Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

UISCE ÉIREANN : IRISH WATER

Grand Canal Storm Water Outfall Extension

Environmental Impact Assessment Scoping Report

November 2020

BARRY & PARTNERS
consulting engineers

CIVIL • STRUCTURAL • ENVIRONMENTAL • TRANSPORTATION

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Appendix A: Drawings

SECTION 1: Introduction

The Grand Canal Tunnel was constructed in the early 1970's (Figure 1.1) in order to:

- Convey foul sewerage from the newly expanding suburbs in the west of the city to the Ringsend Wastewater Treatment Plant in Ringsend.
- Provide a conduit for the overflows from the existing combined foul and storm sewers.
- To convey storm relief flows from the Poddle and Swan Rivers thereby reducing the risk of flooding in those areas.

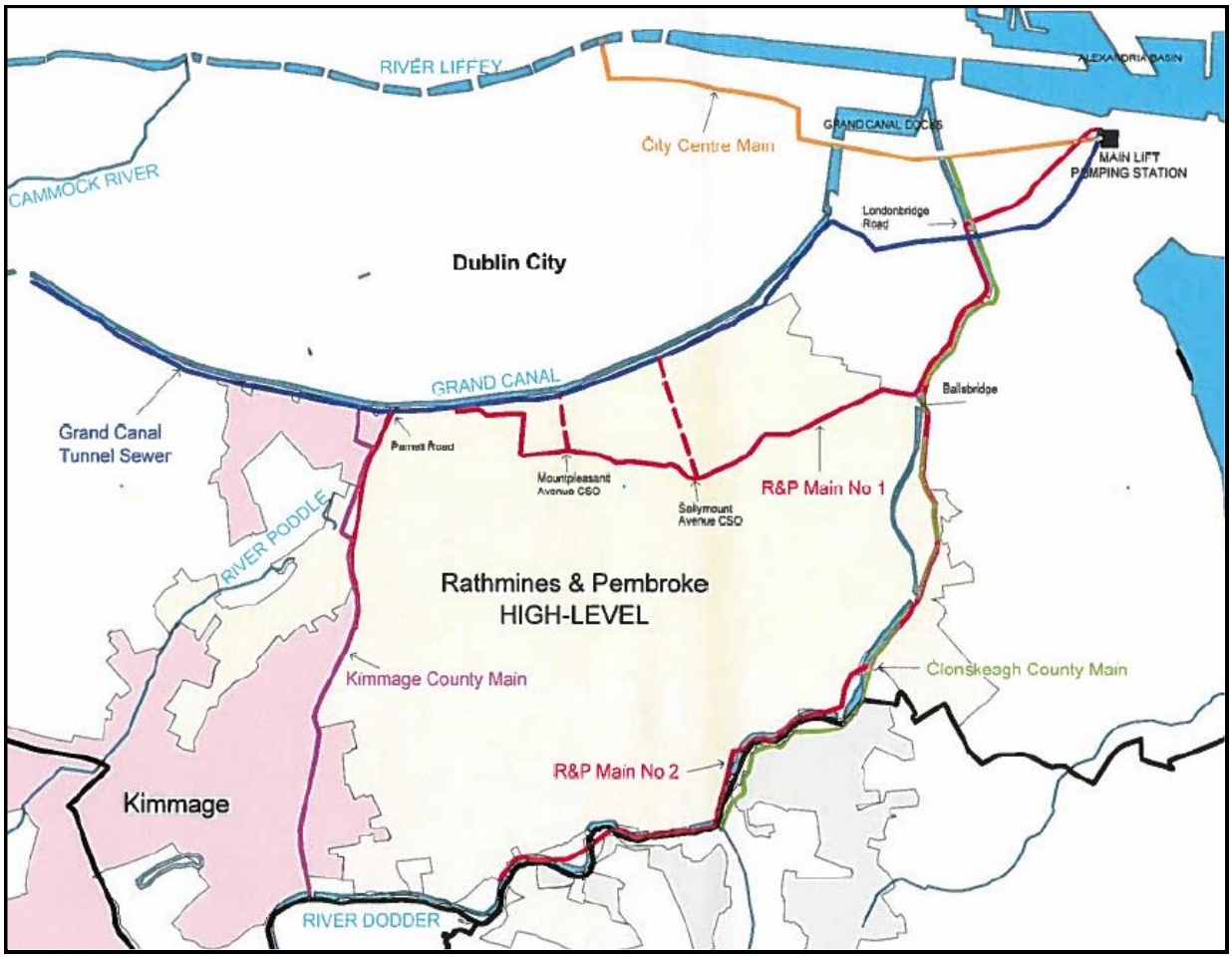

Figure 1.1 Grand Canal Tunnel

The existing tunnel is 4.8km in length and has a diameter of 3.6m in diameter. The tunnel is partitioned into two separate sections. The smaller compartment of the cross section caters for the foul component and the remaining larger section caters for storm water. At Estate Cottages, Northumberland Road (Manhole 1) the tunnel splits, with the foul component being conveyed to Ringsend Wastewater Treatment Plant while the stormwater component is conveyed to the Grand Canal Basin via a 3.2m diameter pipe.

The Basin, in this report refers to the waterbody within Grand Canal Docks. The Docks, in this report refers to the overall area encompassing the Basin, quayside, and surrounding area.

The Grand Canal Docks consists of an enclosed harbour where the Grand Canal terminates before it meets the River Liffey in Dublin, Ireland. This area is a hub of modern apartment buildings and office spaces which has been zoned as a Strategic Development Regeneration Area in the Dublin City Council Development Plan, 2016 – 2022. The area is also important for entertainment, cultural, and recreational activities with a number of restaurants and bars, as well as the Bord Gáis Energy Theatre. The development of water-based recreational activity within the Basin is part of the rejuvenation programme

in the area. During heavy rainfall events the flow in the foul element will exceed its capacity and will overflow to the storm compartment and discharge at the southern end of the Grand Canal Basin. Bacteriological contamination of the water in the Basin (in excess of the bathing water standards) after heavy rainfall events has been identified by Waterways Ireland from water quality testing and they have urged Irish Water/ Dublin City Council to extend the outfall to the River Liffey as is been proposed.

Irish Water, Dublin City Council, and Waterways Ireland agreed in 2017 to establish a Joint Working Group to examine the issue of bacteriological contamination in the Basin. Extensive water quality analysis and monitoring of the impact of the surface water overflows into the Basin from the Irish Water combined sewer network for a period of one year has demonstrated, to the satisfaction of the Working Group the primary source of pollution of the waters in the Basin is the discharge from the surface water section of the Grand Canal Tunnel.

Since the discharge cannot be closed off, a possible solution is to relocate the discharge point to a location outside the Basin. The most preferred location for the discharge point is the River Liffey.

Dublin City Council and Irish Water have agreed to jointly complete the Planning and Statutory Approvals for the extension of the outfall pipe. Dublin City Council will be making the application. Irish Water have procured J. B. Barry and Partners as the consultant and Dublin City Council have provided a Project Manager.

J. B. Barry and Partners has been commissioned by Dublin City Council and Irish Water to prepare this Environmental Impact Assessment (EIA) Scoping Report for the proposed development. This report will describe what information should be contained in the EIAR and what methodology it is proposed to use to gather and assess that information. The potential for likely significant effects throughout different phases of the proposed project, are considered as far as possible at this scoping stage.

This report has been prepared by J. B. Barry and Partners with the assistance of specialist environmental sub-consultants generally in accordance with the following guidelines:

- Department of Housing, Planning and Local Government (DoHPLG), Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018.
- EPA, Guidelines on the information to be contained in Environmental Impact Assessment Report – Draft, 2017

SECTION 2: Description of proposed development

2.1 Site location

The development is located in the Grand Canal Docks, Dublin, Ireland. This area is a hub of modern apartment buildings, and office and retail spaces which has been zoned as a Strategic Development Regeneration Area (SDRA) in the Dublin City Council Development Plan, 2016 – 2022, see Figure 2.1. The area is also known as a Key Developing Area (KDA) within the Development Plan and also a Strategic Development Zone (SDZ) within the North Lotts and Grand Canal Planning Scheme, 2013.

The project will begin at its most southern point in the Grand Canal Basin at the Grand Canal Tunnel Outfall. The works will involve constructing a pipeline from the Grand Canal Tunnel Outfall, near the Grand Canal Dock Dart Station, north through the Basin where it will pass through a section of Hanover Quay. It will then link up with an existing culvert on Asgard Road, built in 2002 as phase 1 of this project. At the northern end of this existing culvert, a pipeline will be constructed underneath Sir John Rogerson's Quay together with an outfall to the River Liffey. The storm water will therefore have bypassed its previous outfall within the Basin and will discharge into the River Liffey/ Lower Liffey Estuary.

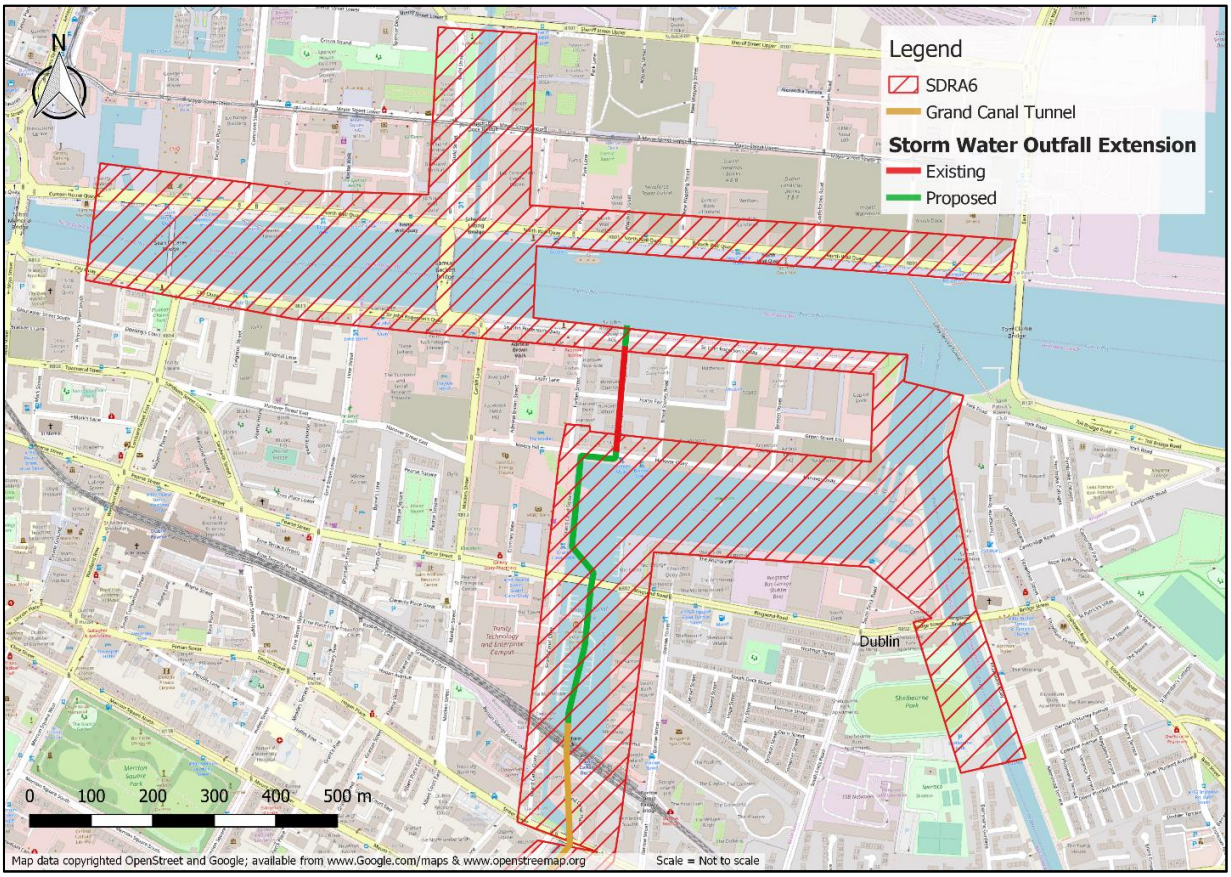

Figure 2.1 Site Location in context of the Strategic Development Regeneration Area (Dublin City Council Development Plan, 2016)

The Grand Canal Docks are set in an urban environment (Figure 2.2) and the proposed development interacts with properties zoned as:

- SDRA6.
- Conservation Areas.
- Z6 "to provide for the creation and protection of enterprise and facilitate opportunities for employment creation".

- Z15 "to seek the social, economic and physical development and/or rejuvenation of an area with mixed use of which residential and "Z6" would be the predominant uses".

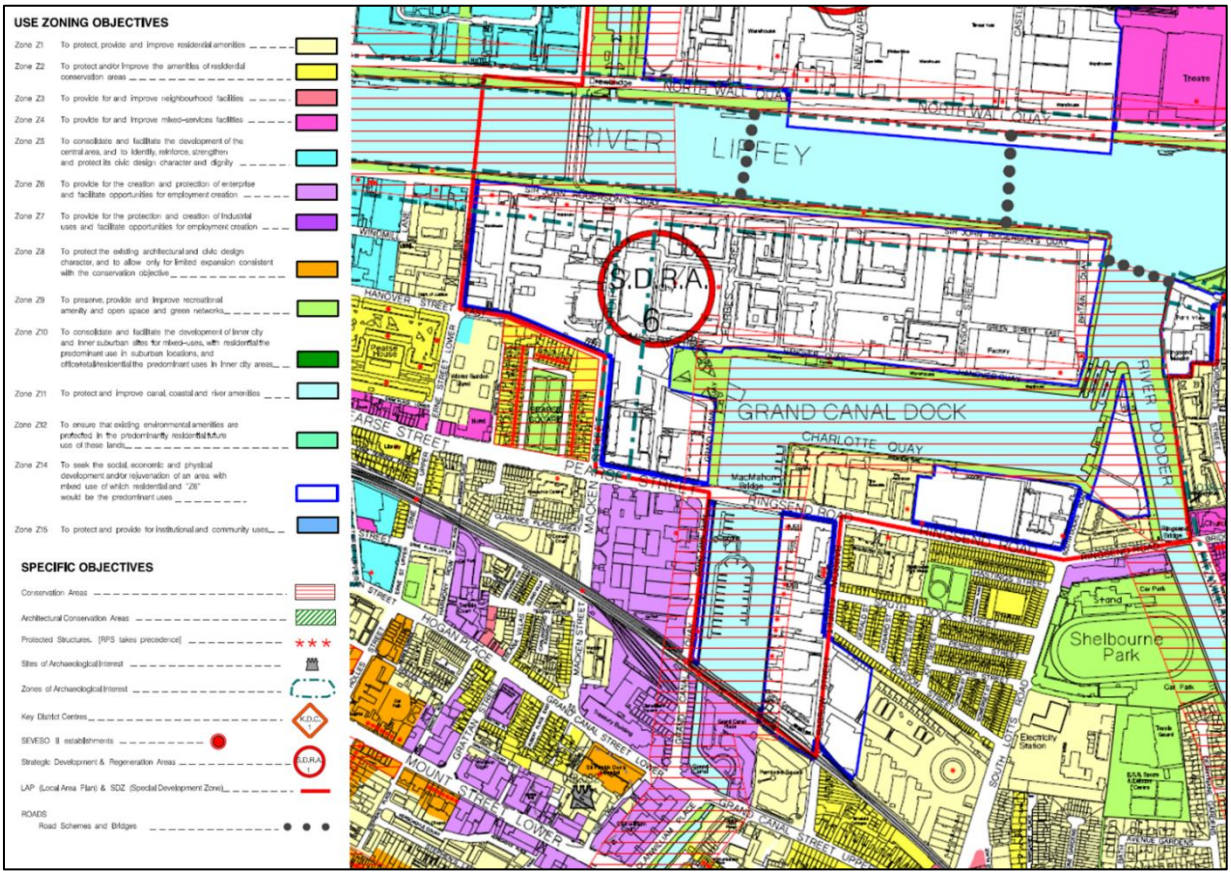

Figure 2.2 Map extract from Dublin City Development Plan 2016 - 2022 Map E Use Zoning Objectives (DCC, 2016)

2.2 Description of the proposed works

The proposed works for the scheme consists of the following:

- Construction of Transition Chamber 1 at chainage Ch.+0m (Starting at southernmost point of development at existing storm water outfall.
- Construction of 5.0m x 1.5m diameter pipes from chainage Ch.+7.26 – Ch.+310.00m.
- Construction of Transition Chamber 2 at chainage Ch.+310.00 – Ch.+320.00m.
- Construction of Twin 2.4m dimeter pipes from chainage Ch.+320.00 – Ch.+490.00m.
- Construction of Transition Chamber 3 at chainage Ch.+490.00m.
- Construction of 4m wide 2.7m high (internal diameter) pipe on Hanover Quay.
- Construction of new outfall structure at Sir John Rogerson's Quay on the River Liffey.

The total length of the pipeline to be constructed is 550m. The proposed works involve 450m of development on the silt bed of the Grand Canal Basin, and 100m along existing road and pedestrian infrastructure, see Figure 2.3 to Figure 2.4. The bed of the Basin is largely flat and gently undulating; a maximum depth of 3.9m was observed by the Archaeological Diving Company (ARDCO) during a dive survey completed in 2008.

Three temporary cofferdams will be built at each of the transition chambers including:

- Transition Chamber 1 at the existing Grand Canal Tunnel Outfall.
- Transition Chamber 2 at the transition point from the 5 No. 1.5m diameter pipeline to 2 No. 2.4m diameter pipeline.

- Transition Chamber 3 at Hanover Quay.

The route is proposed to traverse underwater through the centre of the southern portion of the Basin, pass underneath the MacMahon Bridge, then bear close to the western wall of the Basin. The pipeline will enter Transition Chamber 3 at Hanover Quay and will run underground along the quay before adjoining with the existing pipeline on Asgard Road, see drawings Appendix A.

Particular constraints for the construction phase of the project include:

- Meeting canal draught requirements in terms of navigation; 1.9m minimum clearance.
- Avoiding the existing 8 foot (2.4m) diameter sewer, which is more than 100years's old, underneath the Basin.
- Minimising discharge velocities into the River Liffey.
- Minimising risk of damage to the extension pipe which could cause rapid drawdown of the Grand Canal Basin.

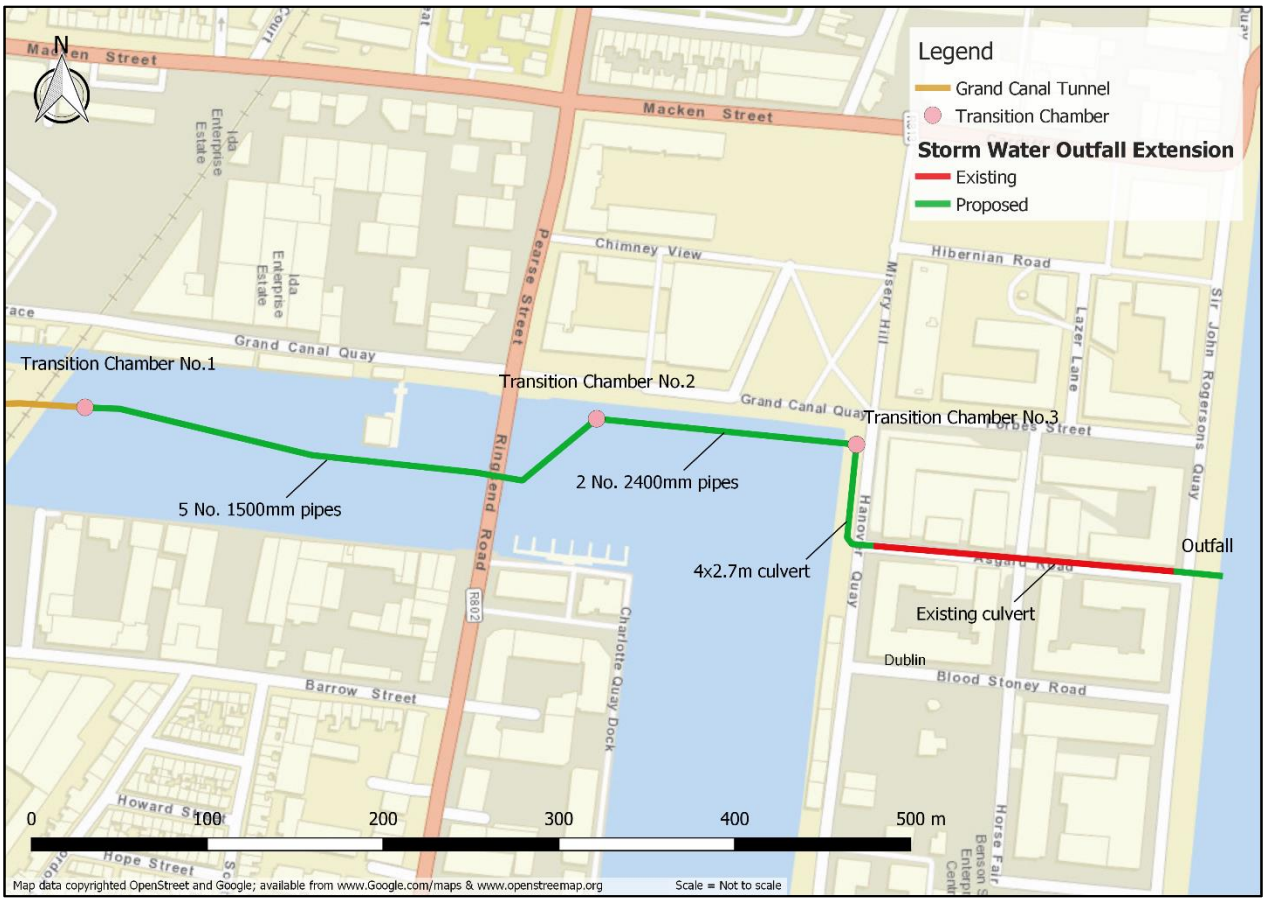

Figure 2.3 Grand Canal Storm Water Outfall pipeline within the Grand Canal Docks

The proposed development will result in the intermittent discharge (rainfall related) of polluted combined sewage stormwater overflow from the South Dublin Sewer system to the River Liffey. This overflow is currently discharged into the Basin, and the proposed development will move the outfall to the River Liffey. The discharge will contain elevated concentrations of Faecal Coliform, BOD, Nutrients and Suspended Solids.

The capacity of the proposed culverts were checked using the outputs from the Greater Dublin Strategic Drainage Study (GDSDS) and modelled using InfoWorks. The InfoWorks model was run for the following two joint probability scenarios:

- 1 in 1 year storm (9.7m^3/s flow) with the modified 100 year tide (i.e. estimated future 100 year tide (3.4mOD Malin Head).

- 1 in 20 year storm (18.6m^3/s flow) and a MHWS tide (2.25mOD Malin Head).

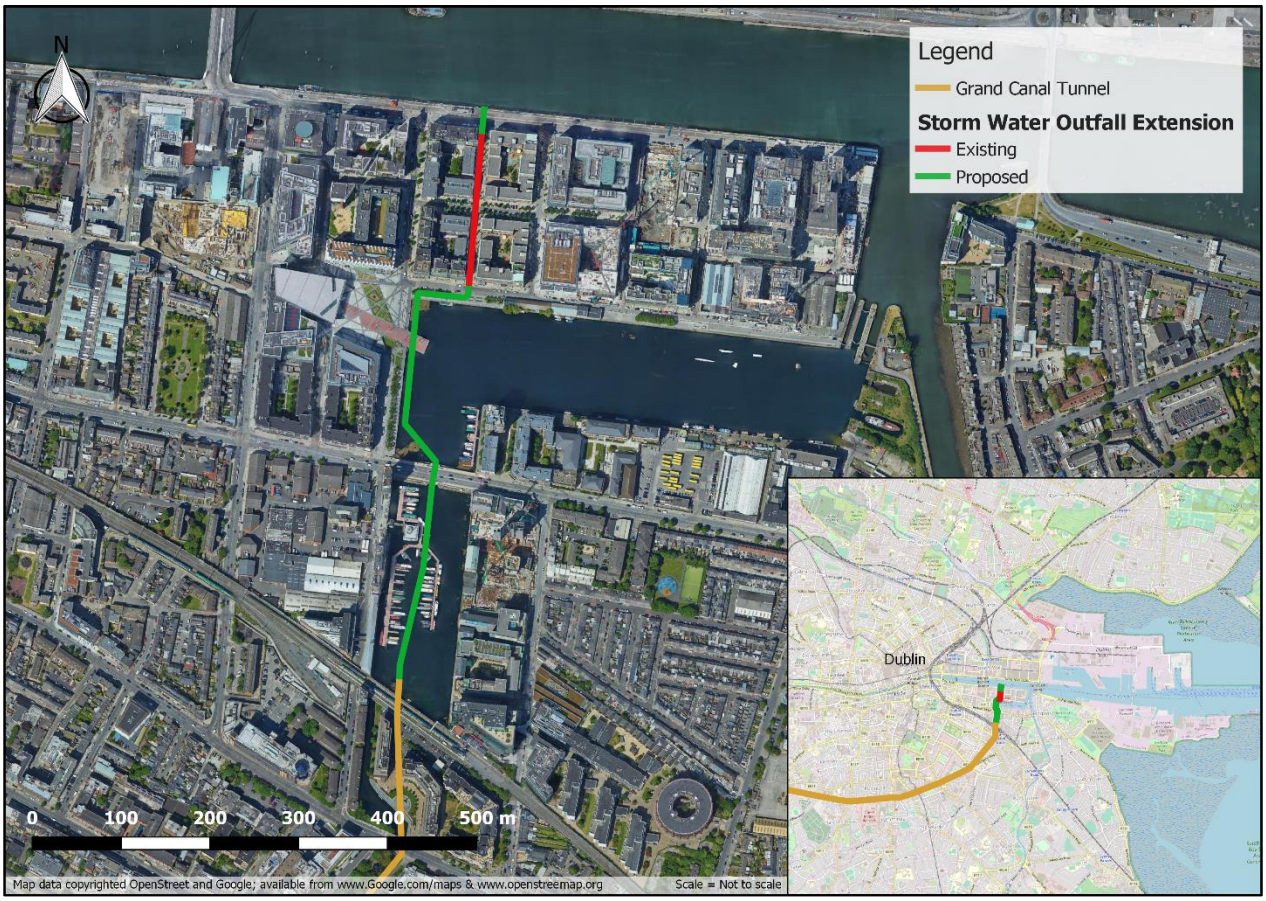

Figure 2.4 Overview of Grand Canal Storm Water Outfall Pipeline

2.3 Need for the scheme

Water quality in the Grand Canal Basin has been adversely affect over recent years by the existing stormwater outfall discharging foul sewerage into the southern end of the Basin (also known as the Inner Docks) during periods of high rainfall. The long retention time and low throughput of water through the Basin make it vulnerable to pollution after these events. In 2016 the impact on water quality in the Grand Canal Docks resulted in complaints being made to the EPA by Waterways Ireland. The majority of instances of microbiological contamination occurred in the Inner Basin in close proximity to the existing surface water outfall.

In 2017 Irish Water, Dublin City Council and Waterways Ireland agreed to establish a Joint Working Group to examine the issue. Extensive water quality analysis and monitoring of the impact of the surface water overflows into the Basin from the Irish Water combined sewer network for a period of one year has demonstrated, to the satisfaction of the Working Group, that the primary source of pollution of the waters in the Basin is the discharge from the surface water section of the Grand Canal Tunnel.

It was concluded that if the Grand Canal Docks is to be usefully developed as an Amenity in accordance with current policy, the existing discharge point of the Grand Canal Tunnel surface water outfall into the Basin must be removed.

The solution involves the extension of the existing storm water outfall pipe from the 3.2m diameter Grand Canal Tunnel near the Docklands Railway Station. The existing surface water outfall will be intercepted in Transition Chamber No. 1 in the Inner Dock and then continue via 5 No. 1.5m diameter pipelines as far as a Transition Chamber No. 2 in the Outer Dock. At this point 2 No. 2.4m diameter pipelines will be constructed under the platform as far as Transition Chamber No. 3 located in Hanover

Quay. From here a 4.0x2.7m box culvert will be constructed as far as the existing Phase 1 culvert in Asgard Road. Thereafter, the culvert travels the length of Asgard Road to Sir John Rogerson's Quay where a new tie in will be constructed, along with outfall structure on the River Liffey.

Primary objective:

- Extension of the Grand Canal Surface Water Outfall through the Grand Canal Docks to a new outfall at the River Liffey.

Primary drivers:

- Pollution to the Grand Canal Basin.
- Enhanced water quality and amenity value of the Grand Canal Docks.

SECTION 3: Legislative context and planning history

3.1 Planning history

In the early 1990's, arising from development and upgrading of the Grand Canal Docks and its environs, the Office of Public Works (who had responsibility for dock maintenance/operation) requested that the storm water discharge from the Grand Canal Tunnel be removed from the Docks. A study, carried out by J. B. Barry and Partners in 1992, identified possible alternative options for re-routing the storm water discharge away from the Docks into the River Liffey. A preferred option was identified, cost estimates were prepared, and a report submitted recommending implementation of the proposed works.

In October 2000 Dublin Corporation instructed J. B. Barry and Partners to carry out a review of the Extension of the Grand Canal Surface Water Outfall through the Grand Canal Docks to a new Outfall at the River Liffey.

This project began in 2002 where Phase 1 saw the construction of a 170m long 4.0x2.7m box culvert underneath Asgard Road, between Hanover Quay and Sir John Rogerson's Quay. Phase 2 of this project involves the connection of the Grand Canal Tunnel to the box culvert completed as part of Phase 1, and the construction of the outlet structure in the River Liffey at Sir John Rogerson's Quay. In 2008/2009 the design prepared for Phase 2 proceeded to tender and a Section 25 certificate was granted by the Dublin Docklands Development Authority. However, the project was put on hold in 2012 and was not progressed primarily due to the economic downturn. In 2015 the Dublin Docklands Development Authority dissolved, and the Section 25 certificate was void. In 2017 a feasibility study was completed to consider three more alternative pipeline routes through the basin and assess the most appropriate. It was concluded that the original option was the optimal solution.

3.2 EIA Directive

EIA requirements derive from EU Directive 2014/52/EU. Known as the EIA Directive, it amends the previous directive (2011/92/EU) on the assessment of the effects of certain public and private projects on the environment. It is defined under Article 1(2)(g) as follows:

> *"Environmental impact assessment means a process consisting of:*
>
> *i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);*
>
> *ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;*
>
> *iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;*
>
> *iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and*
>
> *v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a.'"*

3.3 National legislative framework for EIA

The EIA Directive(s) have been transposed into Irish legislation by the Planning and Development Acts 2000 to 2019 (the "Planning Acts") and the Planning and Development Regulations, 2001 - 2018. Section 172 of the Planning Acts sets out the statutory basis for the requirements for Environmental Impact Assessment. It provides as follows:

> *"172.— (1) An Environmental Impact Assessment shall be carried out by the planning authority or the Board, as the case may be, in respect of an application for consent for proposed development where either—*
> *(a) the proposed development would be of a class specified in—*
> *(i) Part 1 of Schedule 5 of the Planning and Development Regulations 2001, and either—*
> *such development would exceed any relevant quantity, area or other limit specified in that Part, or*
> *no quantity, area or other limit is specified in that Part in respect of the development concerned,*
> *or*
> *(ii) Part 2 of Schedule 5 of the Planning and Development Regulations 2001 and either—*
> *such development would exceed any relevant quantity, area or other limit specified in that Part, or*
> *no quantity, area or other limit is specified in that Part in respect of the development concerned,*
> *or*
> *(b)*
> *(i) the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 but does not exceed the relevant quantity, area or other limit specified in that Part, and*
> *(ii) the planning authority or the Board, as the case may be, determines that the proposed development would be likely to have significant effects on the environment."*

The most recent 2014 EIA Directive has been transposed into Irish Legislation, through the European Union (Planning and Development) (Environmental Impact Assessment) Regulations (S.I. 296 of 2018). The partial enactment of these Regulations on the 1st September 2018 was accompanied by a circular letter issued by Department of Housing, Planning, Community and Local Government (dated 27th August 2018, PL 05/2018) to planning authorities and An Bord Pleanála.

3.4 EIA Screening

Projects for which an EIA is mandatory under Annex I of the Directive have been listed under Part 1 of Schedule 5 of the Planning and Development Regulations 2001 - 2018. Similarly, Part 2 of Schedule 5 outlines thresholds for other projects which also require EIA, as per Annex II of the Directive.

Projects requiring Environmental Impact Assessment are transposed from the EU EIA Directive into Irish Legislation through Section 172 of the Planning Acts. An initial determination is to be undertaken to examine whether the proposal is a project as understood by this transposition of the directive. If a proposed project is not of a type covered, there is no statutory requirement for it to be subject to Environmental Impact Assessment. In determining if the proposed project is of a type it is also necessary to go beyond the general description of the project and to consider the component parts of the project and/or any processes arising from it (EPA, 2017).

Consequently, whether or not the project falls within the scope of or exceeds the thresholds set out in the legislation must be determined.

Schedule 5 of the Planning and Development Regulations 2001 – 2018 details the types and thresholds of development which require an EIA. The proposed development is not considered to have a mandatory requirement for an EIA as it does not fall within any of the categories within Part 1 of Schedule 5 of the

Regulations. These regulations have been amended to set out the updated criteria in accordance with the requirements of the EU Directive 2014/52/EU.

The proposed development has been identified as a sub threshold development under Part 2, Class 10 (b) (iv), as it is infrastructural development within an urban environment. However. it does not exceed the relevant threshold. As a sub threshold development, the project does not automatically require an EIA, but still requires screening to determine if an EIA is required. The need for subthreshold (Part 2 Class 15) screening is justified on the basis that the project value, its scale, nature, and setting in a built up urban environment and the composition of the discharge, can be considered a significant urban development, and should be subject to the criteria set out in Schedule 7 of the Planning and Development Regulations 2001 - 2018. The overriding consideration in determining whether a project should be subject to EIA is the likelihood of significant environmental effects.

An EIA Screening Report and AA Screening Report was carried out in June 2020. The EIA Screening Report concluded that although the project is sub threshold there is a possibility of significant effects on the environment associated with the project. Consequently, adopting the precautionary principle, it was concluded that in the interest of providing a quantified statement of any impacts to the competent authority the project shall be subject to a full EIA, and that an EIAR shall accompany the application. AA screening established that there was a possibility of significant effects to Natura 2000 sites and that a Natura Impact Statement (NIS) should be prepared.

3.5 The EIA process

The EIAR will follow the guidelines contained in the EPA publication, Guidelines on the information to be contained in Environmental Impact Assessment Report – Draft, 2017. After screening is carried out, and a project is subject to full EIA, the scoping stage must be undertaken. The scoping of an EIAR is concerned with identifying aspects of the environment where there is an interaction, either direct or indirect, positive or negative, with the project. The potential effects thereafter will need to be assessed. Scoping is the process of considering what information should be contained within an EIAR and what methods should be used to gather and assess that information.

The aspects of the environment to be considered are as follows:

- Population and human health.
- Biodiversity.
- Water.
- Land, soils, and geology.
- Air quality and climate.
- Noise and vibration.
- Traffic and transport.
- Archaeology and cultural heritage.
- Waste management.
- Material assets.
- Landscape and visual impact.

Other aspects which much be considered include:

- Interactions between the above environmental aspects.
- Cumulative effects of this project in combination with other existing and proposed projects.
- The effects arising from the vulnerability of the project to risks of major accidents and disasters.

3.6 Consultation

With the publication of this Scoping Report, Irish Water and Dublin City Council are commencing a consultation period with the public, interested parties, and prescribed bodies for the proposed

development. Prescribed bodies/ stakeholders have been identified as part of a Stakeholder Audit. This audit will be maintained and updated throughout the project.

Statutory Consultees will be provided with a copy of this Scoping Report. These are statutory bodies that are obliged to be notified under the Planning and Development Regulations at the time of submitting an application for a proposed project. During consultation they will be invited to make a submission on any issues they may have identified with the proposed development. All submissions (responses, comments, and recommendations) will be appended to the final version of this document, they will be acknowledged in the EIAR and will inform the final scope of the EIAR. An information dissemination session will be held for the general public to keep them informed of the project. A number of communications tools and channels will be utilised including:

- A Frequently Asked Questions (FAQ) document.
- Project pages on Irish Water and Dublin City Council website.
- Media advertisements through regional newspaper.
- Press release to regional newspapers.
- Project brochures.

An initial stakeholder audit has identified the following stakeholders:

Table 1 Stakeholder list

Prescribed bodies and key stakeholders	
Minister for Transport, Tourism and Sport	National Transport Authority
Minister for Communications, Climate Action and Environment	Eastern and Midlands Regional Authority
Health Service Executive	Office of Public Works
Minister for Agriculture, Food and the Marine - Foreshore Licence	Transport Infrastructure Ireland
Minister for Housing, Planning and Local Government	The Heritage Council
Minister for Culture, Heritage and the Gaeltacht	The Arts Council
An Bord Pleanála	Irish Rail
National Parks and Wildlife Service (NPWS)	National Monument Service
Inland Fisheries Ireland	Fáilte Ireland
DCC (planning, archaeology, conservation, traffic, etc)	An Taisce
Dublin Port & Harbour Master (DPC & HM)	Waterways Ireland (WI)
National Asset Management Agency (NAMA)	Local Residents
DCC Dublin Docklands (Luas and the pedestrian bridge)	Geological Survey of Ireland
Electricity Supply Board	Irish Water
Environmental Protection Agency	Birdwatch Ireland
Gas Networks Ireland	Health and Safety Authority
Elected Representatives	Local Businesses
Media	

SECTION 4: Scoping

The environmental factors to be addressed in the EIAR are:

- Population and Human Health.
- Biodiversity.
- Water.
- Land and Soils and Hydrogeology.
- Air Quality and Climate.
- Noise and Vibration.
- Air and Noise.
- Traffic and Transport.
- Archaeology and Cultural Heritage
- Waste Management.
- Material Assets.
- Landscape and Visual Amenity.
- Cumulative effects.

The following Sections outline the receiving environment and the sensitive environmental receptors for the study area. Each environmental factor will be addressed identifying the following:

- Receiving Environment.
- Potential Impacts.
- Data and Surveys.
- Assessment Methodology.
- Mitigation.

4.1 Population and human health

4.1.1 Receiving environment

The likely impacts on human beings will be addressed in this section of the EIAR, including land use, economic activity, employment, settlement patterns, social patterns, and human health (considered with reference to other headings such as air quality and climate, noise and vibration, and water).

Located in the Electoral Division of South Dock, the subject site is situated within one of the busiest parts of Dublin City Centre. The area comprises sizable working and residential populations as well as visiting populations, given the established recreational, tourist and cultural amenities in Dublin Docklands.

4.1.2 Potential impacts

The do-nothing scenario

If the proposed project does not proceed, water quality in the Basin of the Grand Canal Dock will continue to be adversely impacted due to the existing stormwater outfall discharging foul sewage into the inner docks during periods of high rainfall. There are health and commercial impacts arising from the 'do-nothing' scenario. The Grand Canal Docks is a principal focus for water-based activities in Dublin Docklands which includes water sports, tourist and leisure craft. Due to water quality issues, immersive watersports are currently restricted and the addressing of related issues by means of the subject scheme will have significant positive benefits, including the promotion of the use of the waterways as an integral part of quality of life for the community.

Economic activity

During the construction stage of the proposed scheme potential negative impacts and disturbance to the community are likely to occur from construction, increases in ambient noise and dust levels, traffic, road closures and diversions. There will also be some potential positive benefits for local businesses.

During the operational phase, economic activity in the local and wider areas should be positively impacted by the proposed scheme.

Employment

The jobs associated with the construction and operational phases will be assessed and presented in the EIAR. It is anticipated that employment opportunities will arise during the construction phase. Jobs will be created on the construction site and indirectly through suppliers.

An improvement in water quality will also give rise to increased employment prospects during the operational phase providing scope for the development of further water-based commercial enterprises.

Settlement patterns

Settlement patterns are likely to be positively impacted for the area by the ability to implement the Dublin City Development Plan, support strategies, policies, and initiatives.

Social patterns

Social patterns are likely to be positively impacted by the project. There are no anticipated negative impacts arising from the project, however, an assessment will be carried out as part of the EIAR.

Human health

An assessment will be undertaken on potential risks or nuisances that may be caused to human beings during the construction and operational phases. The findings of the aforementioned air quality, water quality, traffic, noise, and vibration assessments will be reviewed and considered as part of this assessment.

4.1.3 Assessment methodology

A desktop study will be carried out to establish the baseline associated with economic activity, employment opportunities, settlement, and social patterns. Noise, vibration, and dust generation during construction will be assessed in the air quality and noise and vibration chapters. Positive impacts and the improvement to quality of life due to the scheme will be discussed in the EIAR.

4.1.4 Mitigation measures

It has been determined that there are likely to be potential impacts on population and human health during both the construction and operational phases of the scheme. Therefore, these aspects will be considered further in the EIAR, and any subsequent mitigation measures will be identified.

4.1.5 Residents and users of the Docks

There will be temporary negative impacts on the residents of the Dock as they may be moved to allow for the construction works within the Docks. Thereafter, a positive permanent impact is anticipated following an improvement in water quality in the Basin. These aspects will be assessed further in the EIAR, and any subsequent mitigation measures will be identified.

4.2 Biodiversity

4.2.1 Receiving environment

The receiving environment consists of the Grand Canal Docks Basin, the River Liffey, four designated European sites including South Dublin Bay and River Tolka Estuary SPA, North Bull Island SPA, North Dublin Bay SAC and South Dublin Bay SAC, and four proposed natural heritage areas (pNHAs).

The construction works will involve 450m of pipeline to be laid atop the silt bed of the Basin, connecting the outfall of the Grand Canal Tunnel to Asgard Road. The discharge location of the outfall pipe will be located on Sir John Rogerson's Quay and will discharge combined stormwater overflow directly into the

River Liffey. The River Liffey is a transitional waterbody in this location, just upstream of Dublin Bay. The Dublin Bay European designated sites are protected under the EU Habitats Directive and Birds Directive and are of international importance for their wetland, intertidal and estuarine habitats as well as wader and wildfowl populations. The pertinent sites in Dublin Bay are described in further detail below.

North Dublin Bay SAC (Site Code: 000206)

North Dublin Bay SAC is located 4km north east of the proposed development. The River Liffey and Dublin Bay act as a hydrological pathway to the SAC, which is 5.9km downstream and out into Dublin Bay. The North Bull Island sand spit is a relatively recent depositional feature, formed as a result of improvements to Dublin Port during the 18th and 19th centuries. It is almost 5km long and 1km wide and runs parallel to the coast between Clontarf and Sutton. The North Bull Island dune system is one of the most important systems on the east coast and is one of the few in Ireland that is actively accreting. It possesses extensive and mostly good quality examples of embryonic, shifting marram and fixed dunes, as well as excellent examples of humid dune slacks. Both Atlantic and Mediterranean salt marshes are well represented, and a particularly good marsh zonation is shown. The salt marshes grade into mudflats and sandflats, some of which are dominated by annual Salicornia species. Petalwort (*Petalophyllum ralfsii*) occurs at its only known station away from the western seaboard (NPWS, 2017).

North Bull Island SPA (Site Code: 004006)

North Bull Island SPA is located 4km north east of the proposed development. The River Liffey and Dublin Bay act as a hydrological pathway to the SPA, which is 5.9km downstream and out into Dublin Bay. The site is among the top ten sites for wintering waterfowl in the country. It supports internationally important populations of *Branta bernicila hrota* and *Limosa lapponica* and is the top site in the country for both of these species. A further 14 species have populations of national importance. North Bull Island SPA is also a regular site for passage waders. The site provides both feeding and roosting areas for the waterfowl species (NPWS, 2017b).

South Dublin Bay SAC (Site Code: 000210)

South Dublin Bay SAC is located 2km east of the proposed development. The River Liffey and Dublin Bay act as a hydrological pathway to the SAC, which is 7km downstream. This intertidal site extends from the South Wall at Dublin Port to the West Pier at Dun Laoghaire, a distance of c. 5 km. At their widest, the intertidal flats extend for almost 3 km. The seaward boundary is marked by the low tide mark, while the landward boundary is now almost entirely artificially embanked. A small sandy beach occurs at Merrion Gates, while some bedrock shore occurs near Dun Laoghaire. The site possesses a fine and fairly extensive example of intertidal flats. Sediment type is predominantly sand, with muddy sands in the more sheltered areas. A typical macro-invertebrate fauna exists. The site has the largest stand of *Zostera* on the east coast. It supports part of the important wintering waterfowl populations of Dublin Bay. It regularly has an internationally important population of *Branta bernicila horta*, plus nationally important numbers of at least a further 6 species, including *Limosa lapponica*. It is a regular autumn roosting ground for significant numbers of *Sterna* terns, including *S. dougallii* (NPWS, 2018).

South Dublin Bay and River Tolka Estuary SPA (Site Code: 004024)

South Dublin Bay and River Tolka SPA is located 2km east of the proposed development. The River Liffey acts as a hydrological pathway to the SPA, which is 3.5km downstream. This site comprises a substantial part of Dublin Bay. It includes virtually all of the intertidal area in the south bay, as well as much of the Tolka Estuary to the north of the River Liffey. A portion of the shallow bay waters is also included. The site possesses extensive intertidal flats which support wintering waterfowl which are part of the overall Dublin Bay population. It regularly has an internationally important population of *Branta bernicla hrota*, which feeds on *Zostera noltii* in the autumn. It has nationally important numbers of a further six species. It is an important site for wintering gulls, especially *Larus ridibundus* and *Larus canus*. It is the premier site in Ireland for *Larus melanocephalus*, with up to 20 birds present at times. Is a regular autumn roosting ground for significant numbers of terns, including *Sterna dougallii, S. hirundo* and *S. paradisaea* (NPWS, 2017c).

Other sites

The proposed development lies within the Grand Canal proposed Natural Heritage Area (pNHA) (Site Code 2104). The Grand Canal pNHA consists of a number of habitats, including hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The rare and legally protected Opposite-leaved Pondweed (*Groenlandia densa*) (Flora Protection Order 1987) is present at a number of locations in the eastern section of the Main Line of the Grand Canal, between Lowtown and Ringsend Basin in Dublin (NPWS, 2009).

A further three pNHAs are located within the vicinity of the proposed development including North Dublin Bay pNHA (Site Code 206), South Dublin Bay pNHA (Site Code 210), and the Dolphins Dublin Docks pNHA (Site Code 201).

It should be noted that the outfall of the proposed development is located within the Transition Zone of the Dublin Bay Biosphere UNESCO site and approximately 3.2km from its Core Zone. In 2015 the Dublin Bay Biosphere was designated for its rich biological diversity. The biosphere supports well developed salt marshes and dune systems and is also important for nesting and wintering waterfowl. The Core Zone comprises a number of Natura 2000 sites as mentioned previously.

Water quality

The Grand Canal Dock Basin has the Water Framework Directive (WFD) status 'Moderate' (2013-2018) which is a downgrade from previous period ('Good' (2010-2015)). The waterbody is 'At risk' of not meeting the WFD objectives (EPA, 2020).

Liffey Estuary Lower has the WFD status 'Good' (2013-2018) which is an upgrade from previous period ('Moderate' (2010-2015)). The waterbody is 'At risk' of not meeting the WFD objectives with the main pressure being urban wastewater (EPA, 2020).

4.2.2 Potential impacts

The potential impacts associated with construction phase include:

- Mobilisation of nutrients and suspended solids during the construction phase may impact protected marine aquatic habitats and species (e.g. sedimentation degradation of salt marshes associated with North Dublin Bay SAC and loss of benthic invertebrate which in turn will reduce the food supply for water birds which are qualifying interests of South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA).
- Impacts via land pathways during construction (e.g. loss of aquatic habitats and species beneath the footprint of the pipeline within the basin and on the quay wall at the location of the proposed new outfall).
- Potential run-off hydrocarbon-based pollution which may occur during the constructions phase may impact on freshwater (within the Grand Canal Dock Basin) and marine aquatic habitats and species.
- Spread of alien invasive species present within the study area.

The potential impacts associated with operational phase include:

- Diversion of polluted combined sewerage stormwater overflow to River Liffey could potentially impact on the water quality of the river (e.g. eutrophication and increased sediment load).
- Improvement of water quality in the Grand Canal Docks Basin.

Due to the presence of a source of pollution, hydrological pathway, and the presence of sensitive receptors, there is the potential for negative impacts to occur upon the European designated sites downstream (North Dublin Bay SAC, North Bull Island SPA, South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA) and the aquatic habitats and species within the Grand Canal Dock Basin, the Lower River Liffey Estuary and the quay wall.

4.2.3 Data and surveys

Consultation has taken place with the Department of Culture, Heritage, and the Gaeltacht in December 2019, however, no observations have been returned to date.

An aquatic ecological survey of the Grand Canal Dock and River Liffey Estuary was carried out by BEC Consultants Ltd on the 28-29th July 2020. The benthic habitat was investigated by means of a grab sample survey with six samples undertaken within Grand Canal Docks and four samples within the Liffey Estuary. Additional data collected include water depth, salinity and temperature. The intertidal zone of the study area comprised the quay walls of the River Liffey along Sir John Rogerson's Quay. Species present were recorded.

A terrestrial alien invasive species survey was carried out along the pipeline route. The focus of this survey was species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (S.I. 477/2011) (as amended).

Aquatic habitats

The benthic grab samples taken in the Grand Canal Basin recorded a total of 22 species or higher taxa. All these species were freshwater species with the dominant species being the water slater *Asellus aquaticus* and the snail *Bithynia tentaculate.* Submerged aquatic plants recorded within the Basin include Nuttall's Waterweed (*Elodea nuttallii*), Rigid Hornwort (*Ceratophyllum demersum*) and Spiked Water-milfoil (*Myriophyllum spicatum*), with filamentous algae and the stonewort *Nitella flexilis* agg. also present. The Leech (*Erpobdella octoculata)* and oligochaete worms of the family *Naididae* were most common in the upper Grand Canal Dock, where the existing outfall is located. These species are tolerant to organic pollution and give an indication that the water from the stormwater outfall is high in organic pollution. This indication is further supported by the presence of filamentous algae. The Water Slater (*Asellus aquaticus)* is also tolerant to organic pollution.

The estuarine habitat of Lower River Liffey in the area of Sir John Rogerson's Quay is defined as SS.SMu.SMuVS Sublittoral mud in variable salinity (estuaries) (following the Marine Habitat Classification for Britain and Ireland (JNCC, 2015)). This habitat is defined by the fine, anoxic mud with some leaf detritus recovered by the benthic grab samples, and the varying salinity of the water. No fauna was recorded in the grab samples taken in this location. The lack of fauna in this area is likely to be the result of the challenging estuarine habitat, with its varying salinity, along with historic pollution of the fine sediment, resulting in anoxic conditions.

The intertidal habitat on the quay wall in the same area is defined as LR.LLR.FVS.Fcer *Fucus ceranoides* on reduced salinity eulittoral rock. This habitat is defined by the dominating species found on the wall, Horned Wrack (*Fucus ceranoides*) together with Green Algae (*Ulva* spp.). Fauna found on the wall include the Barnacle (*Austrominius modestus*) and the Sea Slater (*Ligia oceanica*). The species richness on the quay wall is low, which is expected from the estuarine location. This type of habitat is common within the River Liffey Estuary and other estuaries around Ireland with similar conditions.

The survey did not identify any protected species or habitats within the sites.

Alien Invasive Species

No terrestrial invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (S.I. 477/2011) (as amended) were recorded in the course of the survey undertaken by BEC Consultants Ltd.

Within the Grand Canal Dock, two aquatic invasive species listed on the Third Schedule were recorded, namely the Zebra Mussel (*Dreissena polymorpha*) and Nuttall's Waterweed (*Elodea nuttallii*). These are species for which there is a legal imperative to prevent their spread.

Water quality modelling will be undertaken. This is described in Chapter 4.3.4 Water Quality and Hydrology, Assessment methodologies.

The results of all these surveys will inform the biodiversity impact assessment of the EIAR.

A detailed desk study will be carried out to assist the assessment of potential impact on aquatic habitats and species.

4.2.4 Assessment methodologies

The methodology for the impact assessment will follow the guidance from the following documents:

- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, (CIEEM, 2018).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft) Environmental Protection Agency (EPA, 2017).
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009a).
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA, 2008b).

4.2.5 Mitigation measures

Where impacts are identified, detailed mitigation measures will be proposed. The significance of impacts will be assessed, and mitigation measures will be designed to reduce or remove the impacts.

The Construction Environmental Management Plan (CEMP) will include mitigation measures during the construction phase for run-off of silt and pollution and for mobilisation of sediment.

Measures to avoid the spread of invasive species recorded within the site will be adhered to, including stringent cleaning of equipment, machinery and PPE before entering the development site and again before leaving the development site.

An Appropriate Assessment Stage 2 Natura Impact Statement report will be prepared assessing the potential significant impact on European designated sites (Natura 2000 sites) and identify mitigation measures to avoid impact on these sites.

4.3 Water quality and hydrology

4.3.1 Receiving environment

It is proposed to discharge at to the River Liffey Estuary at Sir John Rogerson's Quay. The River is tidal at this point. The receptors in terms of water quality include the Basin of the Grand Canal Docks (during construction), and the River Liffey, three designated European sites including South Dublin Bay and River Tolka Estuary SPA, North Bull Island SPA, and North Dublin Bay SAC, and three proposed natural heritage areas (pNHAs).

The receptors in terms of hydrology and flood risk include the local businesses and residential properties in the Grand Canal Docks, which is situated in the catchment of the River Liffey.

4.3.2 Potential impacts

The potential impacts of the proposed development include a potential degradation of the water quality in the River Liffey as a result of moving the outfall of the Grand Canal Tunnel to Sir John Rogerson's Quay. A reduction in water quality in the River Liffey may lead to an impact on its Water Framework Directive Status. The water quality impacts may in turn have impacts on Biodiversity

There may be an increased risk to flooding as a result of the scheme if the works occur within a flood zone. Flooding may result in short term impacts primarily during the construction phase of the development.

There will be positive impact on the water quality within the Grand Canal Basin.

4.3.3 Data and surveys

Flow discharges and pollutant loads from the Grand Canal Tunnel will be determined. The characteristics of the receiving waters in the River Liffey will be assessed also, including the vertical velocity profiles and structure of salinity which will be a controlled factor of the advection and dispersion of the outfall plume with the tide.

Ireland's Catchment Flood Risk Assessment and Management (CFRAM) Programme will be accessed to determine whether the proposed development will occur within a flood zone.

4.3.4 Assessment methodologies

A water quality modelling exercise will be undertaken by the Danish Hydraulic Institute (DHI), which will detail flow discharges from the Grand Canal Tunnel and pollution loads of said discharge. Dilution rates in the River Liffey will be determined. The hydrodynamic model MIKE 3 Flow Model FM DHI will be used to investigate the potential impacts on the water quality status of the receiving waters.

An initial flood risk assessment has identified that a section of the proposed construction works will occur within a flood zone. Figure 4-1 below shows an extract of the CFRAM Liffey Tidal Flood Extent Map. It can be seen that a portion of the development to the north, the proposed outfall, will occur within the 0.1% AEP tidal flood event and is therefore located within **Flood Zone B**, where the risk of flooding is moderate.

However, as the development will be located underground it is not at risk to flooding nor will it have an adverse impact on flooding in the immediate vicinity. The proposed development will not be at risk of flooding in the operational phase. As the construction works are temporary in nature the risk of flooding during the construction phase is considered low.

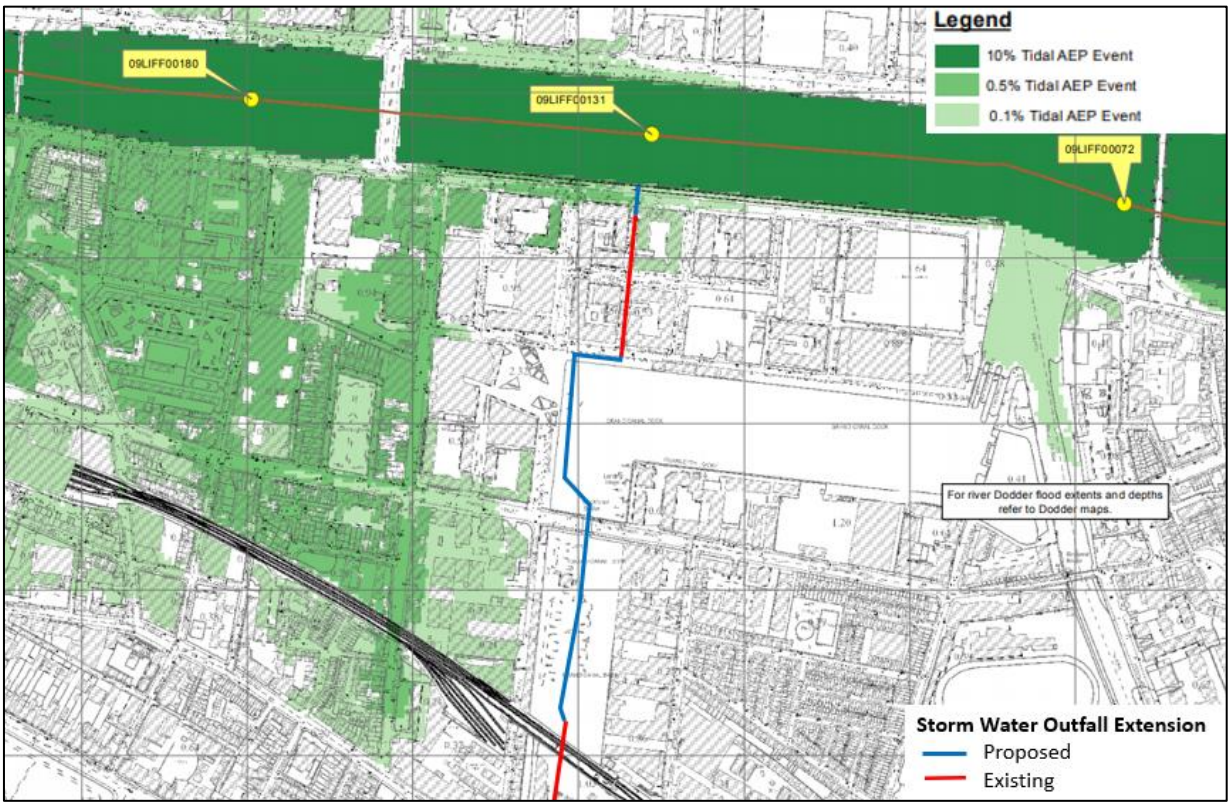

Figure 4.1 CFRAMS Tidal Flood Extent Map

4.3.5 Mitigation measures

The need for water quality mitigation measures will be identified following the assessment of discharge flow, quality and receiving water characteristics. Relevant mitigation measures, if required, will be detailed in the EIAR. Mitigation options will be limited as the discharge is from a storm sewer as opposed to a wastewater treatment plant where treatment of discharge is carried out.

During the construction phase, adequate flood resilient construction techniques should be incorporated to minimise the risk of impacts due to a flooding event.

4.4 Land, soils, geology and hydrogeology

4.4.1 Receiving environment

This chapter of the EIAR will address the likely significant impacts on land, soil, geology and hydrogeology during the construction and operation of the proposed development.

The proposed site encompasses a linear stretch of submerged pipeline within the Grand Canal Basin, a section of Hanover Quay, and Sir John Rogerson's Quay. The proposed development is entirely located within the Grand Canal Docks Strategic Development Area. This is a built up area, and the proposed works will interact with hardstanding road and pavement surfacing, the silt bed of the Basin, and the River Liffey.

The area is underlain by dark limestone and shale from the Lucan Formation (GSI, 1:100,000scale map, 2020). Historic site investigations indicate that the depth to rock is approx. -9mOD.

There are no designated geological sites in the area. The nearest site is The River Poddle (Site Code: DC011), which is located 1.8km west of the proposed development. This River flows South to North, through Dublin City and is mostly underground.

There will be no abstractions from or discharges to groundwater as a result of the proposed development. The Lucan Formation is classified as a locally import aquifer, which is moderately productive only in local zones. It should be noted that there are no groundwater users in the vicinity.

Groundwater will flow in a northly direction and discharge to the River Liffey as baseflow.

The groundwater vulnerability in this area is classified as low.

All soils within the construction area are considered contaminated.

4.4.2 Potential impacts

There are no discharges to or abstractions from groundwater involved as part of the proposed development. Impacts on the geological and hydrogeological environment will be minimal.

The potential impacts associated with construction phase include:

- The disposal of contaminated material from Hanover Quay, and Sir John Rogerson's Quay. This is addressed in Chapter 4.9 Waste Management.
- The disturbance of the silt bed of the Basin from lowering pipeline sections and construction of Transition Chambers.
- Surplus soil arising from earthworks and how it will be handled and disposed of or recovered.
- Risk of contaminating soils during construction.
- Contamination due to accidental spillages and fugitive emissions.
- The EPA radon mapping shows that the site is not located in a high radon area.

There are no identified potential impacts associated with operational phase.

At this stage, there are no significant impacts anticipated on the land, soils, and hydrogeological environments at the proposed site.

4.4.3 Data and surveys

There are no groundwater users downgradient of the development site. No surveys are recommended to support the assessment of impacts upon geology, and hydrogeology.

A desk study will be carried out to address the potential impacts upon land, soils and geology from the proposed development in both the construction and operational phases.

4.4.4 Assessment methodologies

The methodology for the assessment of impacts on geology and hydrogeology will be undertaken in accordance with the recommendations in "Guidelines for the Preparation of Soils, Geology Hydrogeology Chapters of Environmental Impact Statements", Institute of Geologists of Ireland, 2013, and "Geology in Environmental Impact Assessment Report – A Guide", Institute of Geologists of Ireland, 2002.

4.4.5 Mitigation measures

Where impacts are identified, detailed mitigation measures will be proposed. The significance of impacts will be assessed, and mitigation measures will be designed to reduce or remove the impacts.

4.5 Air quality and climate

4.5.1 Introduction

Relevant policy and legislation – air quality

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values are also known as "Air Quality Standards" and are health or environmental-based levels, for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set. Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011 (S.I. No. 180/2011), which incorporate EU Directive 2008/50/EC, which has set limit values for a number of pollutants. The limit values in relation to Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10} and $PM_{2.5}$) are applicable to the proposed development (see Table 4-1).

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for nuisance dust in respect of this development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (TA Luft, 2002), sets a maximum permissible emission level for dust deposition of 350 mg/(m^2*day) averaged over a one year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Heritage & Local Government apply the Bergerhoff limit value of 350 mg/(m^2*day) to the site boundary of quarries (DoEHLG, 2004). This limit value can also be implemented with regard to potential dust impacts from construction of the proposed development.

Table 4-1 Ambient Air Quality Standards 2011

Pollutant	Regulation	Limit Type	Value
Nitrogen Dioxide (NO2)	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m3
		Annual limit for protection of human health	40 µg/m3
Nitrogen Oxide (NOX)	2008/50/EC	Critical level for protection of vegetation	30 µg/m3 NO + NO2
Particulate Matter (as PM10)	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m3
		Annual limit for protection of human health	40 µg/m3
Particulate Matter (as PM2.5)	2008/50/EC	Annual limit for protection of human health	25 µg/m3

Relevant policy and legislation – climate

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002 (UN, 1997). For the purposes of the EU burden sharing agreement under Article 4 of the Doha Amendment to the Kyoto Protocol, in December 2012, Ireland agreed to limit the net growth of the six Greenhouse Gases (GHGs) under the Kyoto Protocol to 20% below the 2005 level over the period 2013 to 2020 (UN, 2012). The UNFCCC is continuing detailed negotiations in relation to GHG reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties to the Convention (COP25) took place in Madrid, Spain from the 2nd to the 13th of December 2019 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015 and is an important milestone in terms of international climate change agreements. The Paris Agreement is currently ratified by 187 nations and has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatons as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made on elevating adaption onto the same level as action to cut and curb emissions.

In order to reduce the risk due to climate change, National and European statutory bodies have set targets for future greenhouse gas (GHG) emissions. Ireland has signed up to several climate agreements including the EU 2030 Climate and Energy Policy Framework (EC, 2014) which aims to reduce GHG emissions by 40% compared with 1990 levels by 2030. The Climate Action Plan (CAP) (Government of Ireland, 2019), published in June 2019, outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas.

4.5.2 Receiving environment

Air quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2018*" (EPA, 2019). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2020).

As part of the implementation of the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), four air quality zones have been defined in Ireland for air quality management and assessment purposes. Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development is within Zone A (EPA 2020). The long-term EPA monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

With regard to NO_2, continuous monitoring data from the EPA at suburban Zone A locations in Ringsend, Dun Laoghaire, Swords and Ballyfermot show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 16 – 27 µg/m^3 in 2018. Sufficient data is available for the stations in Ballyfermot, Dun Laoghaire and Swords to observe the long-term trend since 2014 (EPA, 2019) with results ranging from 13 – 19 µg/m^3 and few exceedances of the one-hour limit value. In addition, continuous monitoring data from the EPA at urban Zone A locations in Winetavern Street and Rathmines show that annual concentrations of NO_2 were 29 µg/m^3 and 20 µg/m^3 at both locations respectively in 2018. Based on the results at suburban and urban Zone A locations, an estimate of the background NO_2 concentration in the region of the proposed development is 22 µg/m^3.

Continuous PM_{10} monitoring carried out at the Zone A locations of Winetavern Street, Rathmines, Phoenix Park and Dún Laoghaire showed 2014 – 2018 annual mean concentrations ranging from 9 - 15 µg/m^3, with at most 5 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m^3 (35 exceedances are permitted per year). Based on the EPA data a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 15 µg/m^3.

Continuous $PM_{2.5}$ monitoring carried out at the Zone A location of Rathmines showed $PM_{2.5}/PM_{10}$ ratios ranging from 0.60 – 0.68 over the period 2014 – 2018. Based on this information, a conservative ratio of 0.7 was used to generate a background $PM_{2.5}$ concentration in the region of the proposed development of 10.5 µg/m^3.

Climate

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details emissions up to 2018 (EPA, 2020). The data published in 2020 states that Ireland has exceeded its 2018 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by 5.59 Mt. For 2018, total national greenhouse gas emissions are estimated to be 60.93 million tonnes carbon dioxide equivalent (Mt CO_2eq). This is 0.1% lower (0.07 Mt CO_2eq) than emissions in 2017. Agriculture is the largest contributor in 2018 at 33.9% of the total, with the transport sector accounting for 20.1% of emissions of CO_2.

The EPA 2019 GHG Emissions Projections Report for 2018 – 2040 (EPA, 2019) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 – 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 10 Mt CO_2eq under the "With Existing Measures" scenario and 9 Mt CO_2eq under the "With Additional Measures" scenario.

Sensitive receptors

Sensitive receptors in the vicinity of the proposed development have the potential to experience air quality and climate related impacts. For the purposes of this assessment, high sensitivity receptors are

regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. There are a number of medium to high sensitivity receptors in close proximity to the proposed development. There are several apartment blocks and office buildings within 50m of the proposed works along Grand Canal Quay, Barrow Street, Hanover Quay and Sir John Rogerson's Quay.

4.5.3 Potential impacts

Air quality

During the construction phase potential impacts to air quality will occur as a result of construction dust emissions and the potential for nuisance dust. Excavation activities, soil movement, backfilling and construction works are likely the main sources of dust emissions, Impacts are likely to be exacerbated in dry and windy weather. According to the Institute of Air Quality Management guidance dust soiling impacts can occur within 350m of a construction site (IAQM, 2014), therefore, sensitive receptors which fall within this distance of construction activities will be most at risk. Emissions from Heavy Goods Vehicles (HGVs) and site plant and machinery may give rise to short term air pollutant emissions such as nitrogen oxides and particulates (PM_{10} and $PM_{2.5}$).

Impacts to air quality during operation are not predicted as the pipeline will be underground with no air pollutant emissions.

Climate

Potential impacts to climate can occur as a result of GHG emissions from construction traffic and construction plant and machinery potentially causing climate change. Due to the small scale of the development GHG emissions are not predicted to significantly impact Ireland's ability to meet its annual climate targets. The impact of this will be assessed fully in the EIAR.

Impacts to climate are not predicted during operation as the pipeline will be underground with no likely sources of CO_2 or other GHG emissions.

4.5.4 Assessment methodology

The air quality and climate assessment will be carried out in accordance with the following guidance and established best practice, and will be tailored accordingly based on professional judgement and local circumstance:

- EPA Guidelines on the Information to be Contained in the Environmental Impact Assessment Reports - Draft 2017.
- EPA Advice Notes for Preparing Environmental Impact Statements - Draft 2015.
- Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014).
- Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (TII, 2011).
- UK Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment, Section 3 Environmental Assessment Techniques, *Part 1 LA 105 Air quality* and *Part 14 LA 114 Climate* (UK Highways Agency, 2019).

In line with the above guidance, the assessment will cover potential impacts to air quality and climate, it will describe the existing conditions and the likely potential impacts associated with the construction and operation of the proposed development. The impact assessment process will involve:

- Assigning the receptor sensitivity.
- Identifying and characterising the magnitude and significance of any potential impacts.
- Incorporating measures to avoid and mitigate (reduce) these impacts.
- Assessing the significance of any residual effects after mitigation.

The air quality assessment will include a review of the relevant standards and legislation, a review of background ambient air quality data from the EPA and establishment of the baseline environment in the region of the proposed development. The sensitivity of the surrounding environment to air quality impacts will be established based on the IAQM guidance and the potential impacts from the construction and operation of the proposed development will be identified. The climate assessment will include a review of all relevant standards and legislation, a review of the existing climate baseline and identification of the potential climate related impacts as a result of the construction and operational phases of the proposed development.

4.5.5 Mitigation measures

A series of mitigation measures such as speed restrictions and water misting etc. to minimise any foreseen impacts for both the construction phase and operational phase of the project will be proposed as required as part of the EIAR. The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, a dust management plan will be formulated by drawing on best practice guidance from Ireland, the UK and USA.

The contractor appointed to the construction of the proposed development will be required to comply with these measures. The mitigation measures will ensure no significant impacts to sensitive receptors occur.

4.6 Noise and vibration

4.6.1 Receiving environment

The receiving environment is a heavily populated urban area. The main sources of noise would be road traffic, with the heaviest volumes on the Ringsend Road. Traffic restrictions and pedestrianisation of some areas around the theatre also mean that a good deal of the area would not be exposed to high levels of road traffic noise. In recent times, the area has been heavily developed and construction noise would often form a dominant feature of the noise climate.

The primary noise sensitive receptors are therefore expected to be residential apartments, which are located in close proximity to the proposed development. Additional noise sensitive receptors exist in the form of the Marker Hotel and the Grand Canal Theatre.

The primary vibration sensitive receptors adjacent the stormwater outfall would include residential dwellings on Hanover Quay and Asgard Road. No protected structures are close proximity to the proposed SWO path.

4.6.2 Potential impacts

Potential construction phase impacts

As with most projects of this type the greatest potential for noise and vibration impact will arise during the construction phase. During this period, potential noise and vibration impacts will arise from activities such as:

- Breaking of existing hardstanding including footpaths and roads.
- Dredging or removal of material from dock prior to drainage.
- Pumps associated with drained work areas within the Grand Canal Basin.
- Driving of sheet piles to form temporary cofferdams in the Basin and at the outfall structure.
- Crane operation hoisting pipe sections into place.
- Installation of temporary work areas and compounds.
- HGV movement including removal of spoil and excavated or dredged material.
- Operation of hand tools and small machinery (grinders, SDS drills, impact drivers and generators).

In order to minimise the impact of noise and vibration during the construction phase a series of mitigation measures will be included in the EIAR and will be implemented during the construction phase of the

project. Examples of these will be the selection of plant with a low inherent potential for noise/vibration generation, limiting hours during which noisy/vibratory activities are permitted and monitoring of noise/vibration levels at sensitive locations in order to demonstrate compliance with relevant noise/vibration limits.

Potential operational phase impacts

The only mechanical plant that may be required is a small motor to operate the penstock gate. Otherwise noise impacts during the operational phase of the development would be expected to be insignificant with the exception of works associated with maintenance of the outfall which may include movement of manhole covers and occasional operation of grab arm HGV to remove trapped detritus from the outfall chamber.

4.6.3 Data and surveys

In order to characterise the existing noise environment in the vicinity of the proposed development, baseline noise monitoring surveys will be undertaken in the vicinity of the nearest noise sensitive receptors. The proposed baseline surveys will enable a full and proper impact assessment of the project to be undertaken and to enable suitable mitigation to be designed as needed.

4.6.4 Assessment methodology

It is proposed that an assessment of noise and vibration will be carried out in accordance with the following guidance and tailored accordingly based on professional judgement and local circumstance:

- Protection of the Environment Act 2003, and associated Regulations.
- Dublin Agglomeration Noise Action Plan (December 2018 – July 2023).
- Dublin City Council's Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition.
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.
- BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration.
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings.

The noise and vibration assessment will adhere to the following methodology:

- Confirm specific noise and vibration sources relevant to the proposed development.
- Establish existing noise levels at noise sensitive receptors in the vicinity of the proposed development.
- Assess potential noise and vibration impacts of construction activities.
- Assess potential noise impacts of operational phase plant processes.
- Assess potential impacts of additional road traffic associated with the proposed development during the construction and operational phase.

The assessment will take account of Noise Sensitive Locations (NSL's) relevant to the proposed development. Sensitive receptors will comprise places where it would be reasonable to expect people to be exposed to local noise and vibrations. The EPA NG4 definition of an NSL will be used in the assessment, as reproduced below:

> *NSL – any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels :*

The complete list of noise/vibration sensitive receptors within the vicinity of the proposed development will become clear once the final site and route options are selected, thus informing the full study area for the EIAR. A series of mitigation measures to minimise any foreseen impacts for both the construction phase and operational phase of the project will be proposed as required as part of the EIAR.

4.6.5 Mitigation measures

The EIAR will outline any required mitigation measures which will need to be incorporated during the design process. Operational design criteria for the appointed contractor will incorporate noise and vibration limits and standard mitigation measures as will be outlined in the EIAR.

4.7 Traffic and transport

4.7.1 Receiving environment

The principal receptors in relation to traffic issues are:

- The local residents (nuisance, disruption, noise and air quality).
- Neighbouring developments and businesses.

The traffic associated with the proposed Grand Canal Storm Water Outfall Extension will comprise construction traffic only and will have no impacts during the operational phase.

4.7.2 Potential impacts

The areas to be examined for potential impacts include changes in traffic patterns during the construction phase due to possible road closures and increased traffic volumes associated with construction activity.

4.7.3 Data and surveys

Traffic counts will be carried out at junctions on the surrounding road network (i.e. along Grand Canal Quay, Pearse Street/Ringsend Road, Grand Canal Street, Forbes Street, Hanover Quay, and Sir John Rogerson's Quay) during morning and afternoon peak periods to determine current traffic volumes.

4.7.4 Assessment methodology

Road junctions will be modelled using industry standard computer models (e.g. PICADY, OSCADY and ARCADY by TRL) using the survey results as baseline inputs. Modelling will look at peak hour capacities, queuing, and delays. Based on the survey results, a competent traffic expert will undertake a traffic impact assessment in terms of the existing road network and following consultation with the Roads and Traffic Department of Dublin City Council. The impact of the change in traffic volume and patterns will be assessed on the basis of the light/moderate increase in the traffic volume and an overall assessment will be made of the temporary construction phase impacts.

4.7.5 Mitigation measures

A Preliminary Traffic Management Plan, including mitigation measures (e.g. restrictions during peak commute hours) will be developed for the project's construction stage in consultation with the Roadworks Control Unit and the Roads and Traffic Department of Dublin City Council by the PSDP and a Construction Stage Traffic Management Plan will be prepared by the PSCS when appointed.

4.8 Archaeology and cultural heritage

4.8.1 Receiving environment

The study area is located at St. Marks, Dublin South City (ITM north part of the proposed works 717399, 734316, southern extent 717287, 733672, see Figure 4.2). The Grand Canal Docks, including Grand Canal Docks Quay, Charlotte Quay, Hanover Quay/ Britain Quay, and the River Dodder are located within a Conservation Area as marked on Map E of the Dublin City Development Plan 2016-2022.

The north part of the study area, where an outfall structure is proposed at Sir John Rogerson's Quay, is located within the banks of the River Liffey, that are within the Dublin City Zone Of Archaeological Potential: DU018-020, and Sir John Rogerson's Quay DU018-020201 - a recorded monument listed in the Record of Monuments and Places for County Dublin published in 1998. It is also listed in the National

Inventory of Architectural Heritage (NIAH) (Reg. No 50020465), with Granite ashlar quay walls, stone setts, mooring rings, steps, bollards, lamp standards and machinery (RPS 7542).

The environs of the study area are rich in cultural heritage structures, including Recorded Monuments, Protected Structures, heritage structures listed in the National Inventory of Archaeological Heritage, structures listed in Dublin City Industrial Heritage Record and shipwrecks listed in the National Wreck Inventory.

Record of Monuments and Places (RMP) and Sites and Monuments Record (SMR)

The SMR lists all known archaeological sites and monuments in each county with accompanying maps locating these sites. All sites included in the RMP are protected under the National Monuments Acts (1930–2004). There are several monuments listed in the RMP and SMR in the environs of the study area in addition to the Dublin City Zone Of Archaeological Potential DU018-020, and Sir John Rogerson's Quay DU018-020201-. These include:

- Dublin North City, Graveslab DU018-020707-.
- Dublin South City, Settlement Cluster DU018-053----.
- Dublin North City, Quay DU018-020564-.
- Dublin South city, Glass works DU018-020325-.

The only RMP within the works area itself is Sir John Rogerson's Quay DU018-020201.

Record of Protected Structures (RPS), National Inventory of Architectural Heritage (NIAH) and Dublin City Industrial Record (DCIR)

The Dublin City Development Plan 2016-2022 contains a list of Protected Structures for the City and lists cultural heritage sites, buildings of historic, architectural, cultural, scientific, and/ or artistic interest. These are protected by the Local Government (Planning and Development) Act 1999 and the Planning and Development Act 2000 (Part IV Architectural Heritage). The NIAH is a state initiative and contains a record and evaluation of the post-1700 architectural heritage of Ireland, as an aid for the protection and conservation of the built heritage. It provides the basis for recommendations by the Minister for Culture, Heritage, and the Gaeltacht to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

DCIR highlights structures requiring statutory protection, makes recommendations on conservation of streetscapes, and raises awareness of the industrial heritage of the city.

Listed below are Protected Structures and structures/ sites of Architectural and Industrial importance located within and in the environs of the study area:

- Grand Canal Docks/ Britain Quay basin that is a part of a triple sea-locks (RPS 987, NIAH Reg No. 50020499, DCIR structure).
- Railway Bridge (RPS No. 883, DCIR structure).
- Old Malt house (RPS 3277).
- Victoria Draw Bridge/ MacMahon Bridge (DCIHR structure).
- Malt house (RPS 3513).
- Diving Bell (NIAH Reg. No. 50020468).
- Boland's warehouse/ mill at lifting bridge (RPS 7377).
- House/ offices, including railings and steps (RPS 483, 484).
- Two-storey brick gables of warehouses (RPS 485).
- Three-storey warehouse with oriel window (RPS 486).
- Five-storey warehouse/ mill gable (RPS 487).
- Four-storey brick warehouse/ mill (RPS 488).
- IDA Enterprise Centre (RPS 3278).
- Alliance Gas works Chimneystack (RPS 8717, NIAH Reg No. 50020490).
- 2 Sir John Rogerson's Quay Façade (RPS 7543).

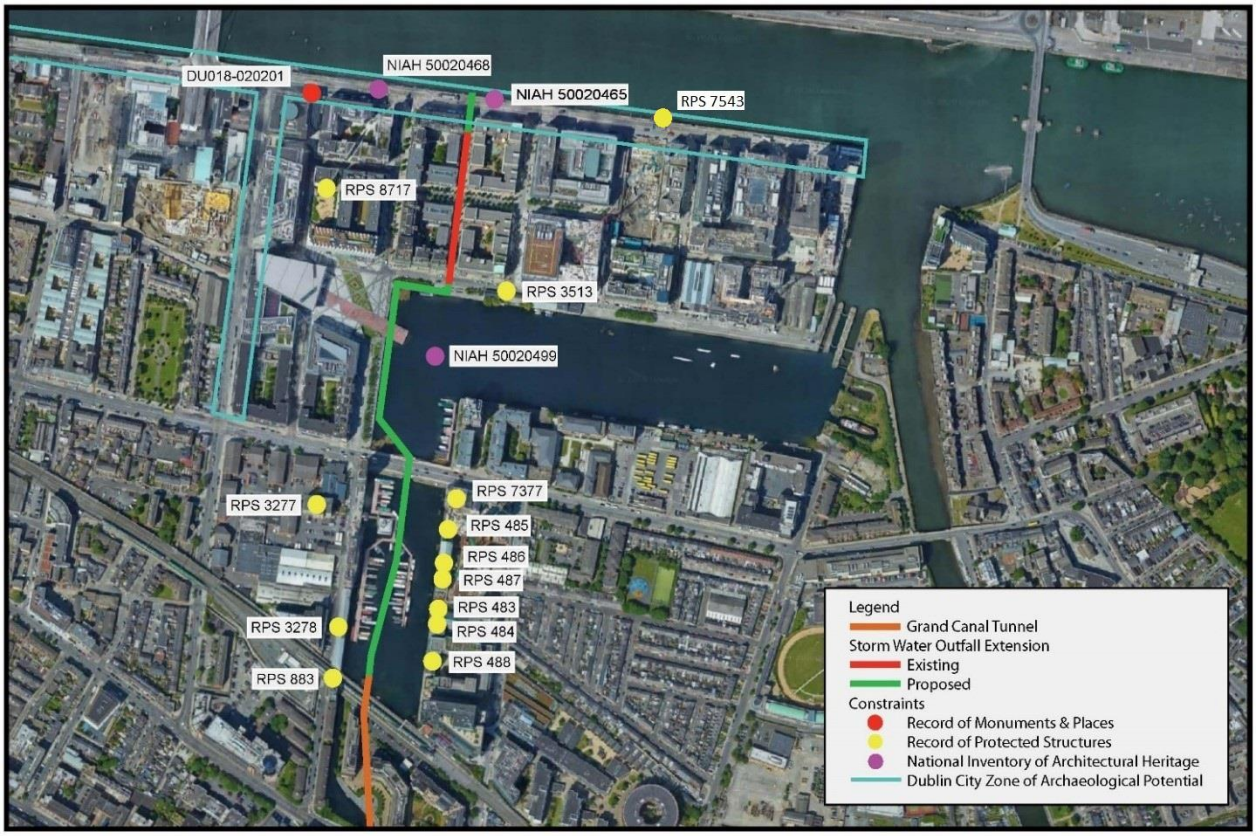

Figure 4.2 Location of the site, nearby Recorded Monuments, Protected Structures, NIAH structures and extent of the Dublin City Zone of Archaeological Potential

Shipwrecks Inventory

The Shipwreck Archive consists of over 18,000 paper files that hold information relating to each individual wrecks recorded in the Wreck Inventory of Ireland Database (WIID) with known location. This data set does not define the level of legal protection that might be afforded any individual wreck under the provisions of the National Monuments (Amendment) Acts (1987 and 1994); however, all wrecks that are over 100 years old and wrecks subject to an underwater heritage order are protected by Section 3 of the National Monuments (Amendment) Act 1987.

The following is a list of wrecks whose place of loss is specifically recorded as the River Liffey with the Hibernia that was burnt in 1776 being the earliest recorded. The Commons Sessional Papers (CSP) report on the majority of wrecks and though brief in nature include the name of the captain and occasionally the circumstances of the wreck and related information (e.g. whether cargo, crew or passengers were lost).

Listed below are the known Shipwrecks in the River Liffey Area:

- Argo, wooden fishing smack of Dublin, opposite the old coast guard station at Ringsend, River Liffey, casualty in 1892.
- Argo, steam ship of Bristol, Around 20ft from Quay Wall, River Liffey, stranded and lost in 1908.
- Britannia, vessel, Between the walls at Dublin, hit an anchor 1774.
- Carolina, galliot of Oporto, River Liffey, sank in 1799.
- Commerce, vessel, Dublin River, sank in 1811.
- Edith, passenger steam vessel, Between the city of Dublin company's Jetty and breakwater head, sank in 1875.
- Emma, Smack with cargo, Eden Quay/Sir John Rogerson's Quay, damaged, sank in 1851.
- Henry, Brig of Liverpool, south wall, wrecked in 1798.
- Hibernia, vessel, River Liffey, burnt, lost 1776.
- James and Ann, vessel, Pigeon Hole, 1812.

- Jessie Maria, Whitehaven vessel, Dublin/Sir John Rogerson's Quay, burnt in 1851.
- Lanston, Portsmouth vessel, Dublin River, lost 1812.
- Leonard, vessel, Dublin, struck by seamer in 1853.
- Maria Carolina, cargo vessel, entrance to Dublin River, sank 1799.
- Mermaid, wooden yacht/cutter, Abreast of No. 2 buoy, river Liffey, sank in 1892 .
- Newport, Montrose schooner, River Liffey sank by Hebden in 1851.
- Nosha Squera de Bonamo, Brig of Oporto, Dublin River, sank in 1798.
- Pelican, wooden smack of Dublin, Ringsend, River Liffey,burnt in 1889.
- Providence, vessel, Behind piles at Dublin, lost 1771.
- Rat, sailing boat, Opposite Halpins Pond, River Liffey, capsized in 1891.
- Slade, brig of rye, River Liffey lost in 1799.
- Times, Steamer, Off Pigeon House, 1851.
- Times, Dublin vessel, River Liffey, lost in 1853.
- Thomas, wooden cutter, near the Horse Shoe Light, The River Liffey, casualty in 1896.
- Unknown, two ships, Ringsend, wrecked 1760s.
- Unknown, vessel, Dublin River, sank.
- Usk, ship, vessel, Dublin River, stranded 1856.
- William, vessel, Dublin River, lost 1812.

National Museum of Ireland Topographical Files

The National Museum of Ireland Topographical Files is the national archive of all known antiquities recorded by the National Museum. The files contain objects reported from 1928, and the computerised database is of finds from the 1980's onwards. A total of 26 artefacts have been listed in the topographical files for the River Liffey and its associated quay structures. These range from early Bronze Age to 19th century material.

Listed below are artefacts listed in the Topographical Files at the National Museum of Ireland in the environs of the study area:

- Glass Bead, River Liffey, 4042:WK428, found with other beads and an iron sword pommel.
- Glass Bead, River Liffey, 4041:WK427, found with other beads and an iron sword pommel.
- Glass Bead River Liffey 4034:WK420, found with other beads and an iron sword pommel.
- Glass Bead River Liffey 4034:WK419, found with other beads and an iron sword pommel.
- Glass ring River Liffey 4031:WK417, found with other beads and an iron sword pommel.
- Glass Bead River Liffey 4030:WK416.
- Glass Bead River Liffey 4029:WK415.
- Iron sword, may be Sudanese, River Liffey at Arran Quay, 1964:1. Found in the bed of the River Liffey, about 10ft out from the edge at Arran Quay. Dating from fourteenth to nineteenth century. Length 100cm, length of blade 88cm, width across cross-guard 15.5cm. The blade is long tapered and flexible tapering to a blunt rounded point.

Previous Archaeological Assessments in relation to the proposed development

The study area was subject to an Archaeological Appraisal by Dr Annaba Kilfeather of Margaret Gowen & Co Ltd in 2006. This recommended the following:

- Archaeological monitoring should be undertaken during the construction.
- Consultation with the conservation officer from Dublin City Council, in relation to extracted stone material reuse.
- The cobbling, metal tracks, stone sets and bollards to be impacted upon should be recorded prior to their removal, retained, and re-established where possible.
- Consultation should be made with the Underwater Unit of the DoEHLG (current Underwater Archaeology Unit AUA).

Subsequently, the study area was the subject of an underwater archaeological assessment undertaken in 2008 within the Grand Canal Docks and Quays, Sir John Rogerson's Quay, and River Liffey by Niall Brady of The Archaeological Diving company Ltd (ADCO) under Licence (07D061, 07R249). No

archaeologically significant materials/ structures were identified. It recognized the impact the development will have on Sir John Rogerson's Quay, as the removal of the granite blocks shall be necessary to insert the storm water outlet pipe. It concluded that the impact the proposed development will have on the wall will be significant and permanent. It was noted that although the works did not identify any features or deposits of archaeological significance, the possibility of encountering archaeological finds during works should not be dismissed, and recommended:

- Licenced archaeological monitoring should be undertaken during removal of all riverbed/ canal-bed material.
- Photomosaic/ drawn elevation of the impact area along Sir John Rogerson's Quay should be made prior to works by suitably qualified archaeologist and a certified site surveyor.

Consultation with the Department of Culture, Heritage, and Gaeltacht took place in 2020. This noted the site lies within the archaeological potential of the historic quays of the River Liffey (DU018-020201), and an area of high underwater archaeological potential, as numerous wrecks are listed within the Wreck Inventory of Ireland database (WIID) in the area. The Department recommended that an updated underwater archaeological impact assessment report be prepared for the scheme. This survey has been commissioned.

4.8.2 Potential impacts

The potential for direct impacts on archaeology and cultural heritage is considered high as the application area is within the Dublin City Zone Of Archaeological Potential (DU018-020). The outfall extension will impact Sir John Rogerson's Quay (DU018-020201) which is a Recorded Monument and is also listed in the National Inventory of Architectural Heritage structure (NIAH Reg. No 50020465). The Granite ashlar quay walls, stone setts, mooring rings, steps, bollards, lamp standards, and machinery is a Protected Structure (RPS 7542). Furthermore, the Grand Canal Docks Basin, including Grand Canal Docks Quay, Charlotte Quay, Hanover Quay/ Britain Quay, and the River Dodder are located within a Conservation Area as marked on Map E of the Dublin City Development Plan 2016-2022.

4.8.3 Data and surveys

An updated Archaeological Assessment of the scheme is required in terms of cultural heritage. This will principally involve a desk top review of currently available data and previous field assessments of the site and surrounding areas. This will allow for identification of likely significant impacts on archaeology, architectural & cultural heritage in the area, and will also include an updated underwater archaeological impact assessment report as recommended by the Department of Culture, Heritage, and Gaeltacht during consultation in 2020.

4.8.4 Assessment methodologies

The National Monuments Acts 1930-2014 and the Planning and Development Act 2000 (as amended) are the principal legislative instruments in the protection of archaeological, architectural, and cultural heritage in Ireland. An updated underwater archaeological impact assessment and dive survey will be carried out as part of the EIAR. A site inspection and revised archaeological assessment report will also be prepared following a detailed review of all existing datasets for the site and its hinterland. These revised reports will form the basis for the preparation of the Archaeology & Cultural Heritage Chapter of the EIAR.

4.8.5 Mitigation measures

Due to the potential significant and permanent impact of the proposed works on cultural heritage, the following mitigation measures will be included in the final EIAR:

- Archaeological monitoring of all excavation and dredging works along the route.
- A detailed pre-construction survey of the location of the outfall at Sir John Rogerson's Quay.
- Additional further mitigation measures may be included following completion of the Archaeological Assessment and Dive Survey.

4.9 Waste management

4.9.1 Receiving environment

The construction works will involve tunnelling and open trench excavation on Hanover Quay and Sir John Rogerson's Quay. There is already a culvert underneath Asgard Road, and this will not be affected.

Approximately 3,900m^3 of waste will be removed. It is expected that a large portion of this will be hazardous waste. The presence of contaminated material was confirmed from a campaign of site investigations between 1996-2008.

4.9.2 Potential impacts

The potential impacts associated with construction phase include:

- Spillage of contaminated material on land and in the nearby waters of the River Liffey and the Basin of the Grand Canal Docks.

The potential impacts associated with the operation phase include:

- None identified.

Waste generated from the works is not likely to result in a significant impact on the receiving environment given that standard best practice guidelines and procedures are followed.

4.9.3 Data and surveys

A desk study will be carried out to address any potential impacts associated with waste arising from construction works.

All material will be treated as contaminated material and no additional surveys will be required to confirm this.

4.9.4 Assessment methodologies

Actions regarding waste material and removal will be undertaken as per Guidelines for the Management of Waste from National Road Construction Projects (NRA, 2014).

4.9.5 Mitigation measures

Management Plans including method statements will be developed for excavations and construction activities that may encounter contaminated or hazardous material.

Waste material arising from construction will be sent to a suitably licenced waste facility.

4.10 Material assets

4.10.1 Receiving environment

Material assets are resources that are valued and intrinsic to places. These may include archaeology and cultural heritage, properties, utilities, and natural resources. Some of these aspects are discussed elsewhere in this Report.

4.10.2 Potential impacts

The potential impacts associated with construction phase include:

- Damage to utilities during digging on Hanover Quay and Sir John Rogerson's Quay.
- Damage to the MacMahon Bridge and services that cross beneath it.

- Damage to the resource that is the Grand Canal Docks by way of amenity for the general public and also mooring for nautical vessels and houseboats.

The potential impacts associated with the operation phase include:

- Reduction of water quality within the River Liffey affecting the amenity use of the receiving water.
- Positive impact on the water quality with the Grand Canal Basin improving the amenity value.

4.10.3 Data and surveys

Consultation will take place with the relevant utilities to determine the exact location, depth, and properties prior to commencement of works. Utility providers will be consulted well in advance and provided with design drawings to determine the extent of their utilities. If present, they may be required on site to monitor the works.

4.10.4 Assessment methodologies

The assessment of material assets will involve a desk study to identify properties, utilities, resources, and amenities etc. that may be affected by the proposed development. Consultation will be made with stakeholders and potential utilities providers in the local area.

4.10.5 Mitigation measures

Mitigation by avoidance will be the primary mitigation measure implemented during the proposed development. This will be applied to avoidance of utilities such as underground services and pipelines, the properties of Gas Networks Ireland (GNI), ESB Networks, Irish Water, Virgin Media etc.

Consultation will be made with utility providers to determine the location of services prior to commencement of works.

Management plans including method statements and risk assessments will be developed for excavations in proximity to underground utilities.

4.11 Landscape and visual impact

4.11.1 Receiving environment

Grand Canal Dock and the surrounding areas contain a number of sensitive landscape and visual receptors which could be impacted by the proposed development. These include a number of existing landmarks and vistas, as well as protected structures and recreational amenities.

The land around the Grand Canal Basin contains a mix of new residential and office developments, alongside older residential and industrial buildings. Some of these older structures are protected, such as the Boland's Mill site on the eastern edge of the Basin, and some warehouses along Hanover Quay and the locks at the entrance to the River Liffey. The Basin itself is significant as a place for water-based recreation.

The area contains numerous landmarks and vistas, which were outlined in the North Lotts and Grand Canal Dock SDZ Planning Scheme (DCC, 2014) and are shown in Figure 4.3. One such landmark is the Alto Vetro Tower, located on the western edge of the Basin, which can be viewed from a number of locations around the area. Another important vista is from the Bord Gáis Energy Theatre plaza eastwards to the Poolbeg Chimneys. In addition to these, the buildings lining the quays enjoy views over the Basin itself.

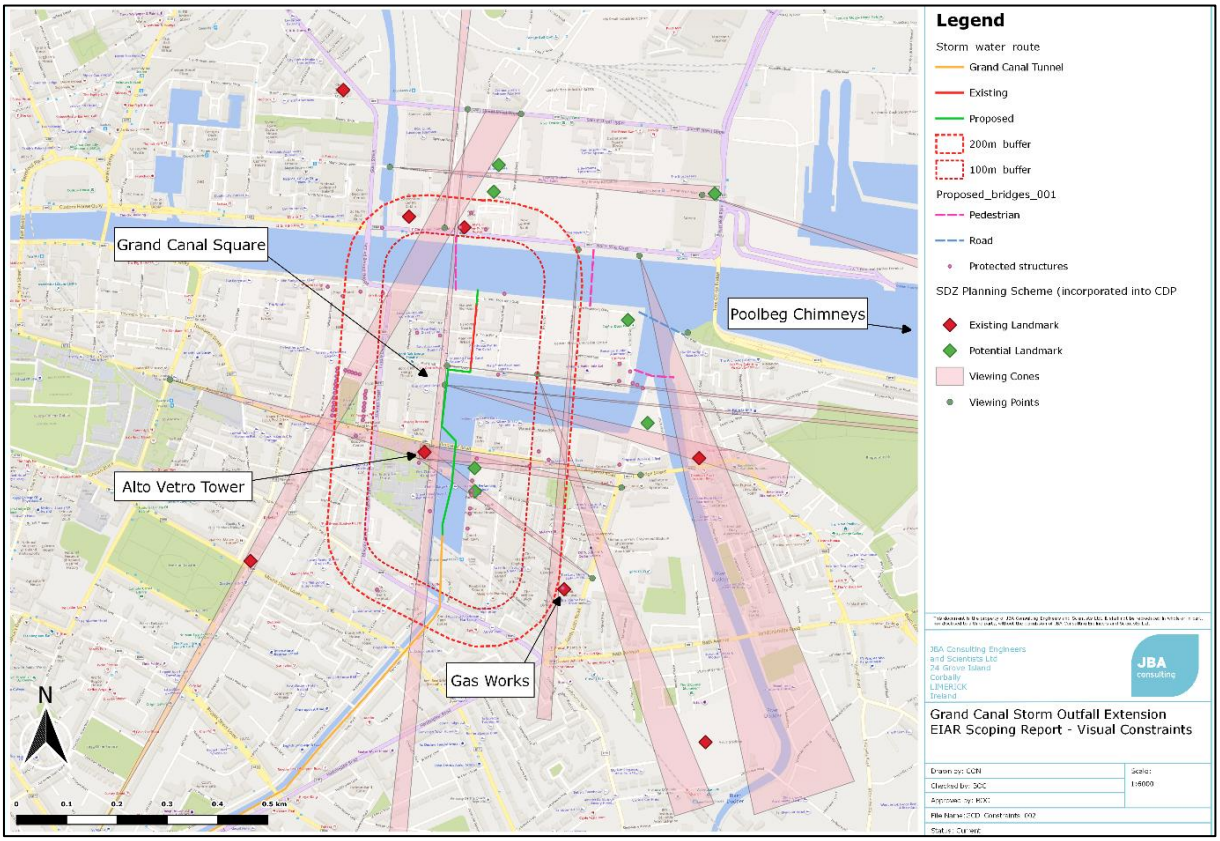

Figure 4.3. Visual Constraints

The plaza at the Bord Gáis Theatre is an important public space in the area (Figure 4.4). The zoning objective for it and the quays along the basin is Z9: "To preserve, provide and improve recreational amenity and open space and green networks" (DCC, 2016).

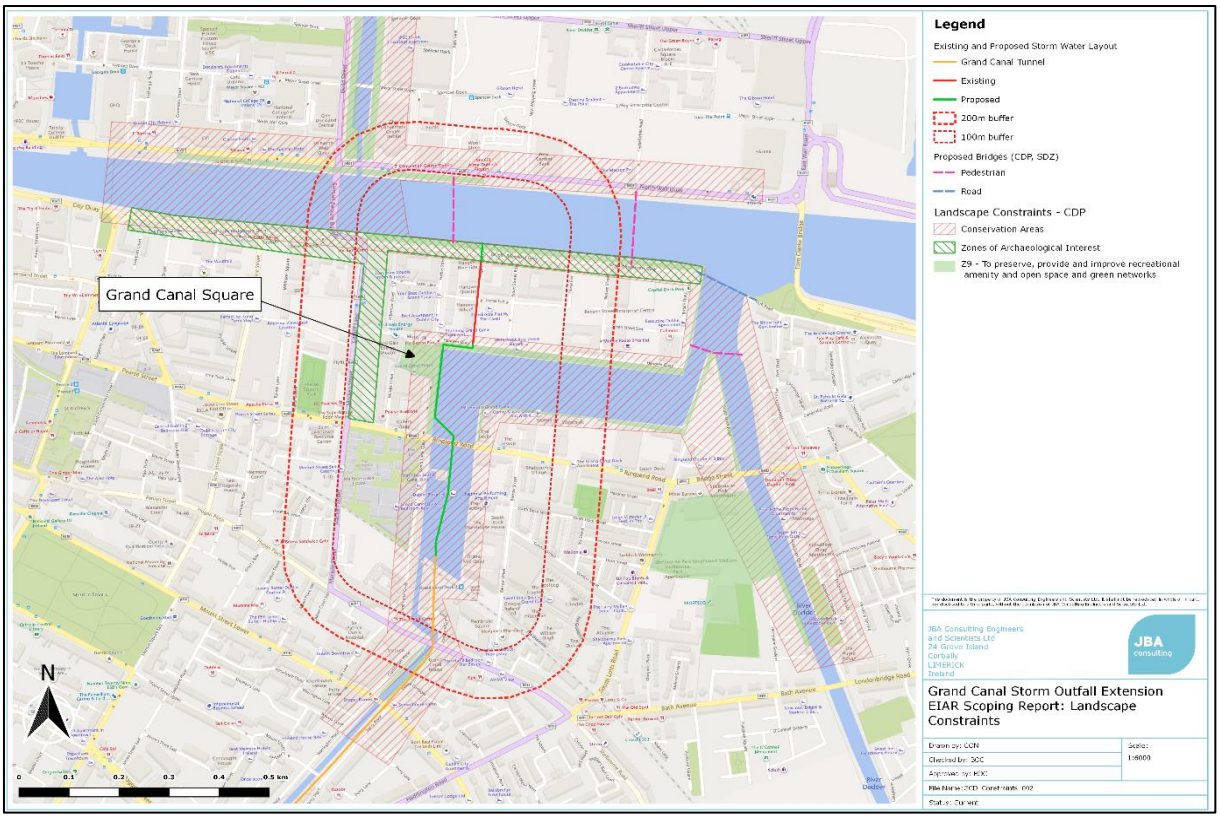

Figure 4.4. Landscape Constraints

4.11.2 Potential impacts

The potential impacts associated with the construction phase include:

- Temporary loss of visual amenity along Grand Canal Quay, due to construction works including the construction of transition chambers and use of cofferdams and pumping in parts of the basin. Impacts may be most prominent in proximity to where Transition Chambers Nos. 2 and 3 are set to be locate Infrastructure associated with the cofferdams in particular could impact the vistas located along this stretch.
- Temporary negative impacts on the public space zoned as Z9 at the Bord Gáis Theatre Plaza.
- Temporary negative affects to streetscape and access along Hanover Quay and Sir John Rogerson's Quay resulting from excavation of the roadways.
- Temporary negative impacts on residents and users of surrounding buildings, depending on their existing view of the Basin.
- Temporary negative effects on boat residents and recreational users within the Basin.

The potential impacts associated with the operation phase include:

- An impact on views of Sir John Rogerson's Quay from North Wall Quay due to the new outfall structure.
- A change in the quality of the views of the southern end of the basin, resulting from the addition of Transition Chamber No. 1 where the existing outfall is currently situated.

4.11.3 Data and surveys

Site walkovers will be conducted in order to assess the current setting and potential impacts of the development. Other data will be collected from the Dublin City Development Plan (DCC, 2016) and the North Lotts and Grand Canal Dock SDZ Planning Scheme (DCC, 2014).

4.11.4 Assessment methodologies

The methodology used will follow that outlined in "Guidelines for Landscape and Visual Impact Assessment - Revision 3" (GLVIA3) published by IEMA and the Landscape Institute.

4.11.5 Mitigation

All elements of streetscape will be reinstated to their original state after construction to reduce permanent impacts.

The design of the outfall on Sir John Rogerson's Quay will consider the visual impact of the structure, in particular from across the River Liffey on North Wall Quay. It should be noted that the 6.5m diameter outfall structure will be located below the mean high water springs (MHWS), and the top of the structure will be positioned at 0mOD (ordnance datum). There is potential to have positive long term impact through removal of existing outfall structure which is of poor visual quality.

The design of the above water sections of Transition Chamber No. 1 will consider the impact on views from adjacent visual receptors.

The Construction and Environmental Management Plan (CEMP) will include measures to screen the cofferdams and associated site works in order to reduce their visual impact while construction is taking place.

4.12 Interactions

The interactions between the above aspects will be assessed where appropriate.

4.13 Cumulative impacts.

The cumulative impacts of the proposed development together with other existing and proposed projects will be addressed. The proposed projects that will be considered are generally those that are "committed developments", i.e. those that have received planning permission or and in the process of applying for planning permission. Publicly available information will be utilised to make educated predictions of the potential for likely significant impacts.

Known projects/ plans that will be included in the EIAR and NIS for the assessment of cumulative/ in combination impacts include:

- The North Lotts and Grand Canal Planning Scheme, 2013.
- Dublin City Development Plan, Strategic Development regeneration Area 6 (SDRA6).
- The Ringsend Wastewater Treatment Plant Upgrade.
- The Dublin Eastern Bypass project.
- The South Campshire Flood Defence Wall project.
- Dublin City Council plan for replacement of services along the MacMahon Bridge.
- Blood Stoney Bridge project.
- Change of use of protected structure (RPS 487) at Dock Mill 2, Barrow Street, from warehouse to office use.
- Alterations to 1-4 Malt House Apartments, Grand Canal Quay, Dublin 2.

SECTION 5: Conclusion

An Environmental Impact Assessment Report (EIAR) as outlined in the previous chapters will be undertaken as part of the planning process associated with the Grand Canal Storm Water Outfall Extension project. J. B. Barry and Partners will prepare a detailed EIAR describing the potential environmental impacts which may arise as a result of the construction and operational phases of the proposed development.

Furthermore, an Appropriate Assessment Stage 2, Natura Impact Statement will be prepared to accompany the planning application.

This EIA Scoping Report is intended to outline key issues to be addressed in the preparation of the EIAR. Consultation will be undertaken with the public, statutory, and non-statutory organisations to ensure input from all interested parties is received at an early stage in the development process.

The completed EIAR and NIS will be submitted to An Bord Pleanála as part of the formal planning application process.

SECTION 6: References

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