with the quality of the water body across a range of categories and parameters. The obligation for EU member states, arising from the directive, is to achieve sufficient status for all water bodies. The current status of the designated bathing waters is shown in Table 6-2.

**Table 6-2: Bathing Waters Status 2014 - 2017**

Bathing Water	2014	2015	2016	2017
Dollymount Strand	Good	Sufficient	Good	Good
Sandymount Strand	Good	Sufficient	Sufficient	Poor
Merrion Strand	Sufficient	Poor	Poor	Poor
Seapoint	Excellent	Excellent	Excellent	Excellent

Dublin City Council also undertake monitoring at non-designated bathing water locations at the Shelley Banks beach, the Great South Wall at the Half Moon Swimming Club, as well as the North Bull Wall, near Dollymount Strand.

### 6.1.2 Methodology

The methodology for the assessment of the potential impacts comprised the assessment of the change in the quality of the effluent being discharged from the WwTP and the assessment of changes in the quality of the receiving waters. Sophisticated physical and biological models were built and used to assess the latter impacts.

### 6.1.3 Potential Impacts

#### Load Reduction

The key changes in the quality of the effluent discharge from the WwTP is summarised in Table 6-3 below.

**Table 6-3: Final Effluent Discharge – Load Reduction Summary**

Parameter	Current Average	Future Average	% Reduction
BOD (Biochemical Oxygen Demand)	8,739 kg/day	7,206 kg/day	17.5%
Suspended Solids	16,205 kg/day	10,508 kg/day	35.2%
Ammonia	4,370 kg/day	600 kg/day	86.3%
DIN (Dissolved Inorganic Nitrogen)	5,939 kg/day	4,804 kg/day	19.1%
MRP (Molybdate Reactive Phosphate)	1,056 kg/day	420 kg/day	60.2%

The table above illustrates the potential of the upgraded Ringsend WwTP to reduce pollutants. It is also estimated that the proposed AGS process will result in a reduction in the bacteriological (E. Coli) content in the final effluent. The impact of the Proposed Upgrade Project will therefore be positive. The future levels of pollutants have been estimated using the process proving trials carried out at the Ringsend WwTP.

## Computer Modelling

Additional analysis of the assessment was then carried out using computer modelling to further examine how the final effluent would impact on the receiving waters. This additional impact assessment was carried out using two computer models, as follows:

### *DHI MIKE3 model*

This is a three-dimensional hydrodynamic model, which simulates the water movement within the study area, including rivers and industrial discharges. The model takes account of tidal flows and water movements due to differences in temperature and salinity.

The outcome of this modelling exercise identified the Tolka Estuary as being the water body most heavily influenced by the discharge, but also confirmed that the modelled impact did not prevent the Tolka from complying with any of the legislative objectives.

### *CEFAS DCPM model*

This simulates the biological reaction to the nutrients present in estuaries. The nutrients assessed are dissolved inorganic nitrogen (DIN) and molybdate reactive phosphate (MRP), and the biological reactions modelled are chlorophyll and macroalgae concentrations.

The model was focused on the impact on the Tolka Estuary, which the DHI MIKE3 model had identified as being the area most impacted by the discharge. The model used the outputs from the DHI MIKE3 model to estimate the concentrations of DIN and MRP present in the Tolka Estuary.

The purpose of the modelling exercise was to determine whether the concentrations of DIN and MRP in the final effluent had an influence on the chlorophyll and macroalgae concentrations in the Tolka Estuary. The outcome of the assessment was that these biological parameters are not sensitive to the quantity of DIN and MRP discharged from Ringsend WwTP.

## 6.1.4 Mitigation Measures

### Impact During Construction

A number of secondary treatment tanks will be temporarily out of operation for a few months while they are being upgraded and this could cause a reduction in effluent quality. Consequently, there is potential for a temporary negative but not significant impact. This impact could be mitigated by carrying out the project over a longer timescale. However, it is considered that the benefit of the slight, permanent positive impact that will be observed after the completion of construction outweighs the disadvantage of the insignificant, temporary negative impact that will be observed during the construction phase.

### Impact During Operational Phase

The Proposed Upgrade Project will result in a positive impact on the receiving water and consequently no mitigation is proposed.

## 6.1.5 Monitoring

The final effluent will be required to be monitored in accordance with the terms of the Wastewater Discharge Authorisation. The receiving waters will continue to be monitored by the relevant public authorities. No additional monitoring is proposed.

### 6.1.6 Residual Impacts

The residual impact will result in improvement of water quality.

## 6.2 RBSF Component

### 6.2.1 Methodology

The assessment considered the impact of the Proposed RBSF Component on the receiving surface water environment in its vicinity.

The assessment was based on a desk study review of hydrological information, site visits, and the Flood Risk Assessment (FRA) provided as part of the planning application. Water quality sampling was undertaken to provide baseline data on the receiving water.

### 6.2.2 Existing Environment

The site lies in the upper end of the catchment of the Huntstown Stream which is a tributary of the River Ward. All runoff from the site is collected in local drainage ditches that drain northwards to the River Ward via the Huntstown Stream. Huntstown Quarry (incorporating treated water from Huntstown Power and the proposed Huntstown Bioenergy Plant) has a licence to discharge to the drainage ditch that borders the southern and western boundaries of the proposed RBSF site.

All surface waters are grouped together for statutory monitoring in waterbodies. The current quality status of the waterbody which includes the Huntstown Stream is “Good”, the second highest of five statuses. However, Irish Water have specifically surveyed and sampled the water in the drainage ditch to the west of the site, which showed the water quality to be polluted due to upstream pressures and unlikely to achieve “Good” status.

A Flood Risk Assessment was undertaken to accompany the planning application. The available flood mapping indicates that certain lower lying areas of the site are at risk of flooding during extreme rainfall events. There is no record of flood occurrences in the area.

### 6.2.3 Potential Impacts

No water will be abstracted from streams in the vicinity of the proposed RBSF site. All wastewater (wheel wash, onsite sanitary facilities and drainage from within the storage sheds) will be directed to the public sewer.

### Flooding Impacts

The receiving water channel of the drainage ditch will not be altered. The Flood Risk Assessment (FRA) concluded that there is no significant risk of flooding of the proposed RBSF site or lands downstream and upstream of the site. There are no flooding impacts predicted as a result of the development of the Proposed RBSF Component.

### Water Quality

Potential impacts on water quality during the construction phase are considered negative, temporary, and imperceptible. This is the typical potential impact associated with construction projects. There are no potential impacts on water quality during the operational phase.

#### 6.2.4 Mitigation Measures

A Construction Environmental Management Plan will be implemented to ensure good construction management practices are employed. The construction of the buildings and site contouring will remove localised topographic depressions and mitigate the risk of flooding.

Following the implementation of mitigation measures the residual impacts of the construction and operation of the Proposed RBSF Component will be neutral and imperceptible. No cumulative impacts are predicted.

#### 6.2.5 Monitoring

As the residual Impacts are predicted to be neutral and imperceptible, no monitoring is proposed.

#### 6.2.6 Residual Impacts

No significant residual Impacts are predicted.

## Section 7: Biodiversity - Marine

### 7.1 Methodology

Surveys of the marine environments in the area where impacts are predicted by the mathematical model were undertaken and sea bed samples at 25 sites in the Tolka Estuary, Clontarf and the Bull Island were collected to record the marine flora and fauna at each site. Samples were also collected to describe the type of sediment and the amount of organic carbon at each site. All data were then statistically analysed to look for spatial and biological correlations between samples and between areas.

The ecological reasons why the Natura sites were designated *e.g.* the habitats or species present, were examined to determine any possible level of impact that the improved water quality might have on them.

The desk-based studies on shellfish, fish and marine mammals were undertaken by examining existing data in 2 specific fisheries assessments carried out in the mouth of the Liffey and reporting on what was found. The Irish Whale and Dolphin Group's database on marine mammal sightings in Dublin Bay was used to assess the occurrence of such species in the area.

### 7.2 Ringsend WwTP Component

The Ringsend WwTP Component of the Proposed Upgrade Project has been designed to improve the quality of wastewater effluent generated at the site by removal of nutrients and suspended solids within the site. The treated effluent is discharged to the Lower Liffey Estuary close to the site. For this reason, the main focus of the assessment undertaken was to examine the quality of the marine habitats within the area where the effluent is predicted to dilute and disperse.

The marine environment in Dublin Bay hosts a number of Natura Sites (EU Protected Sites) and consequently the possible impact on the conservation status of these was assessed.

Other biodiversity aspects of the marine environment in Dublin Bay that were assessed included desk-based studies on shellfish and fisheries and marine mammals.

#### 7.2.1 Existing Environment

The identification of the marine species recorded at the locations sampled in Dublin Bay included anemone, worm types, crustaceans (crabs, shrimps, prawns), molluscs (mussels, cockles, snails *etc.*) and fish. No unusual species were recorded. The dominant sediment type recorded at all sites was sand. With regard to marine mammals, seven species have been sighted in proximity to Dublin Bay including; Minke Whale, Humpback Whale, Killer Whales, Harbour Porpoise, Bottlenose Dolphin, Common Seal and Grey Seal. Both seal species are commonly sighted within Dublin Bay and are known to forage around the existing discharge site at Ringsend.

The following fish species have been recorded in the mouth of the River Liffey: Trout, Bass, Sand Smelt, Common Goby, Mullet, Plaice, Nilsson's Pipefish, Sea Scorpion, Lemon Sole, Pollock, Spratt, Lesser Sand Eel, Eel, Flounder and Shore Rockling. Other species that are known to occur in the area include Salmon, (and its parasitic jawless fish), the Lamprey, and Mackerel.

Due to the quality of water in the inner parts of Dublin Bay and the Liffey, shellfish from the area would have to be placed into a clean water environment for a period for time before they could be consumed. For this reason, no shellfish are collected for consumption in this part of Inner Dublin Bay.

### 7.2.2 Potential Impacts

As the proposed Ringsend WwTP Component will not result in direct physical disturbance of the seabed. The marine biodiversity in the area will therefore not experience any negative impacts usually associated with that type of disturbance.

The main impact on marine ecology is predicted to be a positive one due to the improved quality of the treated effluent. Water chemistry in the Inner Dublin Bay will be enhanced as a result of a lower nutrient load for which the WwTP is currently a major source. A decrease in nutrient loads could lead to an increase in oxygen availability in areas of Dublin Bay where an excess of nutrients results in an overabundance of algae and other microorganisms. The oxygenation of the marine sediments will, in turn, result in the substitution of those species by a more biologically diverse group of species. However, there would still be some prospect of excess nutrients entering the Inner Dublin Bay from the Tolka and Liffey.

### 7.2.3 Mitigation Measures

As the proposed Ringsend WwTP Component will improve water quality in Dublin Bay, no mitigation measures are required.

Post-construction water quality surveys and monitoring will be considered in order to validate the conclusions of the mathematical model.

### 7.2.4 Residual Impacts

A positive improvement in water quality status is predicted along with no negative residual impacts.

## 7.3 RBSF Component

### 7.3.1 Residual Impacts

The RBSF will not have any impacts on marine biodiversity, because it is sufficiently far from the sea.

## Section 8: Biodiversity - Terrestrial

### 8.1 Methodology

This section describes the existing flora and fauna in the vicinity of the two Proposed Upgrade Project sites and reviews the likely significant impacts and proposes measures for the mitigation and monitoring of these impacts, where appropriate. Terrestrial biodiversity includes the birds that use the intertidal parts of Dublin Bay as these move freely between tidal and land areas, including the grassland immediately adjacent to the proposed Ringsend WwTP Component.

A desk study was carried out to collate the available information on the terrestrial biodiversity in the immediate area of the proposed Ringsend WwTP Component and the RBSF Component. Field surveys (including Invasive Species Surveys) on the WwTP site, construction compounds and immediate surrounds were undertaken to describe and evaluate the terrestrial habitats (including flora and fauna).

Ecological field surveys were undertaken for the Proposed RBSF Component in 2017 and 2018 to classify the habitats, record birds and large mammal signs and to inspect the watercourses. A biological survey of the small stream bordering the site was reviewed. A bat survey was undertaken in September 2017 including inspections of trees and buildings, a dusk activity survey using direct observation and handheld ultrasound detector. An automatic (static) bat detector was also deployed at the site.

### 8.2 Ringsend WwTP Component

#### 8.2.1 Existing Environment

There are eight Natura 2000 sites which have the potential to be adversely affected by the proposed Ringsend WwTP Component. They are all located, either wholly or partly within Dublin Bay. The intertidal areas of Dublin Bay support large waterbird populations. Terrestrial habitats occurring in the immediate vicinity of the proposed Ringsend WwTP Component include recent tree and shrub planting on a bund as well as coarse grassland outside the WwTP boundary. The eastern bund contains an invasive plant species, Japanese Knotweed (both within and without the WwTP property).

There is an area of amenity grassland immediately adjacent to the southern boundary of the WwTP site and this is regularly used by wintering waterbirds. Populations of waterbirds in the wider area of Dublin Bay are evaluated because they are potentially affected by the treated effluent from the proposed Ringsend WwTP Component. Comparing the period 2004/05 to 2008/09 with the period 2009/10 to 2013/14 there have been increases in 11 waterbird species, decreases in 9 species and approximately stable numbers in 5 species.

#### 8.2.2 Potential Impacts

##### *Do-nothing impacts*

If the proposed Ringsend WwTP Component is not implemented, and no control measures are taken, then it is likely that Japanese Knotweed will spread further on the eastern margins of the site.

Similarly, the increase in the nutrient outputs from the WwTP due to operational overload and storm water discharges could result in a decline in the biodiversity of invertebrate communities in the Tolka Estuary and North Bull Island channel. It is unlikely that this scenario would have any significant impact on the waterbird populations that forage on invertebrates in Dublin Bay.

## Impacts

The removal of the bund at the eastern end of the WwTP site will involve the removal of recently planted trees and shrubs but will have no significant ecological impacts. The Japanese Knotweed will be subject to special control methods in accordance with an Invasive Species Management Plan.

Connection to a high-voltage ESB cable will be required during construction could lead to temporary negative impacts as this work will occur in the SPA area to the south of the Ringsend WwTP.

There is potential for indirect disturbance from construction workers to Brent Geese and other waterbirds using the area of amenity grassland adjacent to the site. This would have significant effects without mitigation as the area is part of South Dublin Bay and the River Tolka Estuary SPA and the species concerned are qualifying interests of this SPA.

Construction noise from the proposed Ringsend WwTP Component will not be threatening to birds (in particular, waterbirds and terns which are qualifying interests of the European sites in Dublin Bay) and there will be no significant impacts on these species.

The effects of dust deposition on flora and fauna in the vicinity of the proposed Ringsend WwTP Component will be imperceptible.

Waterbird species are not sensitive to the levels of NO<sub>x</sub> concentrations that may be contained in air emissions from the site during construction and operation phases. The species will continue to use the grassland habitat and intertidal areas.

The proposed Ringsend WwTP Component will not have any detrimental impacts on the aquatic food chain in the bay. Benthic macroinvertebrates will become more diverse, phytoplankton will remain abundant, and perhaps more diverse, and the conservation status of bird populations, whether dependent on aquatic plants or infaunal macroinvertebrates, will not be negatively impacted. The predicted removal of nutrients from the proposed Ringsend WwTP effluent will have no significant negative effects the intertidal habitats in Dublin Bay. Hence the waterbird populations, whether dependent on aquatic plants or infaunal macroinvertebrates, are not expected to be impacted by the proposed Ringsend WwTP Component.

### 8.2.3 Mitigation Measures

To mitigate against any disturbance to waterbirds on the adjacent amenity grassland, solid screening will be erected prior to construction to reduce or eliminate any visual disturbance (this is already in place as part of a works contract).

No mitigation is required for impacts on the tern colony in Dublin Port.

Specific control measures have been recommended to prevent the spread of Japanese Knotweed. An Outline Invasive Species Management Plan has been prepared for this purpose.

The connection to the ESB high-voltage cable shall be completed during the summer months to eliminate potential impacts to over wintering Brent Geese.

A Dust Management Plan will be implemented during construction, but it is not predicted that dust emissions will have any significant impacts on terrestrial biodiversity.

## 8.2.4 Monitoring

Populations of waterbirds on the grassland will be monitored during construction and for a year afterwards. Monthly surveys will be carried out to monitor population levels of waterbirds in Dublin Bay (including South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA) in all months during construction and for one year following completion. Annual monitoring will be undertaken in the immediate vicinity of the proposed Ringsend WwTP Component to assess the efficacy of control measures proposed in the Invasive Species Management Plan.

## 8.2.5 Residual Impacts

No negative residual impacts are predicted.

## 8.3 RBSF Component

### 8.3.1 Existing Environment

The proposed RBSF site is not covered by any nature conservation designations. However, it is within the catchment of the River Ward which enters the Broadmeadow River north of Swords and ultimately discharges into the Broadmeadow Estuary SAC. The site comprises mainly open areas of grassland, with dry meadow and grassy verges and some areas of damp ground being actively grazed by horses. The grassland has been colonised by a variety of woody species. No invasive plant species were found on the site. The western, southern and south-eastern boundaries of the site are bordered by mature tree lines and hedges. The site is of local biodiversity value only. All the habitats present are common and widespread, and none are listed for protection in the EU Habitats Directive. All birds recorded on the site are common and widespread in farmland in Ireland. No ground nesting birds were recorded on the site. Some badger foraging signs were noted but no badger setts (breeding burrows) or trails were located on the site. Three species of bats were recorded foraging or commuting within the site. Trees and buildings on the site have negligible suitability for roosting bats. The level of lighting from the adjacent gas power station is likely to deter any of the light sensitive bat species. Overall, the site is considered to be of local importance or higher value for biodiversity.

### 8.3.2 Potential Impacts

The only habitats affected by the construction are dry meadow and grassy verges which are widespread in the local area. No hedgerows or treelines will be removed as part of the Proposed RBSF Component. The construction of two large buildings in the centre of the site will not affect the use of the site by bats, which will continue to feed in the remaining grassland areas and along the field boundaries.

### 8.3.3 Mitigation Measures

Rainfall runoff from the site will be attenuated onsite to be released at greenfield run off rate. It will not contain any effluent from the biosolids. Drainage near the storage buildings will be collected and discharged to the public wastewater sewer. Petrol and oil interceptors will be used to remove any potential contaminants from road runoff on the site. No changes in the water quality of the neighbouring stream or downstream watercourses are expected as a result. The northern site area will be planted with deciduous trees to mitigate the loss of some potential foraging areas for bats. Any site road lighting will direct downwards so the beam spread does not cover the proposed tree planting.

### 8.3.4 Residual Impacts

The Proposed RBSF Component on this site will have no significant adverse impacts on biodiversity.

## Section 9: Land and Soils

### 9.1 Methodology

Desktop studies and site visits were conducted together with detailed site investigation programmes at both Ringsend and Newtown, Dublin 11.

The assessment considered the impact of the Proposed Upgrade Project on the Land, Soils and Groundwater (Hydrogeological) environments in the vicinity of the proposed Ringsend WwTP Component and RBSF Component. The assessment was based on a desk study review of geological and hydrogeological information, site visits together with site specific site investigation information (boreholes and waste classification reports).

### 9.2 Ringsend WwTP Component

Historical data and site-specific site Investigation information and studies were reviewed to develop a conceptual model of the lands and soils environment.

#### 9.2.1 Existing Environment

##### *Geology*

The Poolbeg Peninsula largely consists of reclaimed land dating back to the early 1900s. The site investigation information indicates that the site is underlain by at least 6.3 metres of made (i.e. manmade) ground. Bedrock was encountered at varying depths of between 41.3 m to 47.1m below ground level and predominantly overlain by marine sediments.

##### *Hydrogeology*

The groundwater beneath the site is contaminated and saline. Groundwater discharges to the river Liffey. Groundwater level response to tidal variations is approximately  $\pm 0.7$  m with an approximate mean groundwater level slightly greater than 0 m OD.

##### *Invasive Species*

The invasive species Japanese Knotweed is present on the eastern boundary of the site.

##### *Contaminated Soil*

The made ground is made of different types of soil, typically brown and grey sand, gravel, clay and silt. Large proportions of anthropogenic (manmade) waste (e.g., building waste, cinders, tyres, metal and plastic) was observed in made ground as well as some asbestos and/or asbestos containing material. Spoil from excavation works within the made ground, will be generally classified as non-hazardous waste with some localised areas of hazardous waste which will have to be exported for disposal.

#### 9.2.2 Potential Impacts

##### *Soil Disposal*

Excavated material from the proposed Ringsend WwTP Component site will be mainly made ground except where it arises from deeper excavations required to install concrete supports (piles) for above-ground structures. Where piling is used to support structures, additional excavated spoil volumes will comprise both made ground and marine sediments. Spoil from excavation works within the made ground will be generally classified as non-hazardous waste (with some localised areas of hazardous

waste). The disposal of material shall be the responsibility of the contractor who will comply with statutory obligations for the collection and transport of waste. Where possible, material will be re-used. Material that cannot be re-used will be recovered or disposed of at sites with appropriate licences. No impact associated with waste disposal is predicted.

As contaminated soils will be removed from site for safe treatment, the risk to the environment will be reduced. As such, the predicted impact on the land and soils environment is permanent slight positive.

The removal and control of Japanese Knotweed on the site will result in a slight positive permanent impact.

### **Accidental Spillages**

Potential impacts during the construction phase include the potential for leakage or spillage of construction related materials on site. For example, raw or uncured concrete and grouts, wash down water from exposed aggregate surfaces, bitumen, fuels and lubricants can all potentially impact on soils and groundwater during construction stage. Impacts on water quality and soils would be negative short-term duration and slight significance. There will be no direct discharges to the soil and hydrogeological environment during the operational phase. No likely significant effects predicted.

### **9.2.3 Mitigation Measures**

A Construction Environmental Management Plan will be implemented to ensure that good construction management practices will be employed during construction and shall be adhered to by the contractors. A contract specific Waste Management Plan will be drafted by the contractor and agreed in advance of the works.

### **9.2.4 Monitoring**

As the residual impacts are predicted to be neutral to positive and imperceptible, no monitoring is proposed.

### **9.2.5 Residual Impact**

The predicted overall residual impact of the proposed Ringsend WwTP Component on land, soils and geology and hydrogeology both during construction and operational stage will be neutral or positive. No negative residual impacts are predicted.

## **9.3 RBSF Component**

### **9.3.1 Methodology**

Site investigation programmes had been undertaken in 2001 (as part of a previous Fingal County Council proposed development) and again in 2017 as part of the design process for the Proposed RBSF Component. No groundwater was encountered during drilling of the boreholes.

### **9.3.2 Existing Environment**

The proposed site is underlain by 13 -23 metres of overburden (proven by site investigation boreholes). The overburden is composed predominantly of glacial tills (clays) with some thin layers of sands, gravels and silts. The underlying bedrock is limestone. Huntstown Quarry to the south west of the site is a County Geological Site designated because the limestone quarry face exposes the base of an important geological formation. The development of the proposed RBSF site will have no impact on this feature.

The water quality status in the area is “good” and it is not considered at risk of deterioration. There are no groundwater dependent land-based ecosystems within 15 km of the proposed site. Groundwater flow is towards the south west and is influenced by the dewatering activities in the Huntstown quarry to maintain dry working conditions.

### 9.3.3 Potential Impacts

The only interactions with land and soils environment will be as a result of routine excavation for foundations, site contouring and landscaping.

Unsuitable and surplus excavated material will be reused on the site for bunding and landscaping. There are no significant impacts predicted as a result of the earthworks on site.

Potential impacts during the construction and operational phase include the leakage or spillage of construction related materials and fuels and chemicals on site. However, the vulnerability classification of the underlying groundwater has been classified as “Low” based on site specific information. The impact on groundwater water quality is predicted to be negligible in magnitude and imperceptible in significance, temporary in duration and unlikely. The impact of accidental spillages on soils is negligible in magnitude and imperceptible in significance.

### 9.3.4 Mitigation Measures

A Construction Environmental Management Plan and a Waste Management Plan will be implemented to ensure best practices.

### 9.3.5 Monitoring

As the residual impacts are predicted to be neutral to positive and imperceptible, no monitoring is proposed.

### 9.3.6 Residual Impact

Following the implementation of mitigation measures, no negative residual impacts are predicted.

## Section 10: Air and Climate

### 10.1 Methodology

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set ambient air limit values for a range of air pollutants. These limit values or “Air Quality Standards” are health or environmental-based levels.

The Transport Infrastructure Ireland (TII) document *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* details a methodology for determining air quality impact significance criteria for road schemes. This methodology can be applied to any assessment where there is a change in traffic as a result of the proposed development, during both construction and operational phases, as is the case here.

The UK Environment Agency’s carbon calculator has been used to assess the potential levels of greenhouse gases emitted during the construction of the Proposed Upgrade Project.

### 10.2 Ringsend WwTP Component

The potential impacts to air quality and climate associated with the proposed Ringsend WwTP Component are described below.

#### 10.2.1 Existing Environment

In terms of the existing air quality environment, baseline data and data available from similar environments indicates that levels of nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns and less than 2.5 microns and benzene are generally well below the National and European Union (EU) ambient air quality standards.

#### 10.2.2 Potential Impacts

##### Air Quality

The proposed Ringsend WwTP Component has the potential to impact air quality as a result of the following:

##### *Dust generated through construction activity*

Construction dust has the potential to cause temporary, slight and local impacts through dust nuisance at nearby residential properties.

While dust from construction activities may be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m of the proposed Ringsend WwTP Component, thus, potential impacts to the nearby houses will be as a result of truck movements along the local roads.

##### *Emissions associated with the increase in traffic (during construction and operation)*

The impact of the proposed Ringsend WwTP Component in terms of ambient levels of nitrogen dioxide, particulate matter less than 10 microns, particulate matter less than 2.5 microns, carbon monoxide and benzene is considered imperceptible for both the construction and operational phase of the proposed Ringsend WwTP Component. Consequently, no mitigation is proposed apart from good practice.

It is predicted that the impact of the proposed Ringsend WwTP Component construction traffic will lead to an increase in nitrogen oxide concentrations within a section of the South Dublin Bay SPA. The SPA is designated solely for Brent Geese, which are not sensitive to this pollutant and therefore no mitigation is needed.

## Climate

The impact to climate during construction and as a result of increased traffic was considered imperceptible as a result of the proposed Ringsend WwTP Component.

### 10.2.3 Mitigation Measures

No specific measures are required. The Construction Environmental Management Plan will include procedures to be adopted on site which will include a site-specific dust management plan to minimise dust nuisance impacts at nearby residential receptors. Accordingly, fugitive emissions of dust from the site are expected to be insignificant and not cause any nuisance at nearby houses.

### 10.2.4 Residual Impacts

Once dust minimisation measures are employed during the construction phase, residual impacts are not anticipated.

Impacts to air quality and climate as a result of the proposed operation of the Ringsend WwTP Component have been assessed to be imperceptible and therefore, residual impacts are not predicted.

## 10.3 RBSF Component

The potential impacts to air quality and climate associated with the Proposed RBSF Component are described below.

### 10.3.1 Existing Environment

In terms of the existing air quality environment, baseline data and data available from similar environments indicates that levels of nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns and less than 2.5 microns and benzene are generally well below the National and European Union (EU) ambient air quality standards.

### 10.3.2 Potential Impacts

#### Air Quality

Construction dust impacts and to a lesser extent operational dust impacts are the primary air quality impacts associated with the Proposed RBSF Component.

Construction dust has the potential to cause temporary, slight and local impacts through dust nuisance at nearby sensitive receptors. While dust from construction activities may be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m of the Proposed RBSF Component. The sensitivity of the area to dust soiling and human health impacts has been categorized as low. Using the sensitivity of the area and the scale of the proposed activities, it was determined that there was a low risk of dust soiling or human health impacts associated with the Proposed RBSF Component's earthworks, construction and movement of vehicles.

Dust minimisation measures have been considered and are included in an overall dust management plan as part of the Construction Environmental Management Plan to be implemented during the construction phase. Therefore, fugitive emissions of dust from the site are expected to be insignificant and will not cause any nuisance at nearby properties.

The biosolids material to be stored at the Proposed RBSF Component has the potential to cause local dust impacts predominantly through the movement of vehicles. The risk of dust soiling and human health impacts was assessed as low based on the overall sensitivity of the area and planned vehicle activity. Appropriate mitigation has been included in the design of the Proposed RBSF Component to avoid potential dust impacts during operation; this involves trucks being covered at all times when transferring material on or off site and material loading and unloading occurring in closed buildings.

Overall, both construction and operational dust impacts are predicted to be imperceptible once all dust minimisation measures are implemented.

## Climate

The impact to climate during the construction of the Proposed RBSF Component has been estimated using the UK Environment Agency's Carbon Calculator. The impact to climate during construction was considered imperceptible. The impact to climate during the RBSF Component's operation will be imperceptible due to the low volume of traffic.

### 10.3.3 Mitigation Measures

As impacts will be imperceptible, no mitigation measures are proposed. However, the Construction Environmental Management Plan will include a dust management plan to ensure that dust nuisance impacts are imperceptible at nearby sensitive receptors. Mitigation measures have also been incorporated into the design of the Proposed RBSF Component as set out above.

### 10.3.4 Residual Impacts

Impacts to air quality and climate have been assessed to be imperceptible. Residual impacts are not predicted.

## Section 11: Noise and Vibration

This section assesses the likely noise and vibration impacts arising from the Proposed Upgrade Project in the context of current relevant standards and guidance.

### 11.1 Methodology

Appropriate national and international policy and guidance has been reviewed and distinct noise and vibration criteria for both the construction and operational phase of the Proposed Upgrade Project identified.

### 11.2 Ringsend WwTP Component

#### 11.2.1 Existing Environment

The existing noise climate in the vicinity of the proposed Ringsend WwTP Component was established by way of a baseline noise survey comprising short term attended monitoring. All surveying was completed by competent persons using Type 2 Sound Level Meters.

The surveying was completed over weekday periods in June 2016. Noise levels were found to be typical of a suburban setting in close proximity to a busy regional road network.

#### 11.2.2 Potential Impacts

##### Construction Phase

During the construction stage, it is expected that increased noise levels will be generated over a short-term period. A variety of items such as excavators, lifting equipment, dumper trucks, compressors and generators may be required to undertake site clearance, excavation and piling.

Subject to the implementation of best practice working methods, the level of construction noise is expected to fall within appropriate criteria. As such, noise from the construction phase is expected to give rise to an insignificant to slight negative short-term impact. Due to the nature of works and the proximity between works and the nearest receptor, the impacts of vibration during the construction phase are deemed to be insignificant.

In addition to onsite construction noise, there is also potential for construction traffic to give rise to elevated noise levels on public roads. Construction traffic projections for the site suggest that noise generated from construction related traffic will be below prevailing road traffic noise levels. As such, noise from onsite construction is expected to give rise to an insignificant negative short-term impact.

In consideration of the nature of the proposed construction works and the distance between the work site and the nearest sensitive receptor, the levels of vibration arising at the nearest receptor are expected to be imperceptible.

##### Operational Phase

The primary sources of outward noise in the operational context are deemed long term and will involve additional wastewater treatment plant items as well as additional vehicular traffic on public roads. Noise during the operational phase has the potential to give rise to long-term negative impacts.

It was determined that the level of road traffic associated with the proposed Ringsend WwTP Component will not give rise to perceptible negative impacts.

Plant noise levels associated with both existing and proposed plant items were found to fall within the relevant adopted night limits.

### 11.2.3 Mitigation Measures

#### Construction Phase

All construction works will be required to be completed in accordance with best practice standards. The Construction Environmental Management Plan for the site will also incorporate specific measures to control noise and vibration.

#### Operational Phase

Mitigation in respect of wastewater treatment plant items shall include:

- Selection of “low noise” equipment including appropriate acoustic enclosures and doors;
- Provision of silencers for blower fan intake and extract points;
- Vibration isolation mounts for all proposed internal and external plant items; and,
- Appropriate siting of all fixed plant.

It is envisaged that adoption of the measures outlined above will ensure that the level of noise emissions from the proposed Ringsend WwTP Component will remain in line with the relevant day, evening and night criteria as outlined in *BS 5228-1:2009+A1:2014* which sets out guidance on permissible noise levels relative to the existing noise environment.

As such, the impacts from operational plant items are deemed to be insignificant.

### 11.2.4 Residual Impacts

Once the mitigation measures are implemented as proposed, no residual significant noise or vibration impacts are expected to arise as a result of the construction and operation of the proposed Ringsend WwTP Component.

Noise during the operational phase of the proposed Ringsend WwTP Component will not give rise to any negative residual impacts.

## 11.3 RBSF Component

### 11.3.1 Existing Environment

The existing noise climate in the vicinity of the Proposed RBSF Component was established by way of a baseline noise survey comprising both continuous unattended and short term attended monitoring. All surveying was completed by competent persons using Type 2 Sound Level Meters. The surveying was completed over weekday periods in November 2017. Noise levels for this site were consistent with those for an urban outskirts area adjacent to a busy national road and aircraft flight paths.

### 11.3.2 Potential Impacts

#### Construction Phase

During the construction stage, it is expected that increased noise levels will be generated over a temporary period.

Excavators, lifting equipment, dumper trucks, etc. may be required to undertake site clearance and excavation. Subject to the implementation of best practice working methods, the level of onsite construction noise is expected to fall within appropriate criteria. As such, noise from onsite construction is expected to give rise to a temporary, insignificant to slight negative noise impact.

In addition to onsite construction noise, there is also potential for construction traffic to give rise to elevated noise levels on public roads. Construction traffic projections for the site suggest that noise generated from construction related traffic will be considerably below the prevailing road traffic noise levels. As such, noise from onsite construction is expected to give rise to a temporary insignificant negative impact.

Rock breaking will not be required for site preparation. In consideration of the nature of the proposed construction works and the distance between the work site and the nearest sensitive receptor, the levels of vibration arising at the nearest receptor are expected to be imperceptible.

#### Operational Phase

The primary sources of noise in the operational context are deemed to be long term in duration and arise from building services plant, material handling as well as vehicular movement onsite and on public roads. It was determined that the level of additional road traffic on public roads associated with the proposed Ringsend WwTP Component is not sufficient to give rise to any perceptible negative impacts.

Noise arising from building services plant, material handling and vehicular movements onsite all have the potential to give rise to slight to moderate negative long-term impacts at the nearest noise sensitive receptor.

Vibration during the operational phases is not expected to result in any perceptible vibration at the nearest receptor, as such it can be deemed to be insignificant.

### 11.3.3 Mitigation Measures

#### Construction Phase

All construction works will be required to be completed in accordance with best practice standards. The Construction Environmental Management Plan for the site will also incorporate specific measures to control noise and vibration. Measures that shall be employed include:

- Selection of quiet plant;
- Control of noise sources;
- Screening;
- Hours of work;
- Liaison with the public, and;
- Monitoring.

## Operational Phase

Mitigation in respect of operational noise will incorporate both physical and management techniques.

Noise from building services plant will be minimised through the selection of “low noise” equipment where required as well as the incorporation of appropriate noise reduction in the form of:

- Acoustic enclosures for fans;
- Provision of attenuators for fan intakes; and,
- Use of acoustic rated doors on all plant rooms or enclosures.

Plant items will be specified and designed to ensure that the cumulative plant noise levels from the site do not exceed 40 dB  $L_{Aeq,T}$  at the nearest noise sensitive receptor.

The following mitigation measures will be taken to reduce noise levels arising from the handling of material within the buildings:

- Loaders to be specified with white noise reversing sirens;
- Impact protection will be provided to reduce noise generated by impact with loading bays; and,
- Loader operators to be advised on appropriate operation of loader to reduce impact noise or scraping.

The following mitigation measures will be taken to reduce noise levels arising from the vehicular activity in and around the site:

- The design of the site is such that the need for reversing should be minimised in open areas and drivers will be required to adhere to onsite traffic management to reduce the use of reverse sirens;
- A speed limit of 20 km/h shall be applicable to all vehicles traversing the site;
- Vehicles shall not be permitted to loiter on or near the south-eastern corner of the site;
- Under no circumstances are air brakes to be used by vehicles on site; and
- Vehicle horns should not be sounded whilst onsite, except in the event of an emergency.

It is envisaged that the implementation of these mitigation measures will ensure that negative noise impacts at the nearest noise sensitive receptor are insignificant.

### 11.3.4 Residual Impacts

The overall level of noise generated by the site will fall within best practice guideline values and as such is deemed to be insignificant.

Once mitigation measures are implemented as proposed, no residual noise or vibration impacts are expected to arise as a result of the operation of the proposed RBSF Component.

## Section 12: Odour

### 12.1 Methodology

The odour assessment for proposed Ringsend WwTP Component utilised historical survey information and was supplemented manufacturer's information in respect of the performance of the odour control units and information from treatment plant operations.

The Proposed RBSF Component odour assessment used atmospheric dispersion modelling to predict any changes in odour conditions in the vicinity of the proposed site.

A mathematical model predicts dispersion of odour emissions by considering the calculated odour emission rate, the stack dimensions, terrain and surface classifications. The model calculates an odour concentration at all selected receptor locations for each hour over five individual years of data from a representative weather station. For this assessment meteorological data was taken from Dublin Airport.

### 12.2 Ringsend WwTP Component

#### 12.2.1 Existing Environment

The existing WwTP was initially commissioned in 2005 and at that time caused an odour nuisance in the local community. In response to these problems, a number of measures were introduced at the plant to eliminate the odour nuisance and ensure proper control of the odours at source. The odour nuisance has since been largely eliminated from the treatment plant, through the provision of odour control facilities, and an odour management plan has been implemented to ensure that the nuisance does not reoccur.

The existing environment includes the following areas:

- Dublin Port to the north of the site;
- Industrialised area generally around the site;
- Recreational areas, particularly to the south and east of the site; and
- Residential areas to the south and proposed residential areas to the south-west of the site.

Residential areas are generally categorised as sensitive receptors for the purposes of odour modelling and setting targets.

#### 12.2.2 Methodology

The methodology for the impact assessment was to supplement the existing odour data for the various sources by additional surveys, followed by computer modelling of the odour impacts. The odour minimisation objective used in 2012 was also reassessed and a second objective was identified and also used to assess the facility.

### Odour Sources

Odour surveys were conducted in 2016 and 2017 on site and the data from these surveys together with data from earlier surveys was used to estimate the existing odour levels. Future odour levels were then estimated using the existing levels where odour sources were not changing and available information in literature for new sources.

Suitably conservative data was selected for use in the modelling exercise to ensure flexibility in the management of the plant odours, during the operation phase, without breaching either of the Ringsend odour objectives.

### 12.2.3 Potential Impacts

#### Odour Objectives

The potential odour impact is assessed by reference to two standards:

- Ringsend Project Odour Goal; and
- Ringsend Odour Target.

The Project Odour Goal is bespoke to the Ringsend plant and arises from the work done by Dublin City Council, their contractors and consultants in response to the odour nuisance experienced when the plant was initially commissioned. The Project Odour Goal is the objective which was used in the 2012 EIS assessment and is set at 10  $OU_E$  (European Odour Units) at the site boundary for no more than 50 hrs/yr, which is interpreted as the 99.4%ile. The 2012 project and EIS did not include the storm tanks in the assessment, and consequently neither does this odour objective.

The Ringsend Odour Target is a more generally recognised target and reflects the guidance published by the EPA in respect of air dispersion modelling from industrial installations. The standard also reflects the source material used in the preparation of the EPA guidance and is set at 3  $OU_E$  at the nearest residence on a 98%ile basis. The plant storm tanks are included in the assessment for this objective.

#### Assessment Conclusion

The results of the modelling exercise are shown on Figure 12-1 (Ringsend Project Odour Goal) and Figure 12-2 (Ringsend Odour Target). These figures show the odour isopleths, which are lines connecting points with the same odour concentration, for the two modelling scenarios.

The odour modelling estimates that the completed proposed Ringsend WwTP Component will achieve both of the proposed standards, being the Ringsend Project Odour Goal and the Ringsend Odour Target.

In addition, ongoing monitoring and maintenance of the odour control facilities during the operation of the WwTP will be required to ensure the continued ability of the plant to achieve the required standards and prevent any odour nuisance in the local environment.



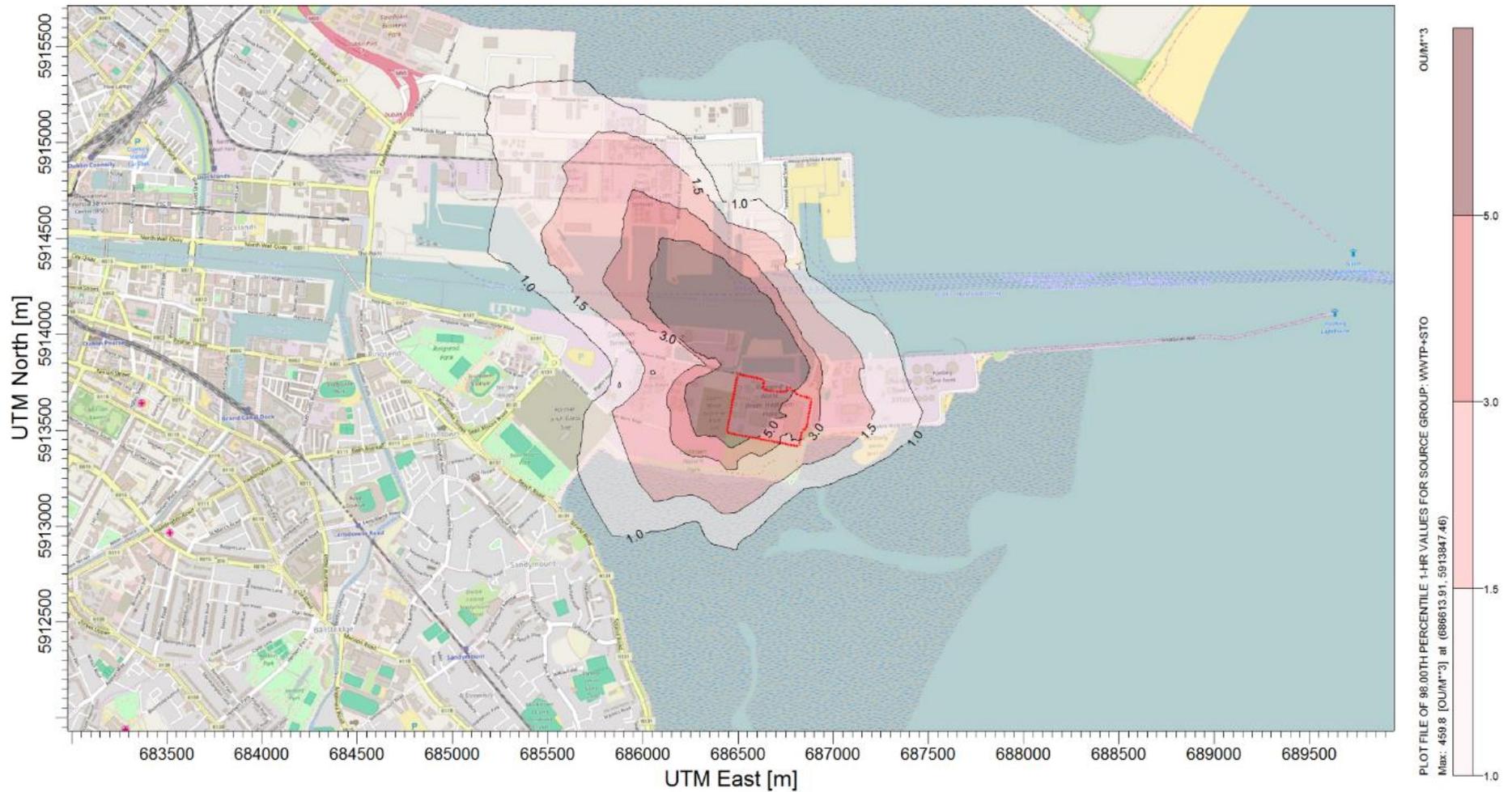


Figure 12-2: Predicted Odour Concentrations for the Ringsend Odour Target (98 percentile basis)

### 12.2.4 Mitigation Measures

The impact assessment has concluded that the WwTP Component will result in an imperceptible positive impact on the local environment and consequently the only proposed mitigation is to ensure that any necessary works during construction or operational phases, on the WwTP, that might impact on the performance of the odour control facilities will be done in accordance with the Odour Management Plan, including making appropriate allowance for the weather conditions pertaining at the time of any proposed activities.

### 12.2.5 Monitoring

The monitoring of the project impacts will predominantly occur at the odour sources, rather than at the receptors. Monitoring at the receptors does not take place due to the low odour levels present, which are not detectable at the target levels. There are no legal requirements to monitor odour levels at a wastewater treatment plant on a regular basis, particularly at locations where no nuisance is experienced. However, it is proposed to monitor odour sources at the Ringsend WwTP to ensure the effective management of the facility.

The monitoring of the odour sources at the WwTP will require further development of the existing Odour Management Plan to include targeted odour measurement of individual odour sources on a regular basis to ensure that the design objectives, and by extension the target odour levels are being met. The frequency and targeting of the odour measurement will be designed to supplement the recent odour surveys and ensure that the data collected and being used for modelling is still relevant. It is expected that targeted surveys will be required every one to two years.

### 12.2.6 Residual Impacts

No significant residual negative impacts are identified from the assessment of the construction and normal operation of the proposed Ringsend WwTP Component.

## 12.3 RBSF Component

The scope of the environmental impact assessment in respect of odour is concerned with the impact of the operation of the proposed Ringsend WwTP Component on the local community.

### 12.3.1 Existing Environment

The area immediately surrounding the proposed RBSF site contains a small number of individual residential properties and proposed residential units which were considered to be the most sensitive to odour impacts. Despite proximity of existing industrial uses, it is considered that the area is currently likely to be perceived as odour free.

### 12.3.2 Methodology

The methodology for the impact assessment was to use computer modelling to estimate the odour impacts, while applying an odour minimisation objective.

### 12.3.3 Potential Impacts

The assessment predicted that an odour annoyance would not be experienced at any long term public receptor, in this case residential properties due to mitigation measures which are incorporated into the design. Odour levels below the annoyance criterion suggest that any perceived odours would be low in

concentration, of minimal duration, and sufficiently infrequent, as to not cause an annoyance at, or impact upon the use (amenity) of, the public area.

### Assessment Conclusion

The model predicted that odour concentrations at the closest receptor indicated as number 1 on Figure 12-3 would be approximately a third of the level where an odour annoyance would be expected (model predicted 3 ou<sub>E</sub>.m<sup>-3</sup> as the 98<sup>th</sup> percentile of hourly averaged). At all other receptors, indicated as numbers 2 to 7 on Figure 12-3. the predicted odour concentration was less than 10% of the level where an impact would be expected. As such the assessment concluded that with adoption of the mitigation measures, it is unlikely that an odour annoyance will occur at any receptor. Figure 12-3 also shows the odour isopleths for both modelling scenarios.

#### 12.3.4 Mitigation Measures

The project design includes several odour control and minimisation measures, including: all materials handling to happen within buildings which ventilate through odour control units; and, operations to occur according to an Odour Management Plan.

Thereafter the impact assessment has concluded that the RBSF Component will result in an imperceptible neutral impact on the local environment and consequently no other mitigation is proposed.

#### 12.3.5 Monitoring

The risk of nuisance or elevated odour levels from the RBSF component is considered to be very unlikely as the biosolids are stable products which will be kept in a dry atmosphere. Monitoring and maintenance of the odour control units will form part of the odour management plan will be required to ensure that the facility is appropriately managed.

#### 12.3.6 Residual Impact

There were no significant residual odour impacts identified by the assessment from the construction and normal operation of the RBSF Component.

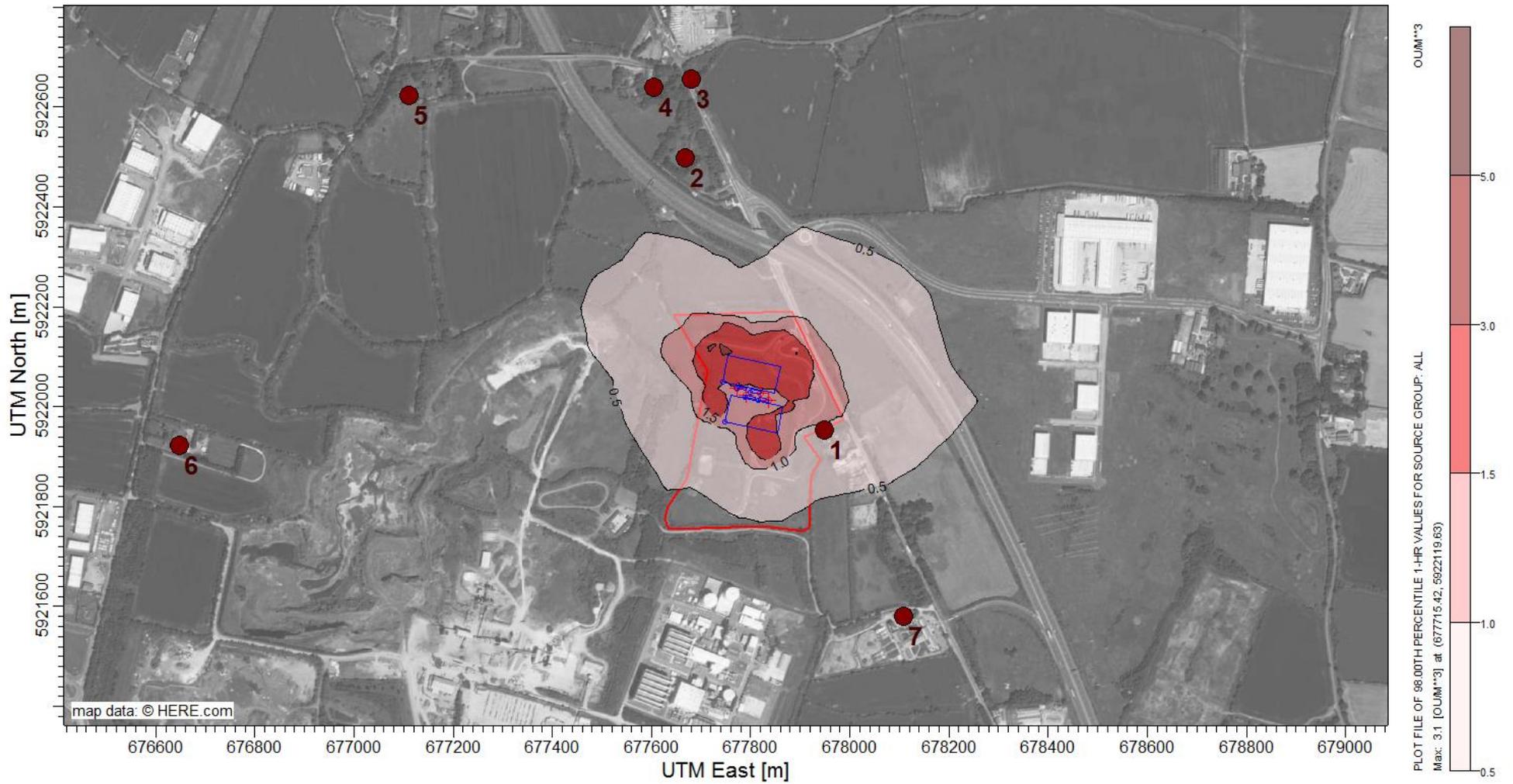


Figure 12-3: Predicted Odour Concentration for the RBSF Component (98 percentile basis)

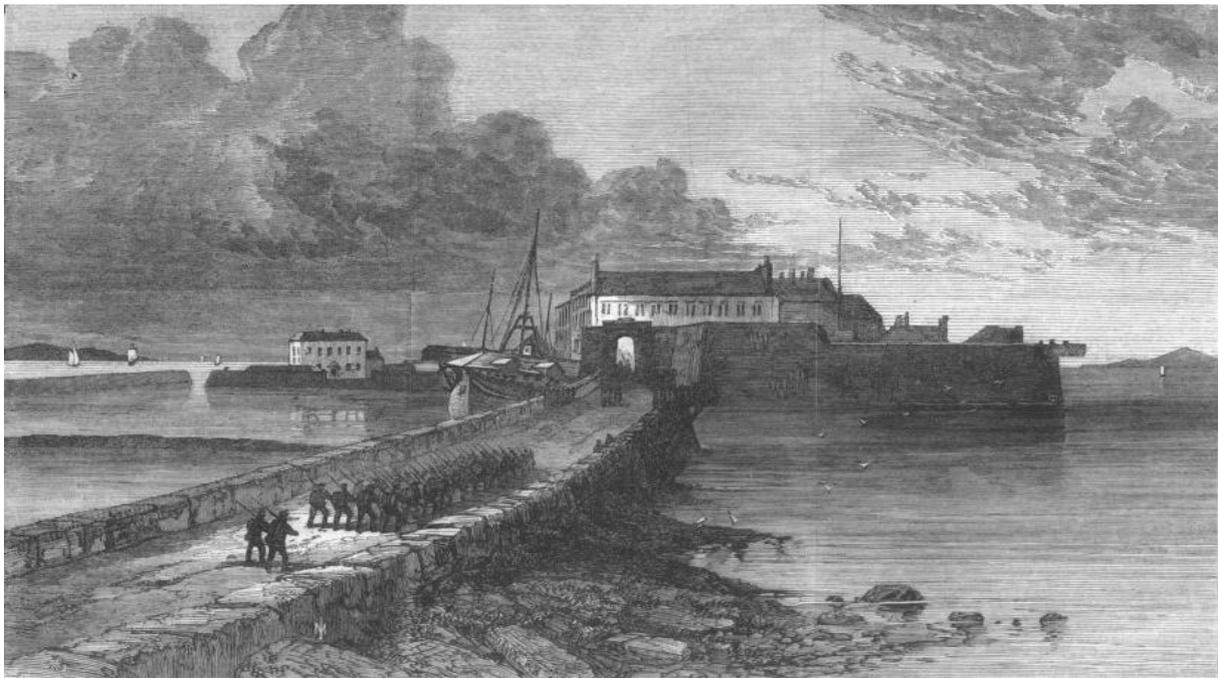
## Section 13: Cultural Heritage

### 13.1 Methodology for Ringsend WwTP Component

The Cultural Heritage assessment involved detailed investigation of the cultural heritage, archaeological, architectural and historical background of the Ringsend WwTP site and the surrounding area. The overall study area, which extends 1 km from the Ringsend WwTP site, was examined using information from a number of public sources.

### 13.2 Ringsend WwTP Component

A field visit was carried out on the 17 May 2016 to identify and assess any unknown archaeological sites, structures and previously unrecorded features and possible finds within the Ringsend WwTP site.



**Figure 13-1: Depiction of the Pigeon House Fort in 1866 looking along the Pigeon House Road east to the gate. From the Illustrated London News No. 1359 Vol. XLVIII**

Characteristics of the proposed Ringsend WwTP Component, associated with both construction and operational phases, have the potential to impact on the Cultural Heritage of the area.

There are 4 protected structures within and in the vicinity of the Ringsend WwTP:

- Remnants of Pigeon House Fort;
- Former Pigeon House Hotel;
- Pigeon House power station: former red-brick electricity generating station; and
- Great South Wall.

#### 13.2.1 Potential Impacts

Potential impacts and mitigation measures where necessary, were considered for both the construction and operational phases, as follows;

### **Piles**

The proposed construction will take place in made ground reclaimed from Dublin Bay which extends from a minimum of 6.3 m to a maximum of 10.4 m below the current surface. Both works and associated vibration may impact potential archaeology associated with the old ground beneath.

### **Construction Machinery and HGVs**

Construction machinery and Heavy Goods Vehicles (HGV) movements have the potential to damage the upstanding parts of the Pigeon House Fort and other heritage structures.

### **Construction Compounds**

Compound C2 is situated on the external side of the north wall of the Pigeon House Fort within the area of the old Pigeon House Harbour with a new access to the compound which traverses over the area of the Pigeon House Fort. The upstanding walls form part of the Pigeon House Fort which is a Protected Structure and should not be impacted.

The access works within the interior of the Pigeon House Fort will require topsoil stripping for the access road and have the potential to uncover material associated with the fort and will be monitored by a suitably qualified archaeologist.

Compound C3 is situated on a paved area immediately east of the old Pigeon House Power Station which is a Protected Structure. The structure of the power station should not be impacted and as with the Pigeon House Fort the walls should be protected with concrete traffic barriers during construction to prevent any impacts.

### **Cranes**

Where cranes placed within the footprint of the Pigeon House Fort, Pigeon House Fort, Pigeon House Harbour and in the area with potential trash deposits to the south of the fort walls require the emplacement of hardstanding material they have the potential to impact subsurface archaeological material.

## **13.2.2 Mitigation Measures**

- Archaeological monitoring will be carried out during construction when there is excavation below the level of the made ground (greater than 6.3 m below ground level).
- Vibration limits proposed in Volume 3, Section 9: Noise and Vibration for piling and construction machinery should not be exceeded.
- The walls of the Pigeon House Fort will be protected with concrete traffic barriers during construction to prevent any vehicular impacts and areas of hard standing for cranes within the footprint of the Pigeon House Fort will be archaeologically monitored.

## **13.2.3 Residual Impacts**

No negative residual impacts are predicted, under normal operating conditions; and, if mitigation measures are employed during construction.

## 13.3 Methodology for RBSF Component

The Cultural Heritage assessment involved detailed investigation of the cultural heritage, archaeological, architectural and historical background of the proposed RBSF site and the surrounding area. The overall study area, which extends 1 km from the proposed RBSF site, was examined using information from a variety of public sources.

A field visit was carried out on the 13 September 2017 to identify and assess any unknown archaeological sites, structures and previously unrecorded features and possible finds within the proposed RBSF site. The application area has been comprehensively archaeologically assessed through test excavation and no archaeological material has been identified.

The closest monument to the application area is a motte and bailey RMP DU014-013--- that was demolished in 1952 and now survives as a cropmark and central raised oval area.

### 13.3.1 Potential Impacts

#### Construction Phase

There will be no direct impact on any items of cultural heritage, archaeology or buildings of heritage interest in the application area or the vicinity of the Proposed RBSF Component.

#### Operational Phase

The main storage buildings will be more than 100 m south of the neighbouring motte and bailey RMP DU014-013--- and the visual amenity of the monument will be protected by a landscaped buffer zone. The operational phase will have no direct or indirect impacts on any known items of cultural heritage, archaeology or buildings of heritage interest in the application area or the vicinity of the Proposed RBSF Component.

### 13.3.2 Mitigation Measures

No mitigation measures are proposed or required for the RBSF Component.

### 13.3.3 Residual Impacts

No negative residual impacts are predicted for the RBSF Component.

## Section 14: Material Assets

Material Assets are resources, built services, infrastructure and amenities that are valued and intrinsic to places. This Section considers the impact on the Material Assets and not the people using them.

Cultural Heritage and Traffic can sometimes be considered as Material Assets but have been examined separately in this EIAR.

### 14.1 Ringsend WwTP Component

The land around the Ringsend WwTP and throughout the Poolbeg Peninsula, is typically used for the provision of industrial and storage facilities. The Poolbeg Peninsula largely consists of reclaimed land dating back to the early 1900s. Nowadays the area is also an important amenity area and is widely used by members of the public. Dublin Bay continues to develop as an amenity area for cyclists, walkers and water-based leisure activities. The Great South Wall, shown in Figure 14-1 below, is a particular focus of leisure activity in the area.

In the nearby Ringsend, Irishtown and Sandymount areas, there are many sports clubs including the nearest club Clanna Gael Fontenoy GAA Club which is situated at Sean Moore Park and is less than 1 km from Ringsend WwTP. Gaelic football and hurling, rugby, soccer, tennis, cricket and hockey are played in schools and clubs in the area. There are also golf courses nearby at Elm Park and Milltown. Likewise, on the northern side of the bay, similar recreational facilities and clubs exist in the Clontarf / Sutton / Howth area.

Construction of the Dublin Waste to Energy Plant on the adjoining westerly site has been completed and the plant is now operational. The ESB power generation plant and Dublin Bay Power Plant are also situated in the immediate vicinity of Ringsend WwTP. Dublin Port is located across the river from Ringsend and is the largest port in Ireland accounting for 43% of all seaborne trade. The existing cargo and passenger ship facilities at Alexandra Basin are currently being upgraded to meet future port requirements as part of the Alexandra Basin Redevelopment programme.

The nearby 34-hectare site, including the former Glass Bottle site, has been designated as a Strategic Development Zone, namely the 'Poolbeg West Strategic Development Zone' (SDZ). Final design details are not currently available, but it is envisaged that a mixed-use development, comprising residential and industrial port activities will arise, subject to the necessary planning approvals.

Ringsend WwTP and adjoining sites are served with water, electricity, telecoms and gas supplies.

#### 14.1.1 Potential Impacts

Potential impacts during the construction phase are limited but include the possibility of damage to the public road network due to HGV construction traffic. The potential impact is rated as a moderate negative short-term impact.

Impact on the road network during the operational phase is predicted to be negative imperceptible and long term.

Severing of public utilities, including electrical cables or gas supplies during construction activities has the potential to disrupt supplies to Ringsend WwTP and the surrounding facilities including Dublin WtE, Dublin Bay Power and Poolbeg Power Stations. The ESB high voltage cable which will be exposed for

connection purposes has particular potential to be affected during the construction phase. The potential impact is considered to be temporary, significant and negative during the construction phase with no potential impact during the operational phase.



**Figure 14-1: Great South Wall**

The proposed Ringsend WwTP Component, when completed, will also provide a long term positive impact by facilitating future residential, industrial and commercial development not just in the immediate Poolbeg area but in the Greater Dublin region. The ability to provide sufficient wastewater treatment capacity is one of the key elements needed to facilitate social and economic growth and developments like housing, schools, hospitals and businesses. Development and construction, facilitated by the completed proposed Ringsend WwTP Component, will result in new work opportunities on a short term and long-term basis. As such the completed proposed Ringsend WwTP Component will have a significant positive, long term impact on the development of Poolbeg and the Greater Dublin region.

#### **14.1.2 Mitigation Measures**

A Traffic Management Plan, together with detailed safety management plans will be developed for the construction phase.

The traffic management plan shall be the subject of discussion and agreement with Dublin City Council Roads Dept. Any damage arising to the road network will be addressed in conjunction with Dublin City Council Roads Dept.

Screening shall be erected during the construction phase on the southern and eastern site boundaries. Screening shall also be erected around temporary construction compounds.



the operational phase, this employment opportunity will lessen and result in a slight long term positive impact. The improved storage opportunity for biosolids will provide a long term positive impact.

### 14.2.2 Mitigation Measures

A Traffic Management Plan, together with detailed safety management plans will be developed for the construction phase. The traffic management plan shall be the subject of discussion and agreement with Fingal County Council Roads Dept.

### 14.2.3 Residual Impacts

No negative residual impacts are predicted for the RBSF Component.

## Section 15: Traffic

### 15.1 Methodology

The assessment of traffic is based on the findings of site visits, observations, on-site traffic counts, plans associated with the Proposed Upgrade Project and consultation with the Design Team.

### 15.2 Ringsend WwTP Component

#### 15.2.1 Potential Impacts

Traffic analysis associated with the impact of the construction works focused on the morning and evening peak periods in both the 2020 Peak Construction Activity Scenario and the 2027 Final Year of Construction Scenario.

The Point Depot Junction, Sean Moore Junction and Whitebank Junctions were examined for 2020 and 2028 in both the “with” and “without” development (proposed Ringsend WwTP Component) scenarios. The Point Depot junction was examined in its current configuration in the 2020 scenario.

DCC intend to upgrade this junction to a signalised junction and it is anticipated that these works will be completed by 2020, however, analysing the junction in its current configuration provides a more conservative assessment. It has been assumed that the Point Depot Improvement Scheme will be complete by 2028. The road network in the vicinity of the proposed Ringsend WwTP Component is illustrated in Figure 15-1.

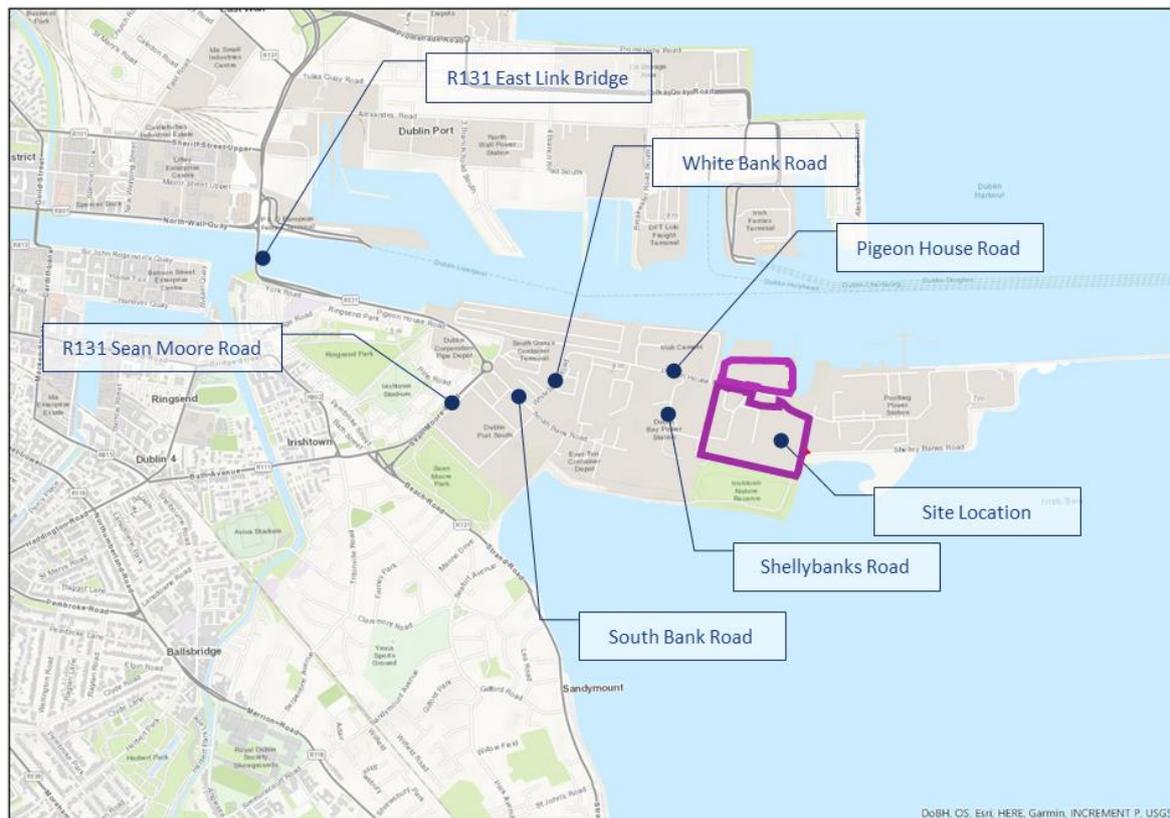


Figure 15-1: Ringsend WwTP Road Network

In both the 2020 and 2028 “without” development scenarios, the Point Depot Junction and Sean Moore Junction will operate above usual design thresholds. The Point Depot Junction will operate within theoretical capacity (the maximum number of vehicles, which can pass through a junction before likely delays) in the evening scenarios however, it will operate over the theoretical capacity in the morning scenarios. The Sean Moore Junction will operate over the theoretical capacity in both the morning and evening scenarios. The Whitebank Junction will operate within usual design thresholds in both scenarios. However, it should be noted that the “with” development scenario results in only marginal reductions in capacity.

Further traffic analysis was undertaken to examine the impact of traffic associated with the operational phase of the proposed Ringsend WwTP Component on the surrounding road network in the 2028 Year of Opening scenario and the 2035 Design Year scenario in the morning and evening peak periods. It has been assumed that the full Poolbeg West SDZ will be constructed in the 2028 scenario without any trip attenuation associated with public transport measures in the surrounding area.

The Point Depot Junction, Sean Moore Junction and Whitebank Junctions were examined in 2028 and 2035 in both the “with” and “without” development scenarios. In both the 2028 and 2035 scenarios the Point Depot Junction and Sean Moore Junction will operate above usual design thresholds.

The Point Depot Junction will operate within theoretical capacity in the 2028 evening scenarios, but it will operate over the theoretical capacity in the morning scenarios and 2035 evening scenario. The Sean Moore Junction will operate over the theoretical capacity in both the morning and evening scenarios.

The Whitebank Junction will operate within usual design thresholds in both scenarios. However, it should be noted that the “with” development scenario results in only marginal reductions in capacity.

The Proposed WwTP Component will result in a Slight Negative Long-Term Impact during 2028 Year of Opening and 2035 Design Year in both the morning and evening peak hours.

### 15.2.2 Mitigation Measures

Construction related HGV trips will adhere rigidly to the Dublin City Council HGV Management Strategy and associated cordon:

- A Traffic Management Plan will be drafted for the works in full consultation with Dublin City Council, An Garda Síochána, the Fire Service and the Ambulance service;
- All traffic management plans, including working times, shall be agreed with and approved by Dublin City County Council Transportation Department in advance of implementation;
- The contractor is to arrange for staff parking at an off-site location. Contractor’s, subcontractor’s or supplier’s vehicles or staff vehicles, or any vehicles associated with the works are not permitted to park, idle or queue on the public road network;
- Best Practice measures as outlined in the EIAR shall be implemented; and
- An Application for an Abnormal Load Permit will be made to Dublin City Council in advance for any abnormal loads exceeding the thresholds laid out in the Road Traffic (Construction and Use of Vehicles) Regulations 2003. Where possible abnormal load movements will be restricted to evening or night time to minimise disruption to local traffic and traffic on strategic routes.

### 15.2.3 Residual Impacts

No negative residual impacts are predicted for the Ringsend WwTP Component

## 15.3 RBSF Component

### 15.3.1 Potential Impacts

Traffic analysis associated with the impact of the construction works for the Proposed RBSF Component focused on the morning and evening peak periods in both the 2020 Phase 1 Construction Scenario and the 2024 Phase 2 Construction Scenario.

Kilshane Cross, R135 Signalised Junction, Elm Road Junction and N2 Northbound Slip Road were examined in 2020 and 2024 in both the “with” and “without” development (Proposed RBSF Component) scenarios. The road network in the vicinity of the proposed Ringsend WwTP Component is illustrated in Figure 15-2.

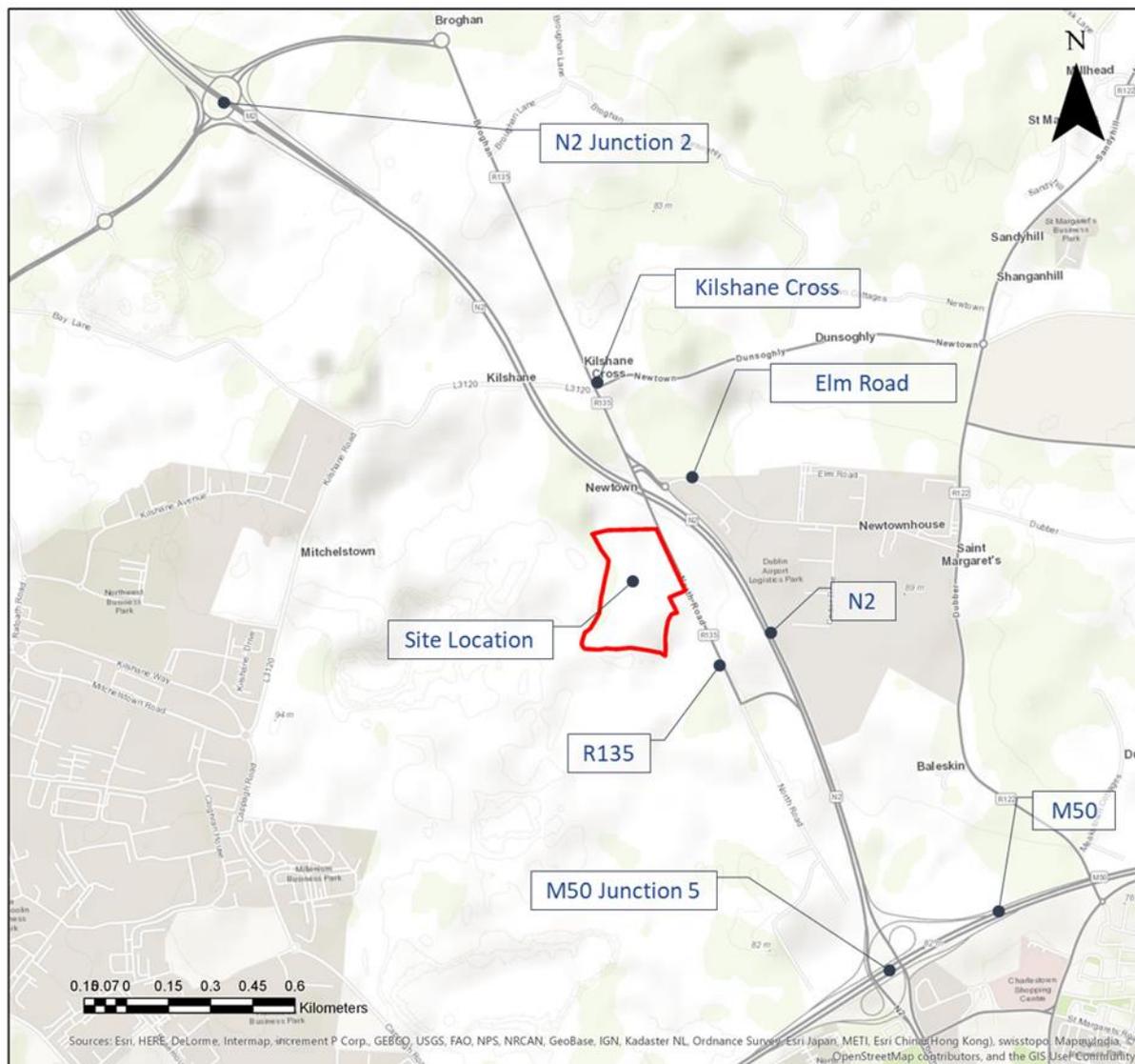


Figure 15-2: RBSF Road Network

In the 2020 Phase 1 Construction scenario, Kilshane Cross will operate in excess of usual design thresholds for both the morning and evening scenarios. In the 2024 Phase 2 Construction scenario, Kilshane Cross will operate over the theoretical capacity in both the morning and evening scenarios. However, it should be noted that the “with” development scenario results in only marginal reductions in capacity and increases in queue lengths.

Traffic analysis associated with the impact of the operational phase of the Proposed RBSF Component focused on the morning and evening peak periods in both the 2025 Year of Opening and the 2040 Design Year Scenario. Kilshane Cross, R135 Signalised Junction, Elm Road Junction and N2 Northbound Slip Road were examined in 2025 and 2040 in both the “with” and “without” development scenarios.

In both the 2025 and 2040 scenarios, Kilshane Cross will operate over the theoretical capacity in both the morning and evening scenarios.

The N2 Northbound Slip Road Junction will be approaching the usual design thresholds in morning peak period scenario “without” the development and will operate marginally over the usual design threshold in the “with” development scenario. However, it should be noted that the “with” development scenario results in only marginal reductions in capacity and increases in queue lengths.

### 15.3.2 Mitigation Measures

The following mitigation measures are recommended for the Proposed RBSF Component:

- A Traffic Management Plan will be drafted for the Proposed RBSF Component in full consultation with Fingal County Council, An Garda Síochána, the Fire Service and the Ambulance service;
- All traffic management plans, including working times, shall be agreed with and approved by Fingal County Council Transportation Department in advance of implementation;
- Best Practice measures as outlined in the EIAR shall be implemented; and
- An Application for an Abnormal Load Permit will be made to Fingal County Council in advance for any abnormal loads exceeding the thresholds laid out in the Road Traffic (Construction and Use of Vehicles) Regulations 2003. Where possible abnormal load movements will be restricted to evening or night time to minimise disruption to local traffic and traffic on strategic routes.

### 15.3.3 Residual Impacts

No negative residual impacts are predicted for the RBSF Component.

## Section 16: Landscape

The landscape and visual impact assessment for the Proposed Upgrade Project takes account of the character and nature of the existing sites (Ringsend WwTP and proposed RBSF site) and their surrounds, the location of sensitive landscapes and visual receptors, the sensitivity and significance of the sites, and their vulnerability to change.

### 16.1 Methodology

The landscape and visual assessment involved visits to the sites and environs of the Proposed Upgrade Project components, together with reviews of aerial photography, various publications, reports and project information. In addition, a series of photomontages has been prepared from various viewpoints in surrounding areas.

### 16.2 Ringsend WwTP Component

The proposed Ringsend WwTP Component is located on the site of the existing Ringsend WwTP on Poolbeg Peninsula. The prominent Poolbeg Electricity Generating Station lies to the east of the site and its twin stacks, which rise to c. 210 m, are acknowledged landmarks at the entrance to Dublin Port and within the wider Dublin City landscape. The Great South Wall extends a further almost 2 km east off the end of the peninsula.

The Dublin Waste to Energy facility (DWtE), located to the immediate west of the WwTP site, is a prominent feature in the middle ground of the peninsula - especially when viewed from the south. Further oil and gas storage and utility developments lie west of the DWtE site. The overall Ringsend WwTP lies to either side of Pigeon House Road, with the main treatment plant facilities to the south and the storm water holding tanks to the north. The River Liffey and its port-related activities lie further north. A small area of open grassland, and the locally elevated landscape amenity of Irishtown Nature Park, lie to the immediate south of the WwTP site, as shown in Figure 16-1.

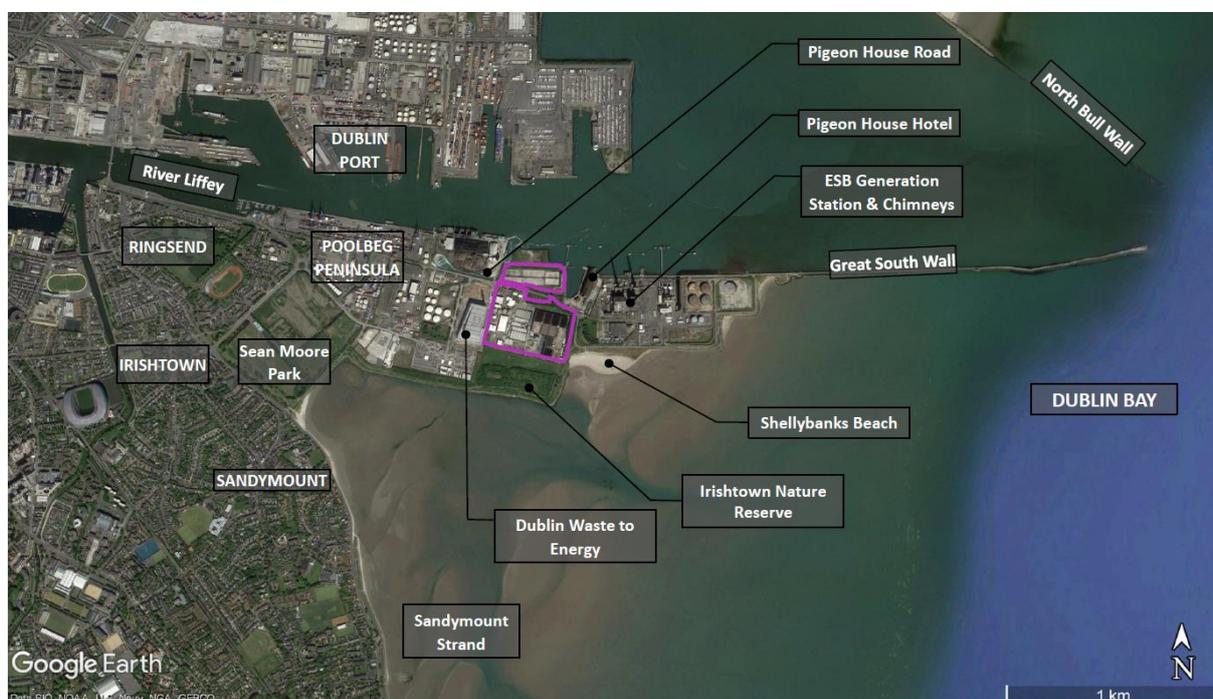


Figure 16-1: Site Context

The scale and nature of the WwTP is most readily apparent in views from the elevated vantage within the nature park to the south (see Figure 16-2 for the existing view and Figure 16-3 for the as-proposed view). The WwTP is also prominently visible in views west from Shellybanks Road and from the adjoining Shellybanks Beach to the east of the site.



**Figure 16-2: Existing Ringsend WwTP as viewed from southwest corner of the site**



**Figure 16-3: As-proposed Ringsend WwTP as viewed from southwest corner of the site**

The overwhelming character of the site and its immediate context is of a city-scale industrial / utility nature dominated by the unique coastal context and setting of the overall peninsula within the city.

### 16.2.1 Potential Impacts

Construction works will be carried out on a phased basis over 7 to 10 years with limited visual landscape impact. The main new buildings, structures and tanks, most likely to give rise to greatest visual attention, will be provided within years 1 and 2 of the construction programme when the capacity upgrade works are being carried out. Likewise, provision of the Phosphorus Recovery Facility (c. 40 m x 20 m x 20 m high) during year 3 of the construction programme will only have localised effects. The balance of construction works, including retrofitting of the existing lower and upper decks of the tanks and provision of new plant and plant upgrades will not give rise to appreciable or significant landscape or visual effects. While the use of cranes will be visible across a wide area, especially south of Dublin Bay, this will not result in significant landscape/townscape or visual effects. The proposed Ringsend WwTP Component is an extension to an existing major utility. In addition, the proposed new elements are of a physical and visual nature that is consistent with the scale and character of the existing land uses and structures.

Post-construction, there will be a slight local short-term effect on the character of views from Irishtown Nature Park and from Shellybanks Road/Beach, where the extended SBR tanks and Phosphorus Recovery Facility and loss of the planting along the east side of the WwTP will increase the perceived scale of development on site. However, the overall longer-term or residual effect on the character of the area will be imperceptible and neutral.

The post-construction effect of the proposed Ringsend WwTP Component structure on the character and views of Poolbeg Peninsula from a wider setting will also be imperceptible neutral, with no discernible change arising from most locations.

### 16.2.2 Mitigation Measures

Screening shall be erected during the construction phase on the southern and eastern site boundaries. Screening shall also be erected around temporary construction compounds. An existing belt of tree and shrub planting located along Pigeon House Road will be retained and protected. Additional shrubs and trees will be added on completion of construction.

### 16.2.3 Residual Impacts

Following completion of construction and reinstatement works, it is considered that no significant residual landscape or visual impact will remain on amenities, activities, character, uses or views within either the Poolbeg or Dublin Bay areas.

## 16.3 RBSF Component

This proposed RBSF site is located at Newtown, Dublin 11 and the Fingal County Development Plan 2017-2023 provides the statutory planning framework. The site is zoned “HI – To provide for heavy industry”. Should the Proposed RBSF Component not proceed, it is most likely that development of an industrial nature would be established on the site. There is no protected structure or historic graveyard identified on the site or its immediate surrounds. Kilshane historic graveyard is located over 300 m to the west. There are no specific Green Infrastructure Objectives pertaining to the site.

### 16.3.1 Potential Impacts

The initial phase of construction for the Proposed RBSF Component will involve site development and the construction of one storage building in 2020. The construction works are estimated to last 12 months. The second building is likely to be constructed in 2024 to meet overall Proposed Upgrade

Project requirements at that stage and construction will last for approximately nine months. It is also possible that construction of both buildings could be undertaken simultaneously. This worst-case scenario has been assessed in the EIAR. Each building will be 105 m long, 50 m wide and up to circa 15.5 m high at the highest point of the curved roofs. Some small stacks on the buildings rise to 18 m.

The initial phase of construction for the Proposed RBSF Component will involve site development and the construction of one storage building in 2020. The construction works are estimated to last 12 months. The second building is likely to be constructed in 2024 to meet overall Proposed Upgrade Project requirements at that stage and construction will last for approximately nine months. It is also possible that construction of both buildings could be undertaken simultaneously. This worst-case scenario has been assessed in the EIAR. Each building will be 105 m long, 50 m wide and up to circa 15.5 m high at the highest point of the curved roofs (excluding some small stacks to 18m).

An existing building and kiosks on site shall be demolished. Welfare facilities, a new administration building and parking for six vehicles shall be provided.

A series of photomontages have been prepared showing the visual nature of the Proposed RBSF Component from nine viewpoints in the surrounding and wider environment, one such view is indicated in Figure 16-4. The landscape and visual effect on views are assessed as being imperceptible and neutral.



**Figure 16-4: Proposed view west/northwest to the Proposed RBSF Component site from the R135**

### 16.3.2 Mitigation Measures

The Proposed RBSF Component is well-sited and will not give rise to significant landscape or visual effects. The Proposed RBSF Component includes for an appropriate landscape scheme comprising earth mounding, strong deciduous and evergreen planting and an upgraded roadside boundary railing and entrance detail. Failed or dead plants are to be replaced in the following planting season.

Lighting standards are to be fitted with horizontal cut-off fittings to avoid light spill.

The Proposed RBSF Component will not give rise to any negative landscape or visual effects of a residual nature and so no further mitigation measures are required.

### 16.3.3 Residual Impacts

Construction works will not have any impact on landscape character, landscape setting, or on views away from the immediate site boundaries or from nearby elevated sections of the N2. Likewise, there will be no impact on landscape character or on the visual nature of the predominantly industrialised area. No negative residual landscape impacts are predicted for the RBSF Component.

## Section 17: Summary of Risk Management

The EIA Directive requires consideration of how vulnerable the Proposed Upgrade Project is to Major Accidents and/or Natural Disasters and what would the resulting impact be. Examples of Major Accidents include unexpected or unplanned events, such as fires, explosions. Natural Disasters can include events such as earthquakes or floods.

### 17.1 Methodology

A list of Major Accidents and/or Natural Disasters that may affect the Proposed Upgrade Project were sourced through consultation with relevant environmental specialists and guidelines that are available. These risks were then assessed according to how likely they were to occur and what the resulting impact on the Proposed Upgrade Project could be. The risk of an impact was classified as being 'High', 'Medium' or 'Low'.

### 17.2 Ringsend WwTP Component

The main impact that could result from Major Accident or Disaster occurring on the proposed Ringsend WwTP Component is a shutdown of the plant leading to untreated wastewater entering Dublin Bay.

With the proposed mitigation measures and operational management plans, 'high' risks that the proposed Ringsend WwTP Component would be vulnerable to, are reduced. The site is located within an area dominated by heavy industry, with plants such as the Poolbeg Power Station, Dublin Waste to Energy site, the NORA facility, Dublin Bay Power and Dublin Port nearby.

The construction and operation of the proposed Ringsend WwTP Component will be managed to minimise the risk of major accidents occurring and will have management plans in place to prevent environmental impacts if an accident occurs. Therefore, it can be concluded that the proposed Ringsend WwTP Component is not vulnerable to any type of Major Accident or Natural Disaster that would lead to a significant environmental effect.

There is potential for a Major Accident at a neighbouring facility causing a shutdown of the WwTP, which could cause an additional or cumulative impact on the water quality of Dublin Bay. This was assessed as being of a 'Medium' risk, though it is noted that all facilities with the potential of causing such an incident are highly regulated by law and have well developed plans to prevent such incidents from occurring and to protect the surrounding area.

### 17.3 RBSF Component

The potential for environmental impacts from a Major Accident or a Disaster occurring at the Proposed RBSF Component are limited, as it would not necessarily give rise to an environmental incident.

A fire at the Proposed RBSF Component could lead to significant levels of smoke and air pollution. However, the Proposed RBSF Component has a fire suppressant system in its design and the risk of this occurring is considered to be "Low". Risks of an environmental incident resulting from a Traffic Accident are also considered to be "Low".

It can be concluded that the Proposed RBSF Component is not vulnerable to any type of Major Accident or Natural Disaster that would lead to a significant environmental effect.

## Section 18: Environmental Interactions

This EIAR has considered the effects of the Proposed Upgrade Project on the various aspects of the receiving environment. There are cases where an effect on one element of the environment results in an effect on another element. In most cases the effect is automatically considered.

For example, noise is assessed based on the effect of the Proposed Upgrade Project on traffic and the noise that the predicted traffic will generate which is compared with acceptable environmental standards which in turn are based on human health considerations.

To facilitate the understanding of, and interactions between, the various environmental disciplines, a workshop was convened for the environmental specialists and the design team. This workshop identified areas of interaction and the information exchange required to predict the direct and indirect effects of the Proposed Upgrade Project.

The interactions and interrelationships involved knowledge sharing and information exchange in relation to the following elements:

- **Design and Construction Details:** The design team provided project specific details to the specialist environmental team to ensure that they had sufficient information to determine the effects on the receiving environment;
- **Sensitive receptors:** Each specialist provided information on the receptors within their study area and their vulnerability to particular effects arising from the Proposed Upgrade Project;
- **Baseline and Modelling Data:** For example, predicted traffic volumes provided by the traffic specialist were provided to the Noise and Vibration and Air specialists to predict the effects of the Proposed Upgrade Project on the noise and air environments. Similarly, water quality modelling results were provided to the Marine Ecologist to assess the potential impacts on the benthic fauna and the consequential effects on the food chain, and
- **Impacts and mitigation measures:** Each specialist assessed the effect of the other disciplines on the sensitive receptors within his / her discipline and where necessary recommended that mitigation was provided to meet the necessary environmental standards (where available). For example, the Cultural Heritage Specialist identified sensitive protected structures in the area and that they could be vulnerable to vibration. The noise and vibration specialist then assessed the effect on these structures and imposed vibration limits to mitigate the risk of damage.

As a result of this collaboration, the interactions and interdependent impacts/effects are addressed in the respective sections within the EIAR and appropriate mitigation and environmental standards recommended.

## Section 19: Cumulative Impacts

Potential cumulative impacts and resulting effects can arise from the Proposed Upgrade Project when combined with other existing and/or approved projects. The cumulative impact assessments have been undertaken by each specialist in each relevant Section of this EIAR.

### 19.1 Methodology

In accordance with the EPA Draft Guidelines (2017), a scoping exercise was undertaken to identify existing and/or approved projects with the potential for cumulative impacts, considering any existing environmental problems relating to areas of environmental importance likely to be affected or the use of natural resources.

The scoping process considered three categories of projects based on the following:

- Existing or commenced project with a valid planning permission within the vicinity of the proposed Ringsend WwTP site that possess the potential for significant cumulative effects with the proposed Ringsend WwTP Component; Likewise, a similar exercise was conducted for existing or commenced projects adjacent to the RBSF Component;
- Approved projects with a valid planning permission but have not commenced construction within the vicinity of the proposed Ringsend WwTP site with the potential for significant cumulative effects with the proposed Ringsend WwTP Component; and a similar exercise was conducted for the RBSF Component; and
- Proposed projects that do not have planning permission but are considered integral to the proposed Ringsend WwTP Component and a similar exercise was also undertaken for the RBSF Component.

The assessment particularly focuses on where the effects of the Proposed Upgrade Project has been assessed to be of minor significance or worse, but when combined with the impact of other concurrent or future developments the overall impact may worsen. Where such effects are identified, additional mitigation measures should be put in place to prevent cumulative impacts from occurring or reduce their overall effect.

### 19.2 Ringsend WwTP Component

The proposed Ringsend WwTP Component has the potential to interact with or create cumulative impacts with other industrial facilities in the local and wider area. Potential cumulative impacts include discharges to the Liffey Estuary, noise, odour, traffic and air. Projects that were identified for consideration include:

- Dublin Waste to Energy;
- Alexandra Basin Redevelopment;
- ESB Site Poolbeg Power Station;
- National Oil Reserves Agency;
- Greater Dublin Drainage; and
- Poolbeg West SDZ.

This EIAR has considered potential cumulative impacts arising from the construction and operation of the WwTP Component of the Proposed Upgrade Project in accordance with the EIA Directive and

corresponding guidelines. It has done so mainly through the integration of cumulative impacts in the undertaking of baseline surveys and the development of models that assess emissions that relate to Water, Odour, Noise, Air Quality and Traffic.

When all the impacts are examined in combination with other projects, facilities and activities in the local and wider area, the WwTP component of the Proposed Upgrade Project is not likely to give rise to any significant cumulative effects, in combination with existing and/or permitted projects in the area.

### 19.3 RBSF Component

The Proposed RBSF Component has the potential to interact with or create cumulative impacts with other industrial facilities and developments in the local and wider area. Potential cumulative impacts include noise, odour, traffic and air.

Projects that were identified for consideration include:

- Huntstown Quarry, Huntstown;
- Huntstown Power Station, Huntstown;
- Dublin Airport Authority developments;
- Huntstown BioEnergy Limited; and
- Greater Dublin Drainage.

The assessment also considered potential cumulative impacts that may arise from the following elements:

- Cumulative elements from the GDD WwTP and Proposed Ringsend WwTP Upgrade Projects; and
- Existing and / or approved projects associated with the NWSMP.

The Proposed RBSF Component is unlikely to give rise to any significant effects cumulatively or, in combination with existing and or permitted projects in the area. Furthermore, the Proposed RBSF Component has been designed to accommodate the combined biosolids volumes from both the GDD WwTP and Proposed Ringsend WwTP Upgrade projects in a manner that will not give rise to significant environmental effects on the surrounding environment.

The assessment did not find any significant additional impacts arising from the proposed Ringsend WwTP Component acting cumulatively or in combination on the water environment.



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